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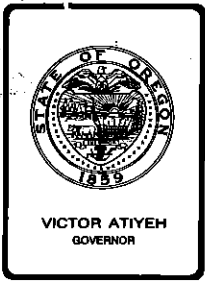
OREGON
ENVIRONMENTAL QUALITY
COMMISSION MEETING
MATERIALS



State of Oregon
Department of
Environmental
Quality

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Environmental Quality Commission

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MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No 0, January 31, 1986, EQC Meeting

Proposed Adoption of Standards for Nuisance
Phytoplankton Growth

BACKGROUND

At the September 27, 1985 meeting, the Environmental Quality Commission (EQC) reviewed an informational report regarding water quality standards for nutrients, (Attachment F) and received testimony on the subject. Excess nutrients are a concern due to the potential occurrence of "nuisance" plant growth that may interfere with the beneficial uses of a water body. Beneficial uses that can be affected include: swimming, boating, fishing, water supply, animal watering and aesthetics. Aquatic growth can be divided into three plant communities: phytoplankton (floating algae); periphyton (attached algae); and macrophyton (rooted aquatic plants). Whether or not these plant communities will exist in a water body or exist in nuisance proportions will depend on a variety of factors including: nutrient availability, sunlight, current velocity, temperature and substrate. Two alternative standards that would enable the Department to better address nuisance aquatic growth were presented (Attachment B).

Alternative 1 addresses nuisance phytoplankton growth. A chlorophyll *a* standard of 0.01 mg/l shall not be exceeded as an average over a three (3) month period. If exceeded, the water body is declared to be in non-attainment. The Department will conduct further study (in accordance with a schedule approved by the Commission) to determine probable causes, beneficial use impacts, control strategy alternatives, or other appropriate actions. Necessary public hearings will be held and a control strategy implemented upon authorization and adoption by the Commission.

Alternative 2 addresses nutrients. Specific concentrations for total phosphate-phosphorus (as a summer average), nitrate-nitrogen and un-ionized ammonia shall not be exceeded. If exceeded, the standard shall become an effluent standard for point source discharges to such waters. Best management practices for non-point sources shall be evaluated and revised as necessary to attain compliance. Where standards are exceeded, increments allocated to new or expanded sources shall not exceed 10 percent of the difference between the ambient level and the standard. Specific standards for individual water bodies may replace the suggested standard.

The Commission directed Department staff to take both alternatives to public hearing to receive further testimony before taking any action. Public notice of the hearings (Attachment F) was published in the Secretary of States' Bulletin on November 1, 1985. Copies of the public notice and the informational report were mailed to the interested public using various water quality program mailing lists. Three public hearings were held: Portland on November 18, 1985; La Grande on November 25, 1985; and Medford on December 3, 1985. The hearing record remained open until 5:00 pm on December 6, 1985. All written testimony, including those letters received after the closing date, were accepted. The Department summarized the hearing record (Attachment C) and evaluated the testimony (Attachment D). Written testimony was sent to the Commission separately and is available to the public upon request.

DEPARTMENT EVALUATION AND CONCLUSIONS

Testimony received (Attachment C) was directed at the possibility that the Commission could adopt either alternative, adopt modifications to the alternatives, adopt both alternatives, adopt a combination of alternatives, or take no action. In addition, the Department invited projections of fiscal and economic impact. As a consequence, the Department received a broad range of testimony. The Department's evaluation of the hearing record (Attachment D) focused on eight issues (in the form of questions). Major concerns focused on the fact that there is no single numeric value for a parameter(s) which would describe when a use would be impaired due to nutrients or nuisance aquatic growth; the course of action required upon exceedence of a numeric standard; and the cost versus benefit of complying with a numeric standard.

The following is a further summary of the staff evaluation and conclusions as they related to the two alternatives contained in Attachment B and to additional suggestions made in the testimony:

EVALUATION OF TESTIMONY ON ALTERNATIVE 1 - NUISANCE AQUATIC GROWTH STANDARD

Out of 45 responses, 12 testifiers supported this alternative or a modification of this alternative, 6 testifiers supported this alternative in combination with alternative 2 and 5 testifiers although they would prefer no action at this time, if action were to be taken they stated that this alternative was better than alternative 2.

Alternative 1 was supported in the testimony for the following reasons:

- o Chlorophyll concentrations are a measurement of algal biomass and would be a better indicator of waters where nuisance phytoplankton conditions may be found.
- o The course of action prescribed (further study) is advantageous given the subjective nature of the numeric limits and the fact that the criteria do not directly relate to use impairment. This course of action consists of a logical series of steps from the assessment of whether a problem exists through to the development and implementation of a control strategy if one is deemed necessary and feasible.

- o The course of action gives better assurance that environmental benefit will result from the recommended control strategy and would avoid inappropriate responses to non-attainment (such as when phosphorus is not the limiting nutrient or when natural contributions are the primary nutrient source). Site specific data will be used to determine if uses are being impacted and would identify limiting nutrients, nutrient sources, and feasible control strategies when needed. Factors such as natural background concentrations can be readily identified and addressed under this alternative.
- o The hearing process prior to adoption and implementation of the control strategy gives an opportunity for factors such as cost to be discussed and allows affected parties a chance to comment.
- o Relative priorities for studies will be established by the Commission giving assurance that staff and financial resources are properly committed.

Alternative 1 was opposed for the following reasons:

- o Chlorophyll concentrations can be highly variable and may be misleading in that they can reflect other algal populations such as periphyton (attached algae) rather than phytoplankton (floating algae). The periphyton concentrations would be a result of conditions upstream and would not necessarily indicate a problem at the point of measurement.
- o The suggested chlorophyll levels are subjectively determined and do not necessarily indicate that a use impairment exists. The levels found may reflect natural conditions.
- o Necessary studies could be quite costly and often are not carried out due to funding, political and technical difficulties.

Several modifications to Alternative 1 were suggested:

- o Different chlorophyll levels should be specified to recognize the differences in the physical characteristics in water bodies, natural differences in productivity in these water bodies and that use impairment would occur at different levels. Analysis of Oregon data and more recent literature should be used in the development of these levels. A procedure for determining "nuisance" conditions is needed.
- o Given that phytoplankton concentrations (thus chlorophyll levels) and growth rates are quite dynamic and variable, methodology should be described to indicate collection, analytical and statistical methods to be used.
- o Minor modifications should be made to the wording to indicate proper action when natural sources are responsible for the growth or when uses are not impaired at that chlorophyll level.

Based on the testimony, if alternative 1 were to be adopted the modifications suggested would enhance the standard.

EVALUATION OF TESTIMONY ON ALTERNATIVE 2 - NUTRIENT STANDARDS

Out of 45 responses, 1 testifier supported this alternative or a modification of this alternative and 6 testifiers supported this alternative in combination with Alternative 1. Five testifiers opposed this alternative in their recommendation that no alternative be adopted or, if an alternative is adopted, it shall be alternative 1.

Alternative 2 was supported in the testimony for the following reasons:

- o Nutrient levels would give the Department a screening mechanism for the potential for nuisance growth.
- o The course of action provides dischargers with a consistent framework for compliance. Nutrient standards would be the basis for establishing total maximum daily nutrient loads for point source discharges. It could force innovative development and use of treatment alternatives and force a greater focus on addressing non-point source problems.

Alternative 2 was opposed for the following reasons:

- o Water quality problems due to algae cannot reliably be predicted based on phosphorus concentrations. There is no universal relationship between nutrient levels and aquatic growth. Recent lake studies indicate that growth potential is better predicted by annual nutrient loadings to a water body and not by nutrient concentrations.
- o The suggested phosphorus levels are subjectively determined and do not necessarily indicate that a use impairment exists. The levels found may reflect natural conditions.
- o The phosphorus levels that would be specified as effluent limits are not routinely achieved by Advance Waste Treatment (AWT) technologies.
- o The specified course of action that automatically requires nutrient removal practices upon exceedence of the criteria could be quite costly (especially for wastewater and storm water treatment and agricultural practices) with the potential of not achieving any environmental benefit. This standard may adversely affect economic development.
- o The relative priority (given limited resources) of achieving nutrient standards as opposed to the protection of health and aquatic life is not adequately addressed.

- o There is limited flexibility to address nutrient sources including natural sources and develop suitable control strategies in this alternative as opposed to Alternative 1. The standard may not be achievable under any circumstances yet nutrient control practices are specified unless a water body specific modification of the standard is made.

Several modifications to Alternative 2 were suggested:

- o Nutrient limits could be combined with chlorophyll limits and a suitable course of action could be suggested.
- o Collection, analytical and statistical methods should be specified.
- o Further work should be done to develop and establish regional nutrient standards.

EVALUATION OF OTHER SUGGESTIONS

Several other suggestions were made that deserve further consideration:

- o Twenty testifiers recommended no action on the adoption of either Standard at this time based on the need not adequately being justified, the fiscal impact not sufficiently being analyzed, and current narrative standards being adequate to address problems. The Department contends that the adoption of Alternative 1, as modified in Attachment A, would provide a more uniform means of identifying potential nuisance conditions and establish a consistent course of action to follow upon identification. The need for implementation of control strategies and the fiscal impact would be developed on a site or basin specific basis from the required study.
- o The nitrate-nitrogen and un-ionized ammonia levels suggested in Alternative 2 relate to water supply and aquatic life uses and should be further developed in a forthcoming issue paper which will focus on the pesticide and other toxic substances sections of the standards.
- o Further staff work is needed to determine if "trending" standards can be developed to provide additional protection to sensitive and scenic waterways. This work will be addressed in the issue paper discussing anti-degradation.
- o Nuisance conditions due to periphyton and macrophyton growth are not addressed under either standard. The Department feels that the narrative standards are adequate at this time and further research is needed prior to the development of numeric standards for these forms of growth.
- o Several testifiers suggested identifying a key area and conducting a pilot study to test the standards prior to adoption.

PROPOSED DEPARTMENT ACTION

1. The Department concludes that alternative 1 should be modified as suggested during the public hearings and proposed to the Commission for adoption. These modifications specify: different numeric standards for different types of water bodies; collection, analytical and statistical methodology; and wording that clarifies the intent of the standard. The modified Alternative 1 is contained in Attachment A. Rationale for the refinement of the chlorophyll levels is presented in Attachment E. Different chlorophyll levels for different water bodies could account for and reduce the influence of periphyton (attached algae) on a phytoplankton (floating algae) indicator. In addition, the specification of collection methodology and use of averaging methods will reduce some of the variability inherent in chlorophyll measurements. The fact that the numeric limits are somewhat subjective reinforces the specified course of action of further study and should not limit the usefulness of the standard for screening purposes. Further refinements to these levels can occur based on the related studies.
2. The Department concludes that Alternative 2 should not be adopted.
3. A standard such as presented in Alternative 2 can be specified for a given waterbody at a future date based on studies carried out under Alternative 1. Similarly, nutrient waste load allocations can be specified based on waterbody specific data and without the adoption of a nutrient standard. The use of nutrient levels as a screening tool is not diminished by not adopting nutrient standards. The major concern with Alternative 2 is that major costs can be incurred with the possibility of achieving little, if no, environmental benefit. Alternative 1 is a more prudent approach that is based on a better measurement of phytoplankton growth and a course of action that gives better assurance of achieving environmental benefit.
4. The Department feels that Alternative 1 should be tested and will do so over the next year in the Tualatin Basin. The following is a brief description of the study which is underway in the Tualatin Basin.

TUALATIN BASIN STUDY

The Department staff have just initiated an intensive review and study of the water quality and pollution sources in the Tualatin Basin. This study is expected to be complete by December 1987. Water quality has been declining in the Tualatin River over the past several years. Although treatment requirements in the basin are quite stringent, population and industrial growth have resulted in substantial increases in waste loadings. Point source discharges along with non-point contributions from urban and agricultural sources, natural background levels and low summer streamflows have all contributed to the declining water quality. In addition, elevated chlorophyll concentrations in the Tualatin River and complaints of nuisance algal growth in Lake Oswego have led to a concern over nutrient concentrations and loadings in the basin.

Major tasks and completion schedules are presented below. Some of the tasks, particularly review and analysis of existing data, can be completed with existing staff. A grant application for federal 205j funds is now being prepared. If approved by EPA, the grant will provide needed resources to develop and implement an intensive data acquisition, analysis and modeling program and, if needed, to develop pollution control strategies.

TUALATIN PROJECT TASKS:

1. Describe specific water quality issues in the Tualatin Basin. Several concerns have been identified to date. This includes a current assessment of water quality in the drainage, an evaluation of beneficial uses, and a review of point/non-point source pollutant patterns and characteristics. Several water quality parameters of concern include dissolved oxygen, ammonia, algae, nutrients, metals, and trace organics. (Initiated 11/85)
2. Develop an initial inventory of existing ambient and source data. Conduct a preliminary identification of additional information required to address the issues. For example, estimates of seasonal loads contributed from significant tributaries are needed to evaluate nutrient and toxics concerns. (Initiated 12/85)
3. Initiate data gathering to fill the preliminary gaps with supplemental information. (Initiate 1/86)
4. Identify desirable enhanced analytical tools to refine existing data assessment capability. This includes installing several water quality models on the Department's Harris computer system. (Initiate 2/86)
5. Evaluate supplemental data and incorporate additional information not included in the preliminary assessment. Modify and/or expand data collection efforts, if required. (Initiate 4/86)
6. Refine initial data review with enhanced analytical tools. Conduct detailed assessment and modeling. (Initiate 6/86)
7. Complete final Tualatin Basin water quality problem assessment. (Complete 9/87)
8. Identify and evaluate planning options and, if needed, prepare pollution control strategies. (Complete 12/87)

SUMMATION

1. The Commission authorized a hearing to receive testimony on two alternatives for nuisance aquatic growth/nutrient standards on September 27, 1985.

2. Notice of public hearings was published in the Secretary of States' Bulletin on November 1, 1985. and mailed to various Departmental mailing lists.
3. Hearings were held in Portland on November 18, 1985; La Grande on November 25, 1985; and Medford on December 3, 1985. The hearing record closed on December 6, 1985 but all testimony received following this date was accepted.
4. Testimony has been summarized and evaluated. Modifications to Alternative 1 (nuisance aquatic phytoplankton standard) were made. Alternative 2 is recommended for elimination from further consideration at this time. Standards for nitrate-nitrogen, un-ionized ammonia and for "trending" (to protect sensitive and scenic waterways) will be further developed in subsequent issue papers.
5. The recommended revision of alternative 1 is contained in Attachment A.

DIRECTOR'S RECOMMENDATION

Based on the summation, it is recommended that the Commission adopt the revisions of Alternative 1 to OAR Chapter 340-41-150 and direct the Department to make the additional considerations noted above in the preparation of issue papers which may propose rule amendments scheduled for Spring 1986.


Fred Hansen

HR0062
WC108

Attachments: A. Proposed Standard Recommended For EQC Adoption
B. Alternative Standards Presented At September 27, 1985 EQC Meeting
C. Summary of Hearing Testimony
D. Analysis of Hearing Testimony
E. Rationale for Chlorophyll a Level and Methodology
F. Public Notice of Hearing and Information Report
-- Water Quality Standards For Nutrients

Andy Schaedel
229-5983
1/22/86

Alternative No. 1

STANDARDS APPLICABLE TO ALL BASINS

Nuisance [Aquatic Growths] Phytoplankton Growth

340-41-150 The following standard and implementation program shall be applied to lakes, reservoirs and streams, [to prevent nuisance growths of phytoplankton:] except for ponds and reservoirs less than 10 acres in surface area, marshes, and saline lakes, to identify water bodies where phytoplankton may create a nuisance condition and may affect the recognized beneficial uses:

- (1) No wastes shall be discharged and no activities shall be conducted which will cause [the level of Chlorophyll_a in the waters of the state to exceed an average of 0.01 mg/l measured over any 3 consecutive month period] average Chlorophyll_a concentrations to exceed the following values:

- (a) Natural lakes which thermally stratify: 0.01 mg/l
- (b) Natural lakes which do not thermally stratify, reservoirs, rivers and estuaries: 0.015 mg/l

Average chlorophyll_a concentrations shall be based on the following collection methodology (or other methods approved by the Department): a minimum of three (3) samples collected over any three consecutive months at a minimum of one representative location (e.g., above the deepest point of a lake or reservoir or at a point mid-flow of a river) from samples integrated from the surface to a depth equal to twice the secchi depth or the bottom (the lesser of the two depths). Analytical methods shall be in accordance with the most recent edition of Standard Methods for the Examination of Water and Wastes or methodology approved by the Department.

- (2) Upon determination by the Department that the standard in Paragraph (1) is exceeded, the Department shall:
 - (a) Declare the appropriate stream reach or water body to be in non-attainment with the standard.
 - (b) In accordance with a schedule approved by the Commission, conduct such studies as are necessary to describe present water quality; determine the impacts on beneficial uses; determine the probable causes of the standard violation and beneficial use impact; and develop a proposed control strategy for attaining compliance where technically and economically feasible. Proposed strategies could include [including] standards for additional pollutant parameters, pollutant discharge load limitations, and such other provisions as may be appropriate.

Where natural conditions are responsible for exceedance of the standard in subsection (1) above, or beneficial uses are not impaired, the standard in subsection (1) may be modified to an appropriate level for that water body.

- (c) Conduct necessary public hearings preliminary to adoption of a control strategy and additional standards after obtaining commission authorization;
- (d) Implement the strategy upon adoption by the Commission.

Andy Schaedel:c
WC102
229-5983
January 17, 1986

Alternative No. 1

STANDARDS APPLICABLE TO ALL BASINS

Nuisance Aquatic Growths

340-41-150 The following standard and implementation program shall be applied to lakes, reservoirs and streams to prevent nuisance growths of phytoplankton:

- (1) No wastes shall be discharged and no activities shall be conducted which will cause the level of Chlorophyll a in the waters of the state to exceed an average of 0.01 mg/l measured over any 3 consecutive month period.
- (2) Upon determination by the Department that the standard in Paragraph (1) is exceeded, the Department shall:
 - (a) Declare the appropriate stream reach or water body to be in non-attainment with the standard.
 - (b) In accordance with a schedule approved by the Commission, conduct such studies as are necessary to describe present water quality; determine the impacts on beneficial uses; determine the probable causes of the standard violation and beneficial use impact; and develop a proposed control strategy for attaining compliance including standards for additional pollutant parameters, pollutant discharge load limitations, and such other provisions as may be appropriate;
 - (c) Conduct necessary public hearings preliminary to adoption of a control strategy and additional standards after obtaining commission authorization;
 - (d) Implement the strategy upon adoption by the Commission.

Alternative No. 2

STANDARDS APPLICABLE TO ALL BASINS

Nutrient Standards

340-41-150(1) No wastes shall be discharged and no activities shall be conducted which will cause the average concentrations measured in any three consecutive months (except as noted) for the following nutrients to be exceeded:

- (a) Total phosphorus in lakes-----0.025 mg/l as P
- (b) Total phosphorus in streams entering lakes-----0.05 mg/l as P
- (c) Total phosphorus in other streams-----0.1 mg/l as P
- (d) Nitrate nitrogen, (N)-----10.0 mg/l as N
- (e) Un-ionized ammonia (individual value)-----0.02 mg/l

- (2) Upon determination that any of the above standards are exceeded, the standards shall be considered to be effluent standards for point source discharges to such waters. Permits for such discharges shall be modified to incorporate the appropriate standards together with a schedule for implementation. In addition, best management practices for non-point sources shall be evaluated and revised as necessary to attain compliance with the standards.
- (3) Where ambient levels of these nutrients are not exceeded, increments allocated to any new or expanded source shall not exceed 10% of the difference between the ambient level and the standard.
- (4) The standards and implementation program set forth in Paragraphs (1), (2), and (3) above shall be considered interim standards until replaced by specific standards for individual stream reaches or water bodies.

Andy Schaedel:c
WC99
229-5983
January 16, 1986

SUMMARY OF HEARING TESTIMONY

On September 27, 1985, the EQC authorized the Department to hold public hearings to receive further testimony on two proposed options which address nuisance aquatic growth and nutrient standards.

Public notice of the hearings was given by publication in the Secretary of State's Bulletin on November 1, 1985 and by mailing using various Department's mailing lists.

Three public hearings were scheduled and held as follows:

City	Date	Time	Location
Portland	November 18, 1985	1:30 p.m.	Commission Room, Dept of Fish & Wildlife 506 SW Mill St
La Grande	November 25, 1985	7 p.m.	Room 309, Hoke Eastern Oregon State College
Medford	December 3, 1985	1:30 p.m.	Jackson County Courthouse 8th and Main

Tom Lucas (Portland) and Krystyna Wolniakowski (La Grande and Medford) served as Hearings Officers and Andy Schaedel was the technical staff member. The format for each hearing was as follows:

1. Introductory remarks and hearing protocol by hearings officer.
2. Brief discussion of the proposed standards by the technical staff member followed by a question and answer session.
3. Receipt of formal testimony (tape recorded).

The record remained open for receipt of written testimony until 5:00 p.m. December 6, 1985.

The summary of testimony is organized as follows:

- A. Index to the testimony
- B. Summary of oral and written testimony

A. Index of Testimony

<u>No.</u>	<u>Organization/Testifier</u>	<u>Oral</u>	<u>Written</u>
1.	Associated Oregon Industries/T Donaca	0-11	
2.	Ashland, City of/A Alsing	0-19	A-39
3	Baker Valley Irrigation Dist/ G Chandler		A-11
4	Beaverton, City of/L Cole		A-22
5	Clackamas County/B Erickson		A-21
5	/D Abrahms	0-13	
5	/G Graham (CH2M-Hill)	0-13	
5	/D Holmes (CH2M-Hill)	0-13	
6	Collier, R		A-8
7	Corvallis, City of/K Brough		A-34
8a	Eugene, City of/C Andersen		A-32
8b	Springfield, City of/M Kelly		A-33
9	Forest Grove, City of/I Burnett		A-14
10	Grants Pass, City of/D Wheaton	0-21	
11	Griffiths, R		A-9
12	Hillsboro, City of/R Gibson		A-19
13	Hughes, B		A-30
14	Jackson Co SWCD/J Parsons	0-14	A-12
15	Klamath Falls, City of/K Carlson (Beak Cons)		A-27
16	Lake Oswego Corp/J Smith	0-10	
16	/G Achterman	0-10	
17	Lake Oswego, City of/P Harvey, P Haines	0-8	A-6
18	Lane County/R Burns		A-7
19	Malheur Co Farm Bureau/B Fujishin		A-10
20	Medford, City of/W. Meyer (Brown & Caldwell)	0-18	
21a	Northwest Env Def Council/C Mackey	0-9	
21b	Sierra Club, OR Chapters/M Holt		A-28
22	OR Dept of Fish & Wildlife/L Fredd		A-20
23	OR Dept of Transportation/J Lilly		A-38
24	OR Environmental Council/J Charles		A-36
25	OR Shores Cons Coal/J Broome		A-15
26	Oregon Trout/B Bakke		A-25
27a	Oregonians for Food & Shelter/D Dietz		A-40
27b	Oregon Wheat/W Grilley		A-41
27c	Oregon Forest Industries Council/R Schack		A-42
28	Portland, City of/G Appel	0-12	
28	/B Gaffi	0-12	
28	/D Parker (Brown & Caldwell)	0-12	A-35
28	/J Lang		A-35
29	Portland General Electric/L Carter	0-6	A-4
30	Rouge Valley COG/E Dittmer	0-16	A-13
31	Salem, City of/S Harris		A-23
32	Scientific Resources, Inc/S Geiger	0-7	A-26
33	Sierra Club, Rogue Group/J Knotts		A-31

34	Sytsma, M	0-15	
35a	Tualatin Valley Irrig Dist/P Torvin	0-1	A-1
35b	/R Coussens	0-2	
36	Tualatin, City of/M McKillip	0-4	A-5
36	/S Rhodes		A-16
37	Unified Sewerage Agency/G Krahmer	0-3	A-29
37	/S LeSieur	0-17, 0-22	
37	/L Skurdahl	0-3	A-24
37	/R Raymond(Cooper Assoc)	0-3	A-2
39	US Environmental Protection Agency/R Burd		A-17
40	US Soil Conservation Service/E Weber	0-20	
41	Washington County/W Myllenbeck		A-18
42	Washington Co SWCD/C Krahmer	0-5	A-3

B. Summary of Testimony

1. ASSOCIATED OREGON INDUSTRIES; Tom Donaca, General Counsel; Oral Testimony (0-11, Portland)

Opposes adoption of both alternatives as presented. Believes that the regulations are premature and the facts are not present to justify the standards suggested. More work on appropriate standards is needed. Recommended that a fiscal impact analysis be conducted on both options to determine costs involved and that federal funding should be pursued.

2. CITY OF ASHLAND; Al Alsing, Director of Public Works; Written (A-39) and Oral Testimony (0-19, Medford)

Opposed to both alternatives presented and recommends that no action be taken at this time. Expressed concern that there are higher priority problems than nutrients in Bear Creek and it would be unwise to commit money to this effort. Recommended that if Lake Oswego has problems with nutrients, that a special study be conducted for them and that state money should not be used to for the study. Bear Creek Valley has an active Water Quality Committee and they have not received complaints or criticisms on the nutrient problems in Bear Creek.

3. BAKER VALLEY IRRIGATION DISTRICT; George Chandler, Chairman; Written Testimony (A11)

Opposed to both alternatives and expressed concern that any regulation would affect irrigation practices and create an economic burden that could devastate an already stressed industry. BVID feels that maintaining and improving the water quality of the Powder River is important and will continue to do what is necessary.

4. CITY OF BEAVERTON; Larry D. Cole, Mayor; Written Testimony (A22)

Submitted a resolution opposing both alternatives. Additional costs would impact citizens of Beaverton through increased service fees to customers of USA (initial estimates of 116-175% increase) and for treatment of storm water drainage. Even if addition sewage and storm water treatment were performed, nuisance aquatic growth would likely occur due to natural source and unregulated non-point sources.

5. CLACKAMAS COUNTY; Bruce W Erickson, Project Manager, Department of Utilities, Written Testimony (A21); Dave Abraham, Director, Dept of Utilities; G. Graham and D. Holmes, CH2M-Hill, Oral Testimony (0-13, Portland)

Oppose both alternatives as not addressing the complexity of the issue and having enormous adverse fiscal and economic impact. Alternative 2 is categorically unacceptable. The intent of Alternative 1 has some merit but the chlorophyll level at 0.01 mg/l is questionable. The wording of Alternative appears to be inappropriate in that it states "No wastes shall be discharged and no activities shall be conducted which will cause..." although the intent appears to be to initiate a study when the standard is violated. Other concerns were:

- o Chlorophyll in rivers may not reflect potential nutrient loading problems but reflect the chlorophyll from attached growth or input from lakes and reservoirs. A variety of factors in addition to nutrients will influence algal growth thus affecting the validity of chlorophyll as an indication of nutrient loading problems. Chlorophyll does not directly relate to the "well being" of aquatic life which standards are designed to protect nor does it relate to oxygen deficits in flowing, well mixed rivers.
- o The chlorophyll standard does not distinguish nuisance algal species. It is unclear who or how a nuisance condition would be defined. Nutrient standards would have little affect on rooted plant growth. High nitrogen and phosphorus levels may not indicate conditions conducive to nuisance aquatic growth when other factors may be limiting.
- o Non-point and natural sources are a major contributor of phosphorus. The phosphorus standard is only meaningful if there are practical ways to control non-point nutrient sources.
- o To adequately track phytoplankton productivity in Oregon's waters would require an increased monitoring effort by DEQ at great expense with little gain.
- o Nutrient removal to the levels suggested in alternative 2 at the Kellogg and Tri-City plants would be of limited benefit to the Willamette River with a great cost. Using existing data, a 1.8% decrease from 0.103 mg/l to 0.99 mg/l in summer average phosphorus values would be observed. Estimated costs would be as follows:

	Capital Cost	O & M Cost	Current Charge	Added Charge	% Increase
Kellogg	\$20,000,000	\$68,000/mo	\$7	\$9	130
Tri-City	\$17,000,000	\$56,000/mo	\$7	\$12	170

6. Dr. Robert Collier; Asst Prof College of Oceanography Oregon State University; Written Testimony (A8)

Supports Alternative 1 based on our inability to relate nutrient concentrations to algal growth responses. This alternative provides flexibility for specific studies to prevent inappropriate or ineffective responses to non-attainment. Noted that many high Cascades lakes are N-limited rather than P-limited and that N levels in Alternative 2 would result in significant algal growth. Other comments were:

- o General language in standards that cover nuisance conditions should be preserved since periphyton growth can be significant and is not covered by proposed alternatives.
- o Strongly supports 3-month average instead of an annual mean based on the dramatically seasonal hydrologic cycle.

7. CITY OF CORVALLIS; Kerry J Brough, Operation Services Manager; Written Testimony (A34)

Favor Alternative 1 as a more practical and fair means of addressing excessive algal growth. Comments include:

- o Capital and operating costs for tertiary treatment plants would be a staggering burden to municipalities at a time when cities are struggling to fund essential services. Preliminary cost estimates for phosphorus removal for Corvallis are: \$1.5 million for construction and \$300,000/year for operation. The increased operating costs represent a 40% of the current operating costs. It would be unfair to automatically impose these costs when there is no universal relationship between nutrient levels and algal growth.
- o Before solving a problem, it must be investigated to determine the cause and source of the problem so that the sources can be regulated in order to solve the problem. Alternative 1 contains the elements necessary for dealing with non-attainment of a standard. If the chlorophyll standard were exceeded but the quality of the receiving water were not degraded, unnecessary expense could be avoided.

8a. CITY OF EUGENE; Christine F. Andersen, Director of Public Works; Written Testimony (A32)

8b. CITY OF SPRINGFIELD; Michael A. Kelly, Director, OCED; Written Testimony (A33)

Opposes the second alternative but supports the first alternative provided that control strategies address non-point sources and cost/benefit on a case by case basis. Specific concerns include:

- o The economic impact of financing nutrient removal from point source discharges creating a tremendous public burden. If imposed without suitable study, benefits may be negligible and costs are high.
- o Non-point sources such as from agriculture; rivers in California with nutrient control on all point sources still suffer problems due to agricultural runoff.

9. CITY OF FOREST GROVE; I.M. Burnett, City Recorder; Written Testimony (A14)

Submitted a Resolution (No 85-55) opposing both alternatives as being expensive and ineffective in improving water quality. Specific concerns were:

- o The City would realize increased costs due to sewage treatment performed by USA and treatment of storm drainage to remove nutrients. Nuisance aquatic growth may still occur due to availability of nutrients from natural sources and unregulated non-point sources.

10. CITY OF GRANTS PASS; David Wheaton, Utilities Superintendent; Oral Testimony (0-21, Medford).

Expressed concern on the costs of redesigning the Grants Pass wastewater facilities to meet the proposed standards, since all the money spent on the current facility designs would be wasted if target phosphorus levels were changed.

11. Dr Robert Griffiths, Assistant Professor, Dept of Microbiology, Oregon State University; Written Testimony (A9)

Supports alternative 1 since alternative 2 would be too restrictive and potentially too costly. Expressed the following concerns:

- o Alternative 2 is impractical since there is no universal relationship between nutrient levels and aquatic growth and the problem being addressed is defined using subjective criteria.
- o Alternative 2 will lock DEQ into extensive and costly monitoring that will have limited use in addressing statewide water quality problems. Given limited resources, toxic wastes in aquatic systems need to be addressed before a large allocation of resources is devoted to nutrients.

12. CITY OF HILLSBORO; Roy F. Gibson, City Engineer; Written Testimony (A19)

Opposes both alternatives since adoption of standards may not result in solving nuisance aquatic growths. Natural runoff could maintain nuisance conditions. The sanitary sewer user would be significantly impacted by high costs due to additional treatment requirements necessary to gain compliance with the standards. The problem and solutions should be investigated more thoroughly prior to adoption of standards.

13. Dr Robert M Hughes; Written Testimony (A30)

Agrees with need for nutrient/chlorophyll standards but suggests using a regionalization (ecoregion) approach in which the background levels for these parameters could become the regional standard. Existing data and selected additional monitoring that would build upon the cooperative regionalization project currently initiated between USEPA and DEQ could be used to develop the background standard. Specific comments and concerns about the proposed standards were:

- o It is impossible and undesirable to have all waters free of nutrients. All waters contain some form of algae with densities varying due to natural and human related causes. The eutrophication of water is a natural process.
- o Case by case studies are laudable, but in reality, very few are carried out due to lack of funding, political pressures, and difficulty in conducting the studies due to a variety of factors. The emphasis on local conditions tends to ignore regional patterns and may create more management problems than are resolved.
- o There is too little discussion of non-point sources of pollution in both the USEPA "Redbook" and Oregon's current and proposed standards. These are major contributors of nutrients. Perhaps nutrient/chlorophyll standards would serve as a foundation for a more proactive program to control non-point sources.
- o The standards do not address periphyton or macrophyton which may be a greater problem in many parts of the state.
- o Chlorophyll a concentrations are affected by turbidity and residence time. Without controls on these variables, some local entity could add clay to their effluent or buy water rights to increase dilution.
- o Current criteria for un-ionized ammonia should be incorporated.
- o Allowing a 10% increment for new or expanded sources violates USEPA antidegradation policy (Fed Reg 1983. 48 (217):51402-51403).

- o Some consideration should be given for nutrient loadings (vs concentrations) to lakes. Nutrient concentrations may be quite low during most of the year but increase several orders of magnitude during high runoff.

14. JACKSON SOIL AND WATER CONSERVATION DISTRICT; Judson Parsons, Director
Oral(0-14, Medford) and Written Testimony (A12)

Recommended that NO action be taken at this time because nutrients in Bear Creek were not the primary problem and did not warrant expenditure of public dollars at this time. Lack of water during the summer low flows and the presence of coliform bacteria were the most important priorities. Explained that water in Bear Creek during the summer was all irrigation return flows and until additional good quality water was available from Lost Creek, nutrient standards on the present flow would serve no beneficial purpose since irrigation flow was better than no flow. The District is committed to improving and maintaining good water quality and is active in irrigation runoff control, and will support alternative #1, chlorophyll standards, only after supplemental water is available for Bear Creek.

15. CITY OF KLAMATH FALLS; Ken L. Carlson, Water Quality Specialist, Beak Consultants Inc; Written Testimony (A27)

Opposed to both alternatives based on numerous technical/scientific concerns over the soundness, applicability and enforceability of the alternatives as proposed. Major concerns were:

- o The relationship of chlorophyll a concentration to concurrent and discrete nutrient concentration is not well defined. Factors such as light, phosphorus, nitrogen, micronutrients and invertebrate grazing influence biomass making it a highly dynamic system. This causes a highly variable system (spatially and temporally) requiring an intensive sampling program.
- o Chlorophyll a in streams is concentrated in periphyton which the standards do not address. In slow moving rivers, light would generally be limiting to algal growth. Research has been unable to establish what a nuisance level of periphyton growth would be or a clear correlation with nutrient concentrations and periphyton biomass. A variety of factors influence its growth
- o Complexity of stream environments requires that DEQ specifies how, when and where samples are to be collected.

- o There are many problems with a single numeric phosphorus standard as proposed in alternative 2. Trophic states of lakes are best predicted by areal loading of phosphorus using the morphology and hydrology data from the lake.

16. LAKE OSWEGO CORPORATION; Gail Achterman, Attorney and Jack Smith, Consultant; Oral Testimony (0-10, Portland)

Supports the adoption of alternatives #1 and #2 together. Each adopted separately would be inadequate. The following rationale was used to support the options presented:

- o Alternative #1 establishes a criterion to measure algal growth in waterbodies and waterways, and if levels exceeded, then special studies would be initiated.
- o Alternative #2 provides numerical standards to be used immediately for point source and non-point source compliance determination. However, this option does not consider other environmental factors in waterbodies that would be addressed in #1 using a chlorophyll a standard.
- o Immediate problems exist with high nutrient loadings and algal growth in Lake Oswego. A correlation definitely exists between the nutrient loadings in the Tualatin River and nuisance aquatic growths.
- o As a matter of law, DEQ is required to adopt standards necessary to restore and maintain the chemical, physical, and biological integrity of Oregon's waters. Statutory obligation would be fulfilled with adoption of the nutrient standards, and would provide a target to aim for.
- o Many states have already adopted nutrient standards that follow the EPA Red Book criteria (15 states and 4 provinces). The Red Book criteria are based on eutrophication studies conducted in many states for flowing waters, impounded waters, and streams flowing into impounded waters. These criteria would be useful and applicable to Oregon waters as well, unless some unique circumstances exist in the state.
- o Emphasized that adoption of standards would not place the entire burden of compliance on the wastewater treatment plants, but implementation and enforcement will cost some money. Clean water is the policy of the state and the country through the Cleanwater Act, and all beneficial uses must be protected.

17. CITY OF LAKE OSWEGO; Peter Harvey, City Manager; Written Testimony (A6); P. Hains, Oral Testimony (0-8, Portland)

Opposes both standards as being expensive and ineffective in improving water quality. Feels EQC should direct resources where most needed to protect for health and safety. Standards do not properly identify or correct problem. Blanket nutrient standards would cripple citizens of Oregon and would have no significant effect in most cases.

18. LANE COUNTY; Roy Burns, Manager of Land Management Division; Written Testimony (A7)

Suggests combining both chlorophyll a and nutrient levels as a trigger for some appropriate remedial action and a significant increasing trend in these levels as a trigger for a protective response. Wording should be added to provide for specific standards to be adopted in special cases. Particular concerns were:

- o The adoption of one of the alternatives would limit DEQ's ability to address the risk to a water body from nutrients and algal growth.
- o A chlorophyll standard would cause a response only after algal changes occur whereas changes might be better anticipated if nutrients are monitored.
- o By addressing an increasing trend, a response could be made before the problem occurs which is preferable to fixing a problem that has occurred.
- o A statement should be added to provide for specific standards that would better address waters that are naturally high in nutrients and algal growth, and to protect pristine waters with low levels of nutrients and algal growth such as a pristine water supply.

19. MALHEUR COUNTY FARM BUREAU; Barry Futishin; Written Testimony (A10)

Recommends no action at this time. Narrative criteria currently in use with the support of relevant sampling and statistic tests when a problem is clearly present is working reasonably well. The 'state of the art' criteria for setting standards does not seem well enough refined to properly address the range of local situations in the state. Specific concerns were:

- o There is not a clear relationship established between the proposed statistical parameters and environmental benefit.

- o There is no discussion of the administrative costs of the proposals as well as the economic costs to industry of implementing the alternatives. Similiar parameters in the State of California caused in the temporary closure of an irrigation district resulting a considerable economic loss.
- o There is insufficient discussion of the degree to which natural circumstances may contribute to non-compliance or make compliance impossible.
- o There is no discussion of how non-point sources might be determined or controlled in alternative 2.
- o The statement that 58 sites of over 100 analyzed would be in non-compliance indicates that either the standards are suspect of the problem is so widespread that enforcement would be expensive and probably impossible.
- o Many of the waterways in the Ontario area would not meet the standards due to the impact of irrigation return waters. However, the irrigation practices in operation for approximately 50 years have resulted in providing habitat for fish and wildlife species that would not have been suited for the area prior to irrigation. In most cases, the current situation is considered the norm and standard.

20. CITY OF MEDFORD Walt Meyer, Brown and Caldwell Engineers; Oral Testimony (0-18, Medford)

Supported adoption of alternative #1 Chlorophyll because it utilized a scientific method of problem definition, development and assessment of alternatives, with adoption of a solution that best fits the problem. Recommended separate standards for lakes and rivers, and a basin-wide approach to assessing receiving water problems. Chlorophyll values should be less stringent in streams than lakes, and should be tailored to a specific body of water.

Opposed adoption of alternative 2 (P values) because of large monetary expenditures for very little environmental benefit. Treatment technology is not available to remove the phosphorus to the proposed values. Standard may not be obtainable because of naturally high background levels. Also emphasized that nutrient concentrations do not always produce nuisance aquatic growth. Estimated that an additional \$500,000 per year would be necessary to achieve standard levels which would come from increasing user fees. Communities cannot afford these rate increases.

- 21a. NORTHWEST ENVIRONMENTAL DEFENSE CENTER; Cyndy Mackey Oral (0-09, Portland) and M. Holt Written Testimony (A28)

Supports adoption of both alternatives #1 and #2 together. Alternative #2 provides a numerical evaluation criteria that is enforceable and provides dischargers with a framework for compliance. Both non-point and point sources are addressed with this option and should be adopted immediately. If nutrient standards are violated, then use of alternative #1 would provide a mechanism to initiate site specific studies. In addition, an amendment to the current temperature standard was suggested.

- 21b. SIERRA CLUB, NEDC; Mary Gray Holt, attorney, Jolles, Sokol, and Berstein; Written Testimony (A28)

Support adoption of nutrient standards and emphasize that the standards should apply to all lakes, reservoirs, estuaries and streams of Oregon. Also urged adoption of an amendment to the temperature standards.

22. OREGON DEPARTMENT OF FISH AND WILDLIFE; Louis C. Fredd, Water Resource Coordinator, Env. Management Section; Written Testimony (A20)

Expressed concern about the potential fiscal impact to the State of Oregon to upgrade fish hatchery treatment facilities to meet the nutrient standards. The State has spent over \$5,000,000 to meet the suspended solids limitations under the current general water discharge permits at 34 hatcheries statewide. Using the DEQ preliminary analysis indicating that 37 stream segments which would exceed the nutrient standards, 13 hatcheries are located upstream and 3 hatcheries are located downstream of these segments. Additional state and federal funding may be required to upgrade these facilities depending upon which alternative is chosen.

23. OREGON DEPT OF TRANSPORTATION, PARKS AND RECREATION DIVISION; John E. Lilly, Assistant Administrator; Written Testimony (A38)

Finds Alternative #1 more desirable, likely to be economical and provide reasonable assurance that controls will achieve the environmental benefit. Expressed the following concerns:

- o None of the options address rooted aquatic plant growth
- o Proposal should not weaken current water quality standards affecting hydroelectric facility siting.

- o Would like to see river segments and lakes designated as scenic waterways receive special consideration for maintaining water quality by applying more stringent anti-degradation standards.

24. OREGON ENVIRONMENTAL COUNCIL; John A Charles, Executive Director; Written Testimony (A36)

Supports adoption of both alternatives. Alternative #1 is a mechanism for correcting problems after they arise and alternative #2 provides a preventive approach. Together they would give DEQ the management tools necessary to control nutrient loadings and would be a basis for setting Total Maximum Daily Loadings (TMDL) and NPDES permit levels. The adoption and implementation of standards will cost money but may have the hidden benefit of causing innovative thinking by dischargers to develop alternative and more cost-effective ways of managing wastes. The standards will fit into the Department's efforts to reassess the entire non-point source program and should eventually take some regulatory burden off point sources through stricter controls of non-point sources.

25. OREGON SHORES CONSERVATION COALITION; John W Broome, Director; Written Testimony (A15)

Support both alternatives with alternative 1 providing for more intensive study and corrective strategy development necessary should implementation of standards in alternative 2 be insufficient to prevent water quality problems. Specific comments included:

- o Alternative 1 will provide a useful screening parameter to identify waters experiencing nuisance aquatic growth. However, it is flawed in that the strategy is corrective rather than preventive as action is triggered after problems have occurred.
- o Alternative 2 provides the basis for a preventive strategy. The standards allow the establishment of site specific maximum allowable loadings for nutrients which would be the basis of such activities as NPDES permits, non-point source programs, etc.
- o Site specific nutrient standards could be further refined for thermally stratified lakes and reservoirs by using the Vollenweider-Rast and Lee phosphorus loading model and data in the "Atlas of Oregon Lakes."
- o Oregon Shores agrees that the fiscal and economic impact of nutrient standards could be large and far-reaching but this impact may not necessarily be negative. Cost-effective and environmentally appropriate land treatment systems could be used rather than expensive and energy intensive tertiary treatment plants. Greater efforts would be made to control non-point sources of pollution rather than the present policy of placing the burden on regulated point sources. In short, nutrient standards will translate to a need for DEQ to develop and implement effective water quality management and planning programs which do not presently exist.

26. OREGON TROUT; B. M. Bakke, Executive Director; Written Testimony (A25)

Supports both alternatives due to concern that nutrient loads cause degradation in quality that directly affects valuable salmonid resources and their survival. In addition, algal growth affects fishing by fouling gear and degrading the angling experience. Requests the Department to develop and implement a program to manage nutrient loading from point and non-point sources.

27a. OREGONIANS FOR FOOD AND SHELTER; David H. Dietz, Program Director; Written Testimony (A40)

27b. OREGON WHEAT; Wesley Grilley, Executive Vice President; Written Testimony (A41)

27c. OREGON FOREST INDUSTRIES COUNCIL; Rick Schack, Forest Resources Director; Written Testimony (A42)

Opposes alternative 2 and gives qualified support to Alternative 1 but suggests that adoption of this alternative be postponed until facts justify the need for the standard. The qualified support depends on the type of site specific review process favoring one that concentrates on a benefit versus control strategy analysis. Specific concerns include:

- o Establishing strict loading limits (alternative 2) is inappropriate at this time due to lack of site specific data and basic scientific knowledge. Strict limits that affect non-point source pollutants would chill the ability of agriculture, timber and business to develop and/or progress.
- o Available data suggests that nutrient loading is not a significant factor affecting Oregon's water quality. Many members of the agricultural, timber and business community view the rush to regulate as another indication that Oregon is not open to business.

28. CITY OF PORTLAND; John Lang, Administrator, Bureau of Environmental Services & Dr. Denny S. Parker, Brown and Caldwell, Consulting Engineers; Oral (0-12, Portland) and Written Testimony (A35)

Oppose both alternatives as being inappropriate, costly and ineffective in many river situations. Suggest further refinement of alternative 1 and to reject alternative 2. Specific concerns include:

- o Alternative 1 needs a range of chlorophyll for different water bodies and a procedure for establishing nuisance conditions. Examples of different "nuisance" levels determined by user responses and approaches for establishing specific target values were cited. Otherwise, alternative 1 consists of a logical series of steps to assess whether a problem exists and to develop a control strategy.

- o Alternative 2 does not involve standard scientific methods to define and solve problems or base regulatory action on real problems. Elevated phosphorus levels do not mean that aquatic growths are a problem nor do values below the standard ensure the absence of nuisance growth. "Redbook" phosphorus values represent a set of average conditions but consideration of specific situations is required.
 - o Uniform application of a single criteria will lead to unnecessary expenditures for Advance Waste Treatment (AWT). The phosphorus concentrations suggested are not routinely achieved by AWT on a long term basis. There are at least 4 systems that average in the range of 0.1-0.3 mg/l using two stage phosphorus removal. Each produces large amounts of sludge which may also be difficult to compost. In many cases, AWT operations have been mothballed after considerable expense because they had no measureable environmental benefit.
 - o Estimated costs for the City of Portland to implement phosphorus removal would minimally be expected to increase by \$10,200,000 per year for amortization of capital and operations and maintenance. Costs to city customers (single family dwelling unit) would minimally rise 50% from \$6.90/mo to \$10.25/mo.
 - o More recent un-ionized ammonia criteria (such as suggested by Szumski) should be investigated.
29. PORTLAND GENERAL ELECTRIC COMPANY; Dr Lolita Carter; Oral (0-6,Portland) and Written Testimony (A4)
- Opposes both alternatives at this time due to too many unanswered questions about how the standards are to be applied, the economic and environmental costs, and the validity of the numerical concentrations proposed. Specific concerns included:
- o Whether a single chlorophyll a concentration is appropriate for Oregon - Eastern Oregon rivers and lakes are often more productive based on climate and other environmental factors. Noted that the Columbia River has exceeded the standard since 1974 when PGE began collecting samples.
 - o Hydropower, recreation, fisheries, irrigation, flood control, municipal and industrial water uses could be negatively impacted by a nutrient standard. Specifically, physical changes brought about by damming can induce algal growth without further nutrient addition due to increased solar insolation and temperatures. The chlorophyll level of 0.01 mg/l is too conservative for impoundments. Controlling algal productivity is difficult and in many cases is not needed or desired.

- o The low nutrient standards may reduce productivity and ultimately limit food for anadromous and resident fish.
- o PGE is concerned about increased usage of chemicals to control biological productivity in order to meet the standard. These chemicals may affect other aquatic life in addition to algae.
- o Expressed fiscal concerns ranging from the costs for sampling, conducting further studies, and fines for non-compliance which would affect PGE and its customers.
- o Concerned about the scientific basis for the standards. Sampling, lab analysis, and quality assurance methodology not specified. The nitrate nitrogen standard is over 30 times that needed to support an algal bloom. Extensive scientific work on nutrient availability has been conducted over the last 10 years but none of these studies were cited by DEQ. The phosphate-phosphorus standard is inappropriate due to nutrient recycling, natural sources and non-point sources.

30. ROGUE VALLEY COUNCIL OF GOVERNMENTS Eric Dittmer, Water Quality Coordinator; Oral (O-16, Medford) and Written Testimony (A13)

Recommended against adopting any standards at the present time. Expressed concerns about the following issues:

- o Sediment and bacteria problems in Bear Creek are the highest priority, and setting nutrient standards is premature at this time.
- o Most of the nutrient sources originate from non-point sources such as agricultural practices and subsurface septic systems. Impractical to determine the source and extent of nutrient enrichment much less to attempt regulation. Identified that even background levels of nutrients can cause blooms of algae, and that the concentration of nutrients and nuisance growth are not always easily predicted.
- o Since funding is insufficient to address current health hazards, expressed concern about where the resources would come from for a statewide nutrient control program. Suggested identifying a key study area to conduct a pilot test to apply nutrient standards and evaluate the results.
- o If a standard must be adopted, then alternative #1 Chlorophyll should be selected to provide more opportunity for research in a local area.

31. CITY OF SALEM; Sue Harris, Mayor; Written Testimony (A23)

Opposes both alternatives expressing economic concerns that the cost for further wastewater treatment would affect the ability of the food processing industry (Salem's largest industry) to compete in the national and international marketplace. Additional water quality standards could create a severe economic impact. While the City of Salem supports the concept of excellent water quality in the Willamette River and has benefited from the clean up, technical information suggests control of nutrients in the Willamette River offers the potential of few water quality benefits and the possibility of extremely high costs. U.S. Geological Survey (early 1970's study) concluded that no algae problem existed in the Willamette River and, if a problem developed, it could not be controlled by regulating municipal treatment plants. The costs far outweigh the benefits for nutrient standards.

32. SCIENTIFIC RESOURCES INC. N. Stan Geiger, President; Oral (0-7, Portland) and Written Testimony (A26)

Opposes the adoption of both alternatives 1 and 2, and recommends that no action be taken at this time. Believes that the standards are premature, not based on the most recently available scientific information for Northwest waterbodies or most recent EPA eutrophication information. Expressed concerns that if chlorophyll is based on a three month summer average, how would these values be measured, where and how often should sampling occur since variability exists in sampling locations, frequency and types of instruments used for conducting the analyses.

Suggested that DEQ eliminate setting any more standards until more scientific investigations are conducted on nutrient loading rates, limiting nutrients, and specific sampling is conducted in special study areas to screen for problems in waterbodies.

33. SIERRA CLUB, ROGUE GROUP; Joe Knotts, Chair; Written Testimony (A31)

Supports concept of nutrient standards on a site specific basis (eg Lake Oswego) but questions the need for statewide standards at this time. Strongly urges the adoption in a more prudent and timely fashion. Specific concerns include:

- o Rivers are different from lakes. Different criteria and priorities need to be set for each.
- o Other problems such as addressing bacteria and sedimentation are of a higher priority.

- o How will the nutrient data base be established and how will non-point sources be addressed?

34. MARK SYTSMA Aquatic Biologist, Oral Testimony (0-15, Medford)

Opposed alternative #1 Chlorophyll standard and recommended adoption of alternative #2 numerical P standards for flowing waters, and areal loading rates for lakes, for the following reasons:

- o Chlorophyll values vary in lakes, rivers and streams by location and time of year and do not necessarily reflect the level of nutrients present in the water. Too difficult to enforce as a standard.
- o Numerical P standards would be easier to apply in flowing waters.
- o Separate standards should be created for lakes and rivers.
- o Areal loading rates of P should be calculated for lakes using hydrologic and morphometric information. Samples should be collected before stratification occurs in the spring months, and the state should designate exactly how, when and where the samples be collected and analyzed.

35a. TUALATIN VALLEY IRRIGATION DISTRICT Remi Coussens, Chairman; Oral Testimony (0-2, Portland)

Expressed general concerns about water quality standards and emphasized that the agricultural community needed to be consulted before any standards or regulations were developed.

35b. TUALATIN VALLEY IRRIGATION DISTRICT; Palmer Torvin; Oral (0-1, Portland) & Written Testimony (A1)

Expressed general concern about standards and how they could affect the 370 farms which are provided water from the TVID in the Tualatin Basin. Costs and benefits of the Tualatin Project 1 (Hagg Lake), nuisance conditions in the Tualatin River prior to the project, lack of observable irrigation return flow and current debris problems in upper portions of the river were identified as problems.

36. CITY OF TUALATIN; Michael McKillip, City Engineer; Oral (0-4, Portland) & Written Testimony (A-5, A-16)

Expressed concern about the potential fiscal impact of nutrient standards and suggested that no action be taken. Specific concerns were:

- o No scientific evidence is presented that would indicate a need for nutrient standards.
- o Fiscal impact of the standards is unknown. Sewage treatment costs can be calculated but costs due to the loss of future development and opportunities due to uncertainty of treatment costs and availability cannot be evaluated. Fiscal impact of treating storm drainage would be unimaginable.
- o No action should be taken until scientific evidence is documented and presented that indicates the removal of nutrients from the Tualatin River would solve the algae problem in Lake Oswego. This would remove any potential cloud over development in the City of Tualatin and Washington Co and not spend limited public funds to possibly improve aesthetic conditions of Lake Oswego.

37a. UNIFIED SEWERAGE AGENCY Gary F. Krahmer, General Manager; Oral (0-3, Portland) and Written Testimony (A-29) and Loretta S. Skurdahl, Assistant County Counsel; Oral (0-3, Portland) and Written Testimony (A-24)

Opposes the adoption of both alternatives #1 and #2. Believes that the proposed standards are premature, inappropriate, ineffective, and would result in unacceptably high costs for both USA and its customers. The following rationale was provided to support their opposition to the standards:

- o USA is a County Service District that provides sanitary sewerage services to Washington County, western Multnomah County and Clackamas County in the Tualatin River watershed, and discharges treated effluent to the Tualatin River. It has a commitment to good water quality, extensively monitors its effluent for nutrient levels and has experience with techniques and costs of nutrient removal.
- o Believe that standards are PREMATURE because sufficient data do not exist to develop valid standards. From extensive analysis of the most recent studies conducted, it is not clear that that a particular phosphorus concentration results in a predictable chlorophyll concentration, nor that a given phosphorus reduction will lead to a known decrease in algal standing crop. The predictive models proposed are not precise enough and current knowledge in eutrophication processes is not sufficient to allow development of a single standard for all water bodies.

- o Standards proposed are also INAPPROPRIATE because they are directed at a poorly defined problem, they do not regulate the factors responsible for the problem, and they place the greatest burden of compliance on the source least responsible for the problem. Municipal source discharges only affect 6.7% of the nations waters, whereas nutrients from non-point sources affect over 40% of the nations waters, and are the most difficult to regulate with standards. A 3-month average chlorophyll standard does not accurately define nuisance algal conditions since blooms occur intermittently. Nuisance algae blooms are more of an aesthetics problem and may interfere with recreational use occasionally, but "nuisance" conditions are subjective judgements and are not considered or stated as a high priority among all competing water quality goals and public funding goals. In addition, according to all the Oregon lakes literature, nuisance aquatic macrophyte growth is more of a problem than nuisance algae, but cannot be measured or controlled using the chlorophyll standard.
- o Standards proposed would be INEFFECTIVE in preserving and protecting the waters of the state because meeting the standards would not guarantee improved water quality conditions through reduced algal growth. Regulating municipal and other point source discharges would not significantly reduce nutrient sources compared to the effects of non-point sources. Although USA does contribute nutrients to the Tualatin which flows into Lake Oswego, the discharge does not lead to severe degradation in water quality and is not the sole source of algae problems. According to monitoring information available, if USA effluent was removed from the Tualatin River, enough nutrient input exists from non-point sources to maintain the lake in a eutrophic state. The phosphorus levels from monitoring data show that other sources of phosphorus exist other than effluent. Lake Oswego is part of a watershed that contributes significant nutrients from surface runoff and groundwater flows.
- o Standards proposed would result in UNACCEPTABLE COSTS. The alternatives available to reduce the phosphorus levels in the effluent to proposed levels would require 1) upgrade of treatment capability; 2) removal of effluent during low flows through increased holding capacity; 3) discharge to Willamette or Columbia; 4) increase dilution flow through construction of dams or pumping of Columbia or Willamette water. A detailed cost analysis of alternatives showed each one to cost between 75 to 200 million dollars which would significantly increase rate payer costs. None of the options are desirable, some infeasible, and all too expensive, without assured improvement of Tualatin River water quality. By statutory requirement (ORS 468.735(1)(h)), EQC must consider costs to local governments and public

when adopting water quality standards. Further, ORS 468.715(2)(b) directs DEQ to require use of all "available and reasonable methods" to achieve standards set by EQC. Alternative #2 may violate the statute when the nutrient concentration of the water body exceeds standards dictating that the effluent standards be set for the same in the discharge permit. This process does not allow for an evaluation of treatment technology and its cost so the permittee can achieve the permit limitations using "available and reasonable methods".

Alternative #1 provides for specific studies and may allow for fairer allocation of costs among the nutrient source contributors but may in the long run be as costly to implement. And finally, the proposed options would make planning for new treatment facilities more difficult because of the uncertainty in costs associated with achieving the proposed standard levels in specific water bodies. At this time, there is insufficient data to indicate that the massive expenditure of public funds to add further treatment to sewage effluent would produce compliance with the proposed chlorophyll and phosphorus standards in the Tualatin.

- o IN SUMMARY, statutory authority already exists to permit regulation of individual water bodies or polluters where problems exist. USA recommends that specific problem areas be treated on an individual basis which can be accomplished under the present regulations. If a specific standard is necessary, than a similar standard approach as in Alternative #1 should be adopted where local citizens or resource users can trigger a site specific investigation to develop appropriate control and restoration measures. DEQ could develop a list of priority waterbodies using a rating scheme that would be responsive to a variety of problems and would avoid commitment of limited resources to meet arbitrary standards where no real problem or benefit exists. For a complex system like Lake Oswego, USA suggests that DEQ and Lake Oswego Corporation cooperate in a thorough monitoring study to assess the magnitude of the problem, and identify all the nutrient sources and environmental factors that may contribute to the algae blooms in Lake Oswego.

37b. UNIFIED SEWERAGE AGENCY OF WASHINGTON COUNTY Stanton Le Sieur, Assistant General Manager; Oral Testimony (O-17, Medford; O-22, La Grande)

Opposed the options presented and recommended no action be taken at this time. Expressed concern that the proposed standards would affect many people in the irrigation districts, stormwater management, agricultural and wastewater dischargers. Other health related problems were of higher priority such as bypasses, infiltration and inflow problems, and failing septic systems. Currently 70 to 80% of the phosphorus is removed from wastewater, but to remove any more to meet the standards would double the operating costs.

39. ENVIRONMENTAL PROTECTION AGENCY; Robert S Burd, Director, Water Division; Written Testimony (A17)

Strongly supports standards with alternative #1 offering two major advantages over alternative #2 but also having two potential problems. Comments included:

- o Advantages of Alternative 1 are: (1) Chlorophyll a provide a direct measure of algal biomass whereas nutrient concentrations do not; and (2) there is a poor correlation between specific nutrient levels and eutrophication indicating that other factors than nutrients are important.
- o Problems with the proposed Chlorophyll standard are: (1) it is unclear where in the water column measurements would be made, the standard should specify the collection point; and (2) the standard does not address macrophytes or periphyton. Consideration of these types of nuisance growth should be given before adoption of a chlorophyll a standard.
- o EPA noted that North Carolina has been pleased with the utility of a Chlorophyll a Standard that it had adopted in 1979. Hawaii has chlorophyll a standard for estuarine and ocean waters and California has a chlorophyll a standard for estuarine waters of San Francisco Bay.
- o Recommended the adoption of new criteria (July 29, 1985) for un-ionized ammonia regardless of which nutrient standard is adopted.

40. US SOIL CONSERVATION SERVICE Ed Weber, District Conservationist; Oral Testimony (0-20, Medford)

Did not oppose or support the options presented, but offered information. Cautioned that the state should not adopt standards that would be restrictive to agriculture. The current agricultural practices are the best possible by todays technology, follow BMP's, and are revised as necessary to achieve compliance. If nutrient standards are adopted, some problems may be solved, but others created in the process.

41. WASHINGTON COUNTY; Wes Myllenbeck, Chairman, Board of Commissioners; Written Testimony (A11)

Opposes both alternatives but supports the proposal for additional research and study to specifically identify the problem and impacts that might result from the imposition of nutrient standards. Expressed the following concerns:

- o The cost to achieve the nutrient levels specified in alternative 2 would be so great that new business and industry may find it economically unfeasible to locate in Washington County. The cost may be so prohibitive that a sewer connection moratorium may result.
- o Nutrient standards may require impoundment of storm drainage that could represent a significant cost burden to the County.
- o Suggests that the Tualatin River water quality should not be allowed to decrease but be maintained at a level that will support fish and wildlife. The increase in fish and wildlife populations over the last decade suggest that additional water quality standards are not necessary at this time.

42. WASHINGTON CO SOIL AND WATER CONSERVATION DISTRICT; Cal Krahmer, Water Resource Committee Chairman; Oral (0-5, Portland) & Written Testimony (A3)

Cited ORS 568.225 as giving Wash Co SWCD responsibility to be involved in the discussion of nutrient standards. Expressed strong concern about the lack of funding to implement non-point source programs and that EQC must give an economic consideration to the impacts of adopting nutrient standards. In particular, the ability of various agencies to furnish technical assistance and provide funding to implement an effective non-point source program must be considered. Observed that the Tualatin River has improved in water quality which now better supports irrigation, fishery, wildlife and recreation uses since the addition of an upstream impoundment.

HR0059
WC65
1/16/86

ANALYSIS OF HEARING TESTIMONY

Background for Analysis of Testimony

The Environmental Quality Commission (EQC) reviewed an "Informational Report - Water Quality Standards for Nutrients" (Attachment F) at the September 27, 1985 meeting. Two alternatives which address nuisance aquatic growth and nutrient standards were proposed. The Commission instructed the Department to take both alternatives out to public hearing to receive further testimony before taking any action. Testimony presented at hearings on November 18, 25, and December 2, 1985 and in writing by December 6, 1985 was in response to public notice which solicited comments on: (1) adoption of either alternative, both alternatives, a combination of alternatives, modifications of alternatives or no action; and (2) any evaluation of fiscal and economic impact.

The Department received testimony from 45 agencies/individuals. Those testifying supported the following actions:

- 20 - supported no action at this time (5 indicated support for alternative 1 if a standard is needed.
- 12 - supported the nuisance aquatic growth standard or modification (alternative 1)
 - 1 - supported the nutrient standard or modification (alternative 2)
 - 6 - supported both standards or modification
 - 6 - no opinion of support expressed

The discussion of testimony which follows is organized to focus on 8 major issues which were raised in the testimony:

- A. NEED: Are nutrient and/or nuisance aquatic growth standards needed or are current standards and programs adequate?
- B. PARAMETRIC CONCENTRATIONS: Is there adequate scientific evidence for suggesting parameters and concentrations for addressing nutrient or nuisance aquatic growth?
- C. ACTION: What course of action should be required when standards are exceeded?
- D. COST VS BENEFIT: What are the actual benefits of meeting the standards and what are the costs?
- E. PRIORITIES: Are nutrients and/or nuisance aquatic growth a priority at this time as compared to protection of health and aquatic life?
- F. SOURCES OF NUTRIENTS: How will the contributions from point, non-point and natural sources be determined and regulated?

- G. PREVENTIVE LIMITS: If standards are set at "potential problem levels," how are increasing trends below the levels in sensitive areas addressed?
- H. OTHER SUGGESTIONS: How should other forms of "nuisance" aquatic growth be addressed (i.e. attached algae, rooted plants)? What future action should be taken resulting from suggestions for additional water quality standard revisions?

For each issue, the discussion is organized as follows:

1. Condensed summary of testimony as it relates to the pros and cons of the major issue with references to Attachment A (i.e. the numbers refer to the testimony listed in Attachment A).
2. Evaluation of Alternatives.
3. Conclusions and Recommendations

- A. NEED: Are nutrient and/or nuisance aquatic growth standards needed or are current standards and programs adequate?

SUMMARY OF TESTIMONY

Twenty respondents (1,2,3,4,5,9,12,14,15,17,19,27,28,29,30,31,32,36,37,41) opposed adopting any standards at this time and recommended no action be taken. However, five of these respondents (5,14,28,30,37) stated that if a standard needs to be implemented, then alternative 1 would be more preferable with further refinement than alternative 2.

The following respondents expressed that neither standard was needed because:

- o Current narrative standards or other rules are adequate (19,37);
- o Insufficient evidence was presented to show need for new standards at this time (1,2,5,27,29,30,32,36)
- o Further work is required to develop a proper standard (5,12,15,19,29,32,37)
- o Nutrient pollution is not widespread in Oregon and only site specific standards (vs statewide) are needed to address nuisance conditions in Oregon (33,37)
- o One respondent suggested that further study was needed to identify the problems and impacts of imposing nutrient standards (41).

The following respondents expressed that both standards were needed to:

- o Meet requirements to protect water quality under federal law (16)
- o Protect other beneficial uses (26)
- o Give the Department the tools it needs to properly deal with nuisance conditions and nutrient problems found in the state (16,18,21,24,25,26)

EVALUATION OF ALTERNATIVES

The issue of standards which address nutrients and/or nuisance aquatic growth was raised during the Department's most recent review of the Water Quality Standards contained in OAR Chapter 340, Division 41. The Commission directed the Department to develop an issue paper which proposes Water Quality Standards for nutrients. The two alternatives presented were proposed to supplement the narrative standards. While the narrative standards provide a means of addressing a nuisance condition once it occurs, they do not provide numeric definition of what might be a nuisance condition or indicate a course of action to follow upon the identification of such a condition. In addition, current policy as contained in the standards recognize the need to protect lakes and reservoirs from nutrient enrichment due to point source discharge by prohibiting the discharge of wastes to lakes or reservoirs without EQC approval. Various studies (such as Clean Lake Phase I studies) and actions (such as nutrient removal from a municipal discharge) have been implemented with existing legal authority. The water quality program has used guidelines in its planning documents to indicate water bodies where nuisance conditions may occur and nutrients may be excessive. These documents form a basis for directing further work as found in documents such as the State/EPA Agreement.

Two options exist. The Department can rely on the existing Standards, Rules and Programs and take no action at this time. The other option is to develop numeric standards to enhance the Department's capability to address nuisance aquatic growth and/or nutrient enrichment.

CONCLUSIONS AND RECOMMENDATIONS

The Department can clearly address nutrient enrichment and nuisance aquatic growth without further standards. There are a variety of approaches that can be used to accelerate identifying and addressing nuisance conditions and nutrient enrichment without establishing numeric standards. The addition of numeric standards would provide a more uniform means of identifying potential nuisance conditions and establish a consistent course of action to follow after problem identification. The Department recommended to the Commission that alternative 1 be taken to public hearing for consideration for adoption (Attachment F, September 27, 1985) as a Standard. The Commission directed that both alternatives be taken out to hearing and, based on the analysis of the hearing record, will decide if numeric standards are needed.

- B. PARAMETRIC CONCENTRATIONS: Is there adequate scientific evidence for suggesting parameters and concentrations for addressing nutrient or nuisance aquatic growth?

SUMMARY OF TESTIMONY

Numerous respondents expressed that the proposed parameters and/or concentrations were inadequate or needed modification.

- o Six respondents stated that neither standard correctly identified a problem or use impairment (5,15,17,28,36,37) and four respondents stated that the parameters and concentrations were too subjective or not well documented (11,29,32,37).
- o Twelve respondents stated that the nutrient criteria were inadequate as there is no universal relationship between nutrient concentrations and aquatic growth (5,6,8,11,12,15,19,20,28,31,37,39).
- o One respondent suggested that natural concentrations and variability of nutrients makes it difficult to establish nutrient standard, that the "red book" rationale were inadequate, and that more data are needed to develop suitable standards (37).
- o Five respondents suggested other factors should be considered with nutrients such as turbidity and flow (5,13,15,29,37) and three respondents indicated that phosphorus is not always the limiting nutrient (5,6,37).
- o One respondent indicated that the nitrate value does not relate nuisance aquatic growth problems and is 10 times higher than suggested levels (29).
- o Three respondents (13,18,29) suggested that a violation of standard could occur by simply changing a physical condition (impounding a river, changing turbidity).
- o Two respondents suggested that chlorophyll was too variable as a measurement and would reflect periphyton growth rather than phytoplankton growth for rivers (5,34). One respondent (5) pointed out that chlorophyll does not distinguish between nuisance and beneficial forms of algae.
- o One respondent (19) suggested that the number river segments that may exceed the proposed standards indicates that the criteria are suspect.
- o Six respondents suggested that both standards were adequate (16,18,21,24,25,26) and were needed together to form a basis for a proper control strategy.

- o One respondent (39) stated that chlorophyll was advantageous as it provided a direct measure of biomass and that three other States (North Carolina, California, and Hawaii) have adopted some form of chlorophyll standards (only North Carolina's standard applies to fresh waters).
- o One respondent strongly supported the use of a 3 month averaging period.
- o Three respondents (13,28,39) urged the Department to adopt the most recent USEPA criteria (July 29, 1985) for un-ionized ammonia.

Many respondents suggested that modifications and additions were needed to clarify the standards.

- o Nine respondents stated that differences in conditions in the state (eg eastern Oregon vs western Oregon), differences among water bodies (eg rivers vs lakes), and differences between water bodies (eg Waldo vs Sturgeon Lake) required different parameter concentrations (19,20,19,28,29,30,33,34,37).
Two respondents suggested a further evaluation of Oregon lake and river data to aid in their development (32,37).
- o Four respondents suggested using the Vollenweider lake loading model instead of a phosphorus concentration for lakes (13,15,25,34).
- o One respondent (13) suggested developing a regional approach to the development of nutrient standards based on the ecoregion maps developed by USEPA and building on the studies initiated jointly between DEQ and USEPA.
- o Five respondents (15,29,32,34,39) discussed the need to specify the collection and analytical methodology (ie how many samples, how and where collected, what analytical methods, etc).
- o Two respondents (18,23) suggested that specific wording should be added to allow for less stringent standards when natural conditions are the cause and more stringent standards for sensitive water bodies (eg water supply lakes, scenic waterways).
- o One respondent suggested that intent of alternative 1 was to trigger a further study yet the wording for the criteria stated that "no wastes shall be discharged...", thus requiring a course of action.

EVALUATION OF ALTERNATIVES

As discussed in Attachment D, the relationship of nutrients, nuisance aquatic growth, and beneficial use impact is complex. To date, there has not been a single numeric value for a parameter(s) which describe when a use would be impaired due to nutrients or nuisance aquatic growth. USEPA has suggested a rationale for the development of nutrient standards in the 1976 "Redbook" which a number of States have adopted as part of their standards. The fact that USEPA has not refined or further developed the rationale indicates the complexity of the issue. A number of States have adopted water body specific nutrient standards or nutrient loading criteria (see Attachment D in Attachment D). Three States (North Carolina, California and Hawaii) have adopted Chlorophyll Standards with North Carolina having good experience using the standard to identify problem areas and water bodies sensitive to nutrient enrichment (see Testimony 39). Nutrient and nuisance aquatic growth standards are admittedly subjective as no one has numerically defined when a nuisance condition that would affect a use. Therefore, nutrient and nuisance aquatic growth standards are generally useful as guidelines for areas where site specific, basin or regional studies are needed. It appears that the chlorophyll measurement offers the advantage of measuring algal biomass rather than the potential for algal growth and therefore would be a better indicator of where nuisance conditions could occur. Obviously, nutrients are important to address in any subsequent action based on finding high chlorophyll levels.

The Department agrees that other factors such as flow, turbidity and physical conditions will affect growth potential. This is another reason that chlorophyll would be a better screening parameter. The Department agrees that the potential for having different levels for different water bodies (eg lakes vs rivers) or different parts of the state should be further explored and should involve a further analysis of Oregon data (this analysis is found in Attachment B). By having a different criteria for different water bodies, other factors such as flow or affects of periphyton can be factored in. The Department agrees that there can be high variability in both chlorophyll and nutrient measurements and should maintain the three month averaging to indicate general nuisance conditions and avoid reacting to short-term blooms. In addition, suggestions for sampling and analytical methodology should be made. Techniques for determining permissible areal lake nutrient loading (Vollenweider Model) and total maximum daily loads are useful tools that can be currently applied or could be used with new standards. New standards are not required in order to use them.

Both the nitrate and un-ionized ammonia standards were suggested since the Department was addressing nitrogen and phosphorus forms as part of a nutrient standard (alternative 2). It was stated in the staff report (Attachment F) that the suggested standards related to drinking water and aquatic life uses and not to nutrient enrichment and nuisance aquatic growth. The Department is currently developing discussion papers on pesticides and other toxic substances, it would be more appropriate to further develop proposed nitrate and un-ionized ammonia standards through those discussion papers.

A variety of options exist. The chlorophyll standard, nutrient standard, both standards or neither standard could be further refined.

CONCLUSIONS AND RECOMMENDATIONS

Admittedly, either standard is a subjective indicators for nuisance conditions. The nutrient standard could serve as screening standards as there is no universal relationship between a nutrient concentration and aquatic growth. Chlorophyll could be a better indicator of waters where nuisance phytoplankton conditions may be found. The Department should proceed with refinement of chlorophyll criteria. Nitrate and un-ionized ammonia should be further developed in the issue paper which updates the pesticide and other toxic substances sections of the standards.

C. ACTION: What course of action should be suggested when standards are exceeded?

SUMMARY OF TESTIMONY

A major issue concerning the proposed alternatives was the proposed course of action. In general, the greatest concern was over the fixed course of action described in alternative 2 (e.g. effluent limits if values are above standard) and there was greater support for the further study approach (although costs and other concerns were expressed about this approach).

- o Six respondents strongly stated that the fixed course of action in alternative 2 was too limited, restrictive, and/or inappropriate (5,6,11,19,28,37). Two respondents were concerned with the fixed course of action in alternative 2 and the time needed to conduct facility planning in order to implement nutrient removal (10,37). One respondent expressed that option 2 does not permit use of "available and reasonable methods" to achieve a standard as required by Oregon law (37).
- o Three respondents (20,28,37) indicated that the nutrient limits required in alternative 2 could be met only through advanced waste treatment (AWT), were not routinely achieved through today's technology and would result in expensive treatment systems which would either require large land areas (for land disposal) or create sludge problems (additional sludge which would be difficult to compost). It was noted that many AWT plants in the United States have been abandoned because they were too costly to operate and no environmental benefit was gained.
- o Three respondents (13,29,40) were concerned that attempts to achieve nutrient standards could result in other water quality problems such as increased turbidity or addition of chemicals that are toxic to fish and other forms of aquatic life.

Eight respondents (6,7,11,20,25,28,30,37) stated that further study as specified in alternative 1 was preferable since it consists of a logical series of steps from determining whether a real problem exists through to adopting control strategies that address a specific water body or site.

- o Four respondents indicated that both courses of action were required as alternative 1 invoked a corrective action and alternative 2 invoked a preventive action (16,21,24,25). These four respondent believed that nutrient standards were required as a basis for establishing total maximum daily loads. In addition, the nutrient standards would lead to the use of cost effective and environmentally appropriate land treatment systems rather than expensive and energy intensive tertiary treatment plants.

EVALUATION OF ALTERNATIVES

Given that nutrient/nuisance aquatic growth standards are somewhat subjective and do not necessarily relate to a use impact, the prescribed course of action must be carefully chosen. The course of action prescribed in alternative 2 has the advantage of being fixed and leaving little doubt as to the strategy to achieve compliance. However, it may be quite costly and restrictive and may not achieve any environmental benefit. The course of action in alternative 1 sets up a logical process for determining if a use is impaired, examines alternatives based on site or area specific data, and involves a hearing process which provides reasonable assurance that the required control strategy is understood and will achieve an environmental benefit. This course of action appears to be more appropriate given that the subjectivity of the standards. Waste load allocation and more stringent standards could be required under either alternative as well as under current standards. Both options would probably require advanced wastewater treatment (AWT) in certain areas but the type of treatment is not specified. EPA currently requires detailed justification of need when providing Construction Grant Funding for projects with AWT requirements; violation of a statewide nutrient standard would most likely not be sufficient justification. Data and analysis from a site specific study would most likely provide sufficient justification.

Four alternatives exist. Retain the further study course of action (alternative 1), retain a fixed course of action (alternative 2), retain both, or develop new courses of action as suggested under "other suggestions."

CONCLUSION AND RECOMMENDATIONS

The course of action prescribed in alternative 1 is advantageous given the subjective nature of the standard and the fact that they do not directly relate to use impairment. In addition, the need to develop specific knowledge of nutrient and environmental interactions, identify nutrient sources, determine available control measures and achievable environmental results in order to implement a successful control program is factored into this course of action. The course of action in alternative 1 (further study) should be retained in the standard refinement and that a fixed course of action such as suggested in alternative 2 should be considered only after further study and proper justification.

D. COST VS BENEFIT: What is the actual benefit of meeting the standard and what are the costs?

SUMMARY OF TESTIMONY

Considerable concern was expressed over the costs of achieving the standard. A majority of the concerns were focused on alternative 2 which would require nutrient removal when the nutrient standard was exceeded. Alternative 1 may also require this but after further study, development of control strategies, hearings and adoption.

- o The following respondents expressed cost concerns as related to:
 - agriculture - 3,19,27,35,40,42
 - economic development - 31,36,41
 - industry - 19,29,31
 - municipalities and sewer users - 2,4,5,7,8,9,10,12,17,20,28,36,37,41
 - municipalities for storm water control - 4,9,36,37,41
 - state & federal agencies for administration - 5,11,13,14,19,22,29,30,33,42
- o Several respondents stated that the Department must determine the cost prior to adoption of any standard (1,36,37) or determine the cost vs the benefit prior to requiring nutrient control (28,37).
- o Many respondents expressed concern that achieving a nutrient standard (especially a single uniform value) would not result in any measurable benefit (14,17,19,36,37) citing that nutrient concentrations do not universally relate to algal growth. One respondent indicated the benefit for meeting the proposed nutrient standard under alternative 2 in the Willamette River near Oregon City would be a reduction of .004 mg/l of P (barely significant in the range of Phosphorus levels found in the Willamette) at a cost of millions to the Clackamas County Sewer District (5).

- o One respondent expressed concern that other water uses (e. g. hydropower) would be affected by implementation of such standards (29).
- o Several respondents (16,21,24,25,26) stated that the standards would achieve the benefit of reducing nuisance growth problems in Oregon. While there would be costs involved, the standards would force the development and use of cost-effective technologies.

EVALUATION OF ALTERNATIVES

As discussed in Attachment F (Informational Report on Nutrient Standards), the advantages of the course of action in alternative 1 were that the final control strategy was based on site specific data which provides reasonable assurance that controls will achieve the desired environmental benefit and that the hearing process assures that the ramifications of issues are understood before implementation. The course of action in alternative 2 leaves little doubt as to the strategy to achieve compliance with the nutrient standards but could be costly with little environmental benefit. There is no doubt that costs could be high for implementing nutrient removal with the adoption of either alternative. However, the implementation of nutrient removal (with associated costs) exists with the current standards. Whereas the cost for pollution control is always a concern, it should not be the determining factor on whether a nutrient standard should be adopted.

CONCLUSIONS AND RECOMMENDATIONS

Costs should not be incurred for the sake of achieving a standard unless the standard is an objective measurement of use impairment. In the case of nutrient/nuisance aquatic growth standards, the standard is more of a guideline indicating where level are high and further study is needed. Therefore, a course of action which requires a hearing process prior to implementing a control strategy will be required so that factors such as cost can be fully understood and affected parties have a chance to comment.

- E. PRIORITIES: Are nutrients and/or nuisance aquatic growth a priority at this time as compared to protection of health and aquatic life?

SUMMARY OF TESTIMONY

Numerous respondents suggested that the issue of nutrients and/or nuisance aquatic growth was of questionable priority at this time.

- o Eight respondents (2,11,14,17,30,33,37,41) questioned the priority of addressing nutrient standards and the related expenditures of resources as compared to human and aquatic health issues (e.g. toxicity, bacterial contamination, sedimentation, etc).

- o One respondent (42) stated that funding for non-point control programs was given such a low priority that management agencies are unable to implement adequate programs.
- o Several respondents (13,21,24,25) stated that the adoption of standards would translate into a need for DEQ to develop and implement more effective water quality management programs.

EVALUATION OF ALTERNATIVES

Nuisance aquatic growth can affect uses such as swimming, boating, fishing, water supply, animal watering, aesthetics and protection of aquatic life. Water quality standards are designed to protect the beneficial uses of the water. Therefore, it is important to address aquatic nuisance conditions in the standards.

The relative priorities for committing limited staff and financial resources is always a concern not only to the Commission and Department management but to the public as well. The relative priorities are particularly important as the agency is becoming more involved in new areas such as hazardous waste control and groundwater protection. Alternative 1 strongly involves the Commission in establishing relative priorities by approving the study schedule and adopting control strategies. This is a benefit given the subjective nature of the standard and the fact that exceedence of the criteria does not necessarily indicate use impairment. Alternative 2 establishes the attainment of nutrient standards as a fairly high priority given the fixed course of action.

CONCLUSIONS AND RECOMMENDATIONS

The course of action listed in alternative 1 allows the Commission to establish a relative sense of priorities for conducting nuisance growth studies and to adopt control strategies. This course of action will be retained in the refinement of the standard.

- F. SOURCES OF NUTRIENTS: How will the contributions from point, non-point and natural sources be determined and regulated?

SUMMARY OF TESTIMONY

Many respondents questioned the ability to adequately treat and control natural, non-point and point sources of nutrients.

- o Thirteen respondents (4,5,9,12,13,17,18,19,20,28,29,30,37) stated that background levels of nutrients and chlorophyll were not adequately addressed or discussed and that alternative 2 did not properly account for the fact that natural background levels can be high and are difficult to control.

- o Four respondents (19,27,30,35) were concerned about how industries such as forestry and agriculture whose practices may create non-point sources of nutrients would be affected by the standards.
- o Eleven respondents (4,5,8,9,16,19,21,24,25,27,30) were concerned that non-point sources cannot be adequately addressed to affectively achieve beneficial levels or that the focus would be on point sources of nutrients since they are easier to control than non-point sources.
- o Four respondents (16,21,24,25) stated that the standards would create a focus on non-point source problems and relieve the burden of wastewater treatment and control now imposed on point sources.
- o Several respondents (6,7,8,11,16,20,23,25,28,30,32,39) stated that the course of action under alternative 1 would allow for proper identification of nutrient sources.

EVALUATION OF ALTERNATIVES

Sources of nutrients are important to determine under any control strategy. The Department recognizes that natural background levels vary considerably and can be quite high. This fact along with the poor correlation of nutrient concentrations to aquatic growth levels make the establishment of a nutrient standard difficult. Most research is focused on examining the affects of nutrient loads from the various sources on a given water body. Studies conducted under alternative 1 would be able to address nutrient budgets from various sources, take into account natural levels of nutrients, develop both point and non-point control strategies aimed at achieving environmental benefit, and consider the impact on the affected parties. Action under alternative 2 would focus on decreasing nutrient concentrations when they exceeded specific levels. Developing suitable control strategies to fit different situations and accounting for naturally high background levels can occur in alternative 2, but upon modification of the standard on a water body or stream reach basis.

CONCLUSIONS AND RECOMMENDATIONS

The course of action listed under alternative 1 is preferable in that it allows greater flexibility to address nutrient sources and develop suitable control strategies for the specific area.

- G. PREVENTIVE LIMITS: If standards are set at "potential problem" levels, how are increasing trends below the standards' levels in sensitive areas addressed?

SUMMARY OF TESTIMONY

Several respondents expressed concern over how pristine and/or scenic waters could be given a higher degree of protection than the standard would allow and whether an increasing trend in a criteria could trigger an appropriate response.

- o One respondent (23) stated that those rivers segments and lakes designated as scenic waterways should receive special consideration for the maintenance of pristine water quality.
- o One respondent (18) expressed concern for pristine waters (such as a pristine water source) in situations where concentrations approaching standard levels would demonstrate an impairment of uses. The respondent suggested that a significant upward trend should trigger a protective response and that the rule should address those unique situations where a higher or lower waterbody standard can be demonstrated to be necessary or desirable.

EVALUATION OF ALTERNATIVES

The issue providing a greater degree of protection for sensitive waterways has been raised in earlier standard reviews. Currently standards do address protection of high quality waters in scenic areas such as state parks, national scenic waterways, etc under Policies and Guidelines Generally Applicable to All Basins (ORS 340-41-026 (1) (a)). This policy is currently under review and will be discussed in the subsequent issue paper.

The request to use an increasing trend to trigger an appropriate action warranted further analysis. At this point in time, further staff analysis is needed to determine if appropriate statistical trend indicators can be developed given the inherent difficulties in establishing proper criteria.

CONCLUSIONS AND RECOMMENDATIONS

Further staff work is required to determine if "trending" standards can be developed to provide additional protection to sensitive and scenic waterways. Some of this work may be presented in an issue paper discussing anti-degradation.

- H. OTHER SUGGESTIONS: How should other forms of nuisance aquatic growth be addressed (ie attached algae, rooted plants) and what future action should be taken resulting from suggestions for additional water quality standards?

SUMMARY OF TESTIMONY

Several suggestions or concerns were expressed for addressing other forms of nuisance growth or for the addition of new standards.

- o One respondent (6) stated that the current narrative language in the Standards should be retained to allow the Department to address other nuisance conditions.
- o Six respondents (5,13,15,23,37,39) expressed concern that the new standards do not address nuisance macrophyton (rooted plants) which are common problems in lakes and nuisance periphyton (attached algae) which are common problems in rivers.
- o One respondent (30) suggested testing a pilot approach to developing nutrient standards by studying an area of the state before adoption of statewide standards.
- o One respondent (37) suggested an approach of allowing local groups to initiate further studies based on their perception of the existence of nuisance conditions. In addition, two respondents (32,37) suggested the development of an Oregon lake management program similiar to that of Washington to deal with nuisance aquatic conditions.
- o One respondent (21) suggested a modification to the temperature standards.

EVALUATION OF TESTIMONY, CONCLUSIONS AND RECOMMENDATIONS

The Department proposes additional nutrient/nuisance aquatic growth standards to supplement the current narrative standard does not propose to delete them. The Department recognizes that the proposed standards do not address attached algae or rooted plant growth. The current narrative would still address these forms of plant growth. There has been limited development of new rationale that would provide a basis for modifying the narrative standard. Limited research has been conducted to provide a basis for developing numeric standards to address these forms of growth. The Department recognizes that both forms can be and are problematic in selected waters of the state (e.g., excessive weed growth in Blue Lake (Multnomah County) and Devils Lake (Lincoln County) and will continue to explore better ways of addressing and controlling nuisance growth.

The Department plans to conduct a study in the Tualatin River Basin in 1986 to address a variety of concerns including potential nuisance growth conditions. This study will be viewed as a pilot study for testing whatever standards that are adopted and for serving as a basis for refining future work.

The modification of temperature standards may be considered during the next standard review.

HRO061
WC78
Schaedel

RATIONALE FOR CHLOROPHYLL a LEVELS AND METHODOLOGYCHLOROPHYLL AS A STANDARD

The characteristic algal pigments are chlorophylls, xanthophylls, and carotenes. The three chlorophylls commonly found in planktonic algae are chlorophylls a, b, and c. Chlorophyll a constitutes approximately 1 to 2% of the dry weight of organic material in all planktonic algae and is, therefore, the preferred indicator for algal biomass estimates (Standard Methods for the Examination of Water and Wastewater, 14th Edition 1976). Two methods for determination of chlorophyll a in phytoplankton are available, the spectrophotometric and fluorometric. The fluorometric method is more sensitive, requires less sample volume, and has been adapted for in vivo measurements.

Many studies using chlorophyll a as an indicator of algal biomass have been conducted, especially over the last 15 years. Much of this work has focused on lake environments since these water bodies are the most sensitive to the effects of eutrophication. Eutrophication is one of the problems associated with the pollution of surface waters and is mainly caused by human or human related activities (Vollenweider, 1970). The following discussions highlight some of the problems associated with the development of criteria and standards that would address nuisance aquatic growth and enrichment. These discussions are quoted out of an early work by Dr R. A. Vollenweider entitled, "Scientific Fundamentals of the Eutrophication of Lakes and Flowing Waters, with Particular Reference to Nitrogen and Phosphorus as Factors in Eutrophication," (OECD, 1970). This work was the fundamental basis for the proliferation of studies over the last 15 years and an understanding of these discussions is significant in the development of chlorophyll criteria:

"In defining the (eutrophication) problem, a distinction must be made between causes, symptoms and effects. A study of the discussions and literature devoted to this subject shows that opinions often vary as to the criteria delimiting the three categories. Qualitatively speaking, there seems to be fairly widespread agreement as to the effects. The quantitative aspect, on the contrary, is a subject of disagreement. Anyone accustomed to the infertility of Scandinavian waters will tend to set the eutrophication threshold much lower than an observer used to Central European waters. On the other hand, as the supply of

water is causing increasing concern in the more highly developed countries (which are thus led to marshal all available resources), it follows that the criteria for rating the acceptability of a given state in relation to a scale of deterioration of surface waters must be fairly flexible, and this makes it exceedingly difficult to arrive at a universally applicable quantitative classification of the degree of eutrophication. The only view on which there might be agreement is a practical one: namely, the question as to whether or not, from the standpoint of its multiple uses, a body of water should be regarded as threatened or in fact deteriorated. ..."

"Eutrophication may manifest itself in any of a number of ways, but the combination of factors modified in each of many individual cases of eutrophication is very much dependent on the local conditions at the outset. This has given rise to considerable controversy as to the validity of various factors, both chemical and biological, as "symptoms". ... The following may be mentioned as typical of incipient eutrophication:

(1) A quantitative increase in the biomass, as observed either in the macrophytes and periphytic algae near the shore, or in the planktonic algae of the pelagic regions. Such an increase is usually accompanied at the outset by a decrease in the number of species typical of oligotrophic waters and, simultaneously or subsequently, by the appearance of indicator organisms in the plant communities.

(2) Qualitative and quantitative changes in the littoral, benthic, and planktonic fauna, and in the fish population. While the members of the latter may be bigger at the outset, the changes are more pronounced at a more advanced stage of eutrophication, with a thinning out of the higher species and a corresponding increase in the lower ones. ...

(3) From the physical and chemical standpoints, the decreasing transparency and changing colour of the waters, the development of oxygen maxima or minima within the metalimnic layers, and the overall decline in the oxygen content of the hypolimnic layers during the summer months, i.e. during the period of thermal stratification, and, lastly, a buildup of the average nutrient level (e.g., phosphorus and nitrogen), which can easily be detected by chemical methods. ..."

The type of impairment that may occur to the various uses of a water body are as follows:

- Water Supply - taste and odor problems, increased costs due to filter clogging, chemical treatment, etc.
- Aquatic Life - shifts in abundance and type of organisms from "diverse and desirable" to "low diversity and undesirable." Increase in die offs of aquatic life.
- Animal Watering - taste and odor problems, potential toxicity due to presence of noxious forms of algae.
- Swimming - safety problems due to limited transparency, discomfort due to insect bites and other skin irritations, unattractive conditions.
- Fishing, Boating - interference due to plant growth, unattractive conditions.
- Aesthetics - unattractive conditions, odors, insects

Insofar as indicators of biomass, Vollenweider (1970) stated the following:

"Among the different possibilities listed above for the biochemical determination of phytoplankton, the determination of the chlorophyll content has enjoyed a certain degree of success in limnology (Kozinske 1938, Manning et al. 1941, Juday et al. 1943, Gessner 1944, Berardi and Tonolli 1953, Vollenweider 1956, Becacos 1962, Aruga and Monsi 1963, Sakamoto 1966, and others).

Chlorophyll content is not of course a reliable measure of phytoplankton either, in view of the fact that the pigment content per unit cell volume depends on a number of factors such as the type of species, physiological state of the environment, etc., but if cautious estimations are made, a chlorophyll examination can quickly give worthwhile information on the relative number of photosynthetic organisms contained in water."

Jones and Lee (1982) "stress the fact that for most applications, planktonic algal chlorophyll concentration tends to be the most reliable eutrophication-related water quality indicator." This conclusion was made after reviewing (under an USEPA grant) the results of The Organization for Economic Cooperation and Development (OECD) Eutrophication Study which was undertaken to quantitatively define the relationship between the nutrient (phosphorus) load to a waterbody and the eutrophication-related water quality response. This study characterized the phosphorus load and response characteristics of about 200 waterbodies in 22 countries, including 34 waterbodies in the United States. In addition, the authors evaluated the phosphorus load-response relationship for approximately 40 additional U.S. waterbodies.

In order to properly develop chlorophyll a levels , one must account for differences in types of water bodies. Just as plant growth is dependent upon a variety of environmental factors (such as sunlight, current velocity, temperature and substrate as well as nutrient availability) so is the resultant or potential impact. For example, algal blooms may cause an oxygen deficit and thus affect a fishery in a deep, stratified lake. The same bloom may not cause an oxygen deficit in a shallow, well mixed lake or in a flowing river but may enhance the fishery by providing an abundant source of food. The following discussions will briefly summarize literature and appropriate Oregon water quality data by water body groupings to best indicate suitable chlorophyll criteria.

CHLOROPHYLL LEVELS FOR STRATIFIED LAKES

C. N. Sawyer (1947) related the "greenness" of water to chlorophyll a concentrations and found that concentrations of 0.010 mg/l or greater are often associated with water classified as eutrophic and possessing deteriorated water quality for beneficial uses.

Since that time, chlorophyll a concentrations have received considerable attention in lake classification schemes. Generally, the classification system most widely applied to lakes and reservoirs is the trophic classification system. Surface waters are ranked according to their biological productivity: unproductive lakes are termed oligotrophic ("little-nourished") and productive lakes are termed eutrophic ("well-nourished"). As stated earlier, there is a variety of opinions as to parameters and values to be used in these classification systems. Chlorophyll a concentrations relative to lake classification for several widely used classification systems are shown in Table 1.

Table 1 CHLOROPHYLL a CRITERIA FOR SELECTED LAKE CLASSIFICATION SYSTEMS (chlorophyll a in mg/l)

TROPHIC STATE	Lee et al 1981	Carlson 1977	National Acadamey of Science	Sakamota 1966
Ultraoligotrophic		<0.0003		<0.0003
Oligotrophic	<0.002	0.0003-0.002	<0.004	0.0003-0.0025
Mesotrophic	0.003-0.007	0.002-0.006	0.004-0.010	0.0025-0.015
Eutrophic	>0.010	0.006-0.040	>0.010	0.015-0.040
Hypereutrophic		>0.040		>0.040

Vollenweider (1976) developed a statistical correlation between the areal annual P loading to a waterbody (normalized by mean depth and hydraulic residence time) and the eutrophication response of the waterbody as measured

by mean chlorophyll concentration. Rast and Lee (1982) substantiated the general relationship, defined it for a greater number of waterbodies, and modified and expanded Vollenweiders work. Some of this work is summarized in Figures 1 and 2. Figure 1 shows the relationship developed between mean depth/hydraulic residence time to phosphorus loading. Excessive and permissible loading curves are shown but it should be pointed out that they do not represent sharp boundaries of water quality. For waterbodies having a given mean depth/hydraulic residence time quotient, there is a vertical gradation in water quality with waterbodies having better water quality plotting toward the bottom and those having poorer water quality plotting toward the top. Figure 2 shows the phosphorus load-eutrophication related water quality response relationships for US waterbodies with 95% confidence intervals shown. The interested reader should consult the bibliography for further discussions of this work.

The relationships shown in Figures 1 and 2 can be used with data contained in the "Atlas of Oregon Lakes" to predict mean summer chlorophyll a concentrations based on estimated permissible phosphorus loads. This analysis can be found in Table 2. As shown, for lakes with mean depth and hydraulic residence time calculated, a permissible phosphorus loading was calculated using Figure 1. It should be strongly noted that the permissible loading does not suggest a desirable or actual loading but provides an indication of a loading that would result in "acceptable" summer recreational chlorophyll averages (the lines were developed using .002 mg/l chlorophyll a averages). The permissible loads can be normalized by several factors (based on the lake's mean depth and hydraulic residence time). An estimate of the mean summer chlorophyll a values for these lakes can then be made using Figure 2 which is based on actual responses of U.S. waterbodies with the given normalized loading.

This estimate, along with the 95% confidence intervals shown, can be used to suggest the ranges of summer mean chlorophyll values that might be found in Oregon lakes given phosphorus loadings at the upper permissible limit. As shown in Table 2, the estimated mean summer chlorophyll a values might typically range from .002 mg/l to .008 mg/l for most Oregon lakes. Saline lakes (e.g., Abert, Goose, Summer) and marshes (e.g., Malheur) have much higher values ranging from .010 to .060 mg/l. A summer chlorophyll and pH value are also shown in Table 2 to give an indication of values detected in the lake as determined in the Lake Atlas.

If one examines the range typically found for the Oregon lakes which were examined and factors in the 95% confidence level, a mean summer chlorophyll a value of 0.010 mg/l appears to be a reasonable guideline. In examining Figure 2, using a normalized annual areal phosphorus loading of 10, one would expect a mean summer chlorophyll a level of .010 mg/l at the upper end of the 95% confidence range. Remembering that the normalized load was based on a maximum permissible load, the .010 mg/l chlorophyll a value would represent an average condition at the upper "acceptable" range. Values above this concentration may represent conditions which reflect excessive loadings.

All this does not imply that average chlorophyll values above .010 mg/l would represent a nuisance condition but would tend to indicate where further study may be warranted to determine the factors responsible for the lake eutrophication. One must also keep in mind that eutrophic does not mean "undesireable" or "due to human influence." Eutrophic lakes are often excellent fishing lakes and do occur naturally.

Based on the above analysis, it appears that 0.010 mg/l is a suitable screening criteria for Oregon lakes at this time. Staff recommends that this value apply to stratified lakes where mixing to the bottom does not occur after stratification. Reasons for this are discussed in the next section. Saline lakes, small ponds (10 acres or less) and marshes should be excluded as their chemistry is complex (saline lakes) and they are naturally shallow and productive waterbodies where the excessive growth would not affect uses or would be extremely difficult to control.

CHLOROPHYLL LEVELS FOR RIVERS, RESERVOIRS, UNSTRATIFIED LAKES AND ESTUARIES

The intent in developing nuisance growth criteria is to indicate waterbodies where further study is needed to determine (in part) if water uses are being affected. Waterbodies, such as rivers, shallow lakes, reservoirs and estuaries, are generally shallow, well mixed and have short retention times. Chlorophyll levels, such as suggested above for stratified lakes, may be observable and could interfere with such uses as water supplies. However, as these waterbodies are well mixed, affects such as dissolved oxygen deficits do not generally occur at the lower chlorophyll levels. Nutrient loading are generally different in that sources such as bottom sediment or bank erosion are significant and less controllable. In addition, chlorophyll concentrations may reflect attached algae (periphyton) eroded from bottom substrate rather than a phytoplankton response due to nutrient loadings. For the above reason, as well as reasons suggested in the Nutrient Hearing Testimony, a higher chlorophyll value should be suggested as the screening criteria for rivers, unstratified lakes, reservoirs and estuaries.

There is limited literature available to suggest chlorophyll criteria for these waterbodies. Therefore, three month average values were determined from data collected on Oregon rivers since 1978. These values were compared with monthly averages regardless of year to give a basis to screen for data outliers. Values were compared to potential chlorophyll limits of .01, .015, .02, and .025 mg/l. Sites and exceedence of potential criteria values are shown in figure 3. Sites where other water quality standards which may be caused by algal growth (particularly pH and dissolved oxygen) were determined from Water Quality Program Status Assessment Reports (1982 and 1984). These sites were circled in Figure 3. From this analysis, a suitable chlorophyll level that suggests a relationship with potential impairment of uses (as indicated by violation of pH and dissolved oxygen) could be determined. One should be cautioned that this analysis does not suggest a direct relationship of phytophyton growth and the violation of other water quality standards since

factors such as biochemical oxygen demand (BOD) and ammonia or other forms of aquatic growth such as periphyton may account for the observed violation of standard.

Two patterns are apparent in Figure 3. The first pattern is that the .01 mg/l level appears to be violated frequently with no indication of related water quality problems. Most notable are the exceedences observed in the Deschutes River which most likely reflect periphyton growth being washed downstream rather than nuisance phytoplankton. The .015 mg/l concentration appears to be a more reasonable level. Only two sites, one in the South Umpqua and one in the Coquille, indicate other water quality problems and have lower chlorophyll levels. This can be explained by factors such as proximity to point sources for both sites and abundant periphyton and macrophyte growth at the S. Umpqua site.

The second pattern that is apparent is that excessive growth as indicated by chlorophyll a concentrations may occur in many eastern Oregon streams but other related water quality problems were not apparent as suggested by the accompanying data. This might be explained, in part, by the different dissolved oxygen and pH standards that apply to these basins, time of day samples were collected as well as the limited data collected in some of these basins. This pattern merits further study as suggested by the course of action in the standard. A higher standard for eastern Oregon water may be warranted but further study is needed. It is also apparent that basin specific standards for the Klamath River are needed.

Based on the above analysis, the Department suggests that an average concentration of .015 mg/l be used at this time as the screening criteria for rivers, shallow unstratified lakes, reservoirs, and estuaries. Analysis of selected unstratified lakes (e.g., Blue, Devils and Garrison) verifies that this value may be suitable in reflecting nuisance conditions.

METHODOLOGY

Since algal distribution is often quite patchy both horizontally and vertically, the Department suggests that screening should represent more generalized conditions. Therefore, collection is suggested at represented sites such as over the deepest point of a lake or in mid-flow of a river rather than in side channels or along shorelines. Similarly, a vertically integrated sample to a depth equal to twice the secchi depth or the bottom (the lesser of the two depths) is recommended in order to provide an estimation through the photic zone (or lighted surface layer). A three month average was suggested to represent more typical conditions and to reduce the influence of short-term bloom conditions. In addition, much research has focused either on spring or summer conditions which would be included in a three month average.

Peak growth as well as peak recreational use typically occur in the summer months which are included in this three month average. Given the variability in growing and water use seasons statewide, a three month average allows for flexibility to address local conditons. The Department recommends the use of Standard Methods or other methods approved by the Department to insure data validity.

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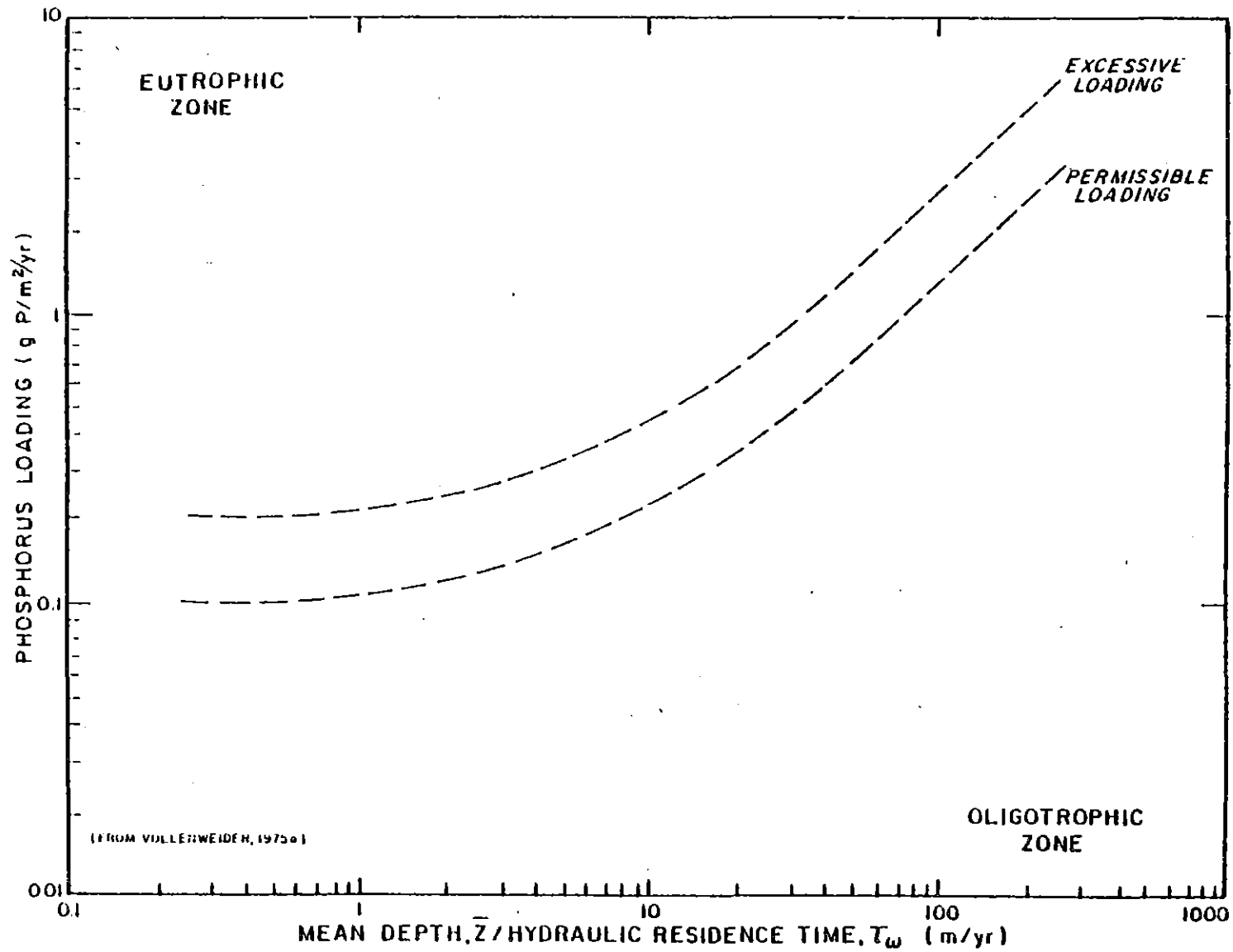


Figure 1. Modified Vollenweider Total Phosphorus Loading and Mean Depth/Hydraulic Residence Time Relationship.

Ref. After Rast and Lee, 1978

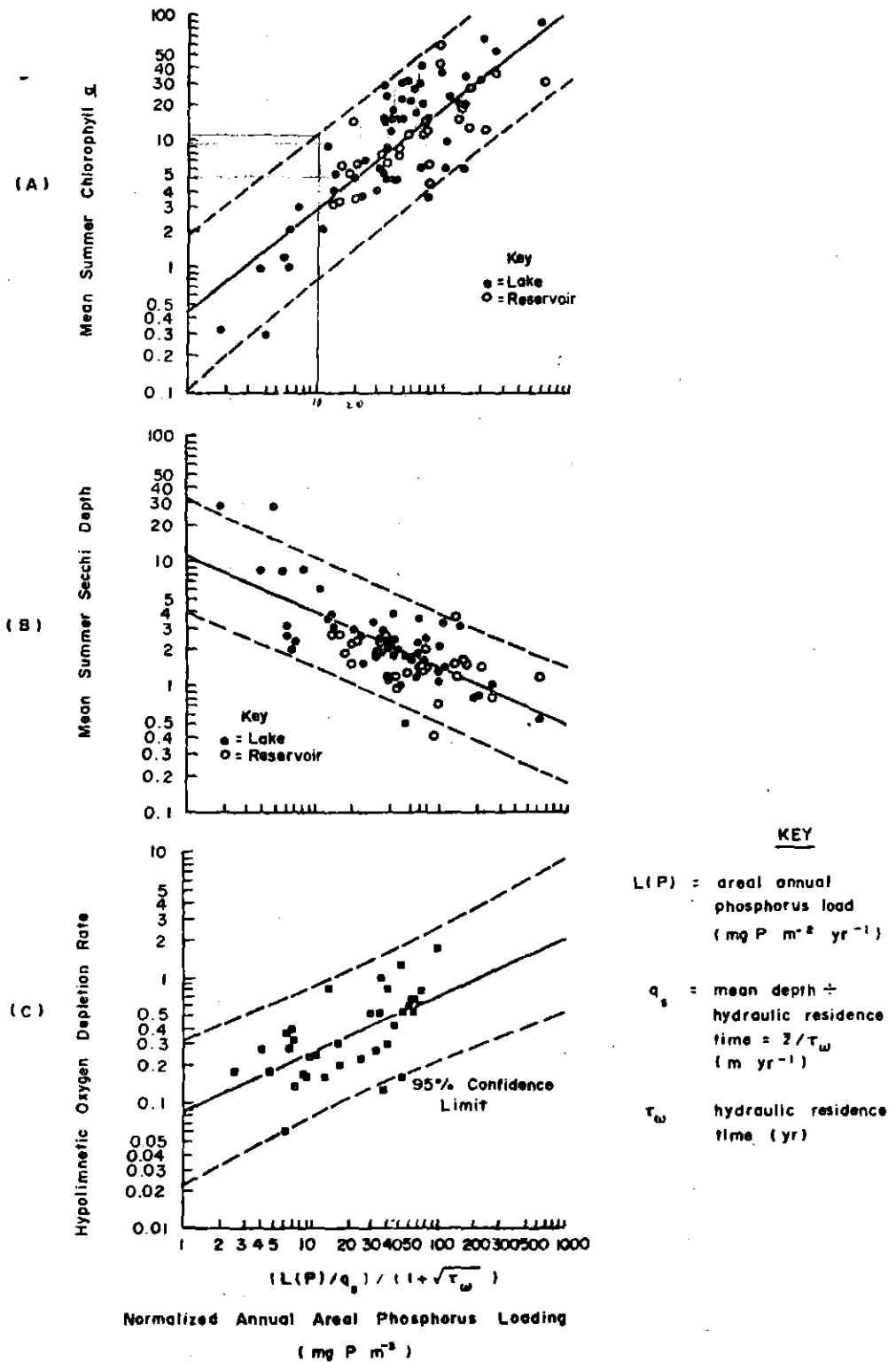
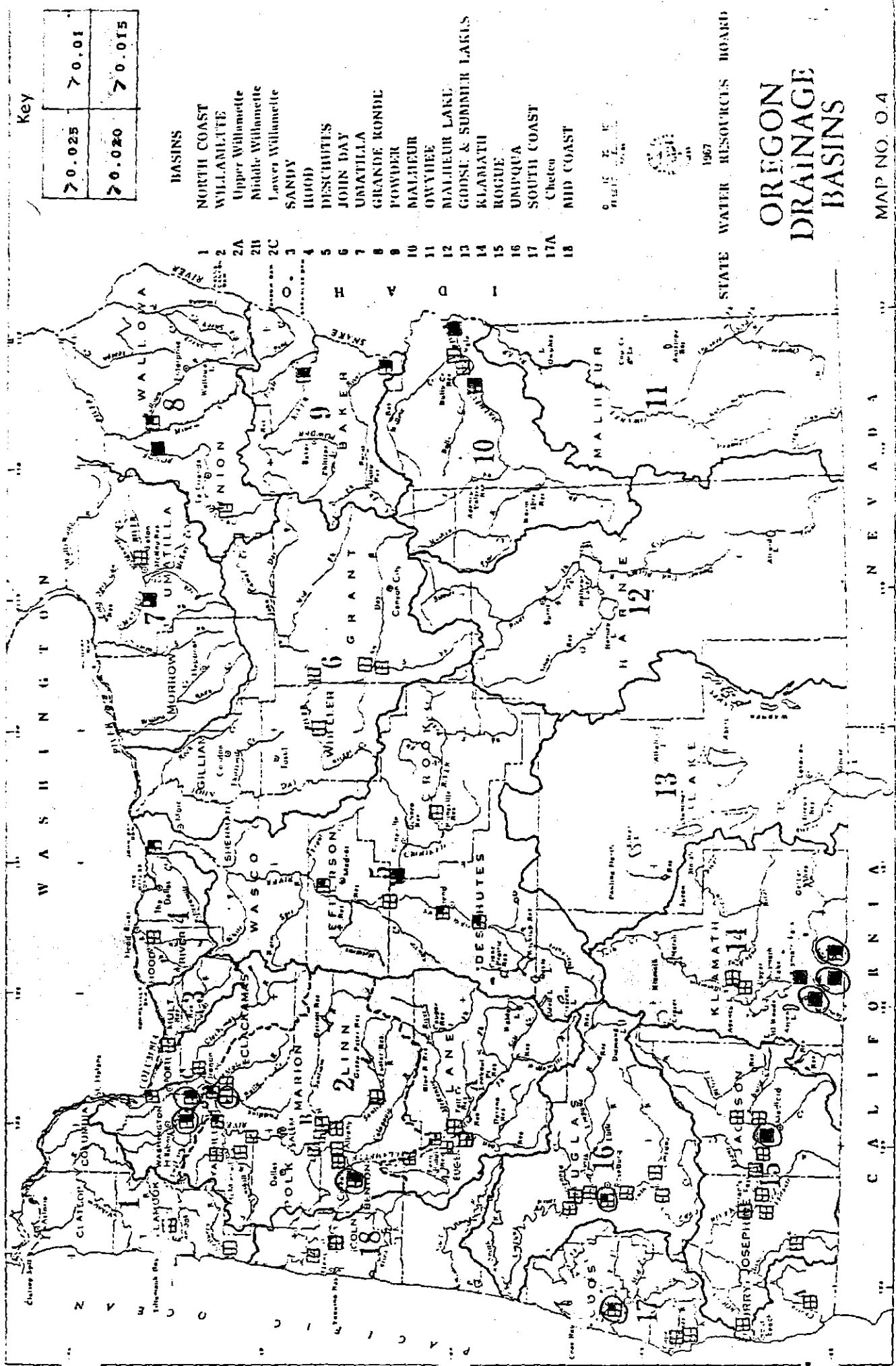


Fig. 2. Updated P load-eutrophication related water quality response relationships for U.S. waterbodies.

FIGURE 3: THREE MONTH AVERAGE CHLOROPHYLL A CRITERIA EXCEEDANCES



Key

>0.025	>0.01
>0.020	>0.015

BASINS

- NORTH COAST
- WILLAMETTE
- Upper Willamette
- Middle Willamette
- Lower Willamette
- SANDY
- HOOD
- DESCHUTES
- JOHN DAY
- UMATILLA
- GRANDE RONDE
- POWDER
- MALHEUR
- OVYHEE
- MALHEUR LAKE
- GOOSE & SUMMIT LAKES
- KLAMATH
- ROGUE
- UNIPQUA
- SOUTH COAST
- Chetco
- MBD COAST

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OREGON
DRAINAGE
BASINS

MAP NO. O.4

TABLE 2

PREDICTED SUMMER AVERAGE CHLOROPHYLL A VALUES FOR SELECTED OREGON LAKES

(SOURCE: ATLAS OF OREGON LAKES)

LAKE NAME	COUNTY	TROPHIC CLASSIFICATION	MEAN DEP z (m)	RES TIME Tw (yr)	Qs (z/Tw) (m/yr)	Permis P Load L(P) (gP/m yr)	(1+ Tw) (yr)	Norm AA Load (mg P/m)	P Ave Chlor a (ug/l)	Sum Chlor a value (ug/l)	chl a (ug/l)	pH (su)
ABERT LK		EUTROPHIC	2.2	4.5	0.5	0.10	3.12	65.5	13.2	4.0	10.1	
ASATE LK		EUTROPHIC	6.4							10.1	8.6	
AGENCY LK		HYPEREUTROPHIC	0.9	0.17	5.3	0.16	1.41	21.4	5.7		9.6	
ANTELOPE FLAT RES		EUTROPHIC	3.4							3.1		
ANTELOPE RES		EUTROPHIC	2.4							5.7	8.0	
ANTHONY LK		OLIGOTROPHIC	3.0	0.17	17.6	0.33	1.41	13.2	3.9	2.1		
APPLEGATE RES		MESOTROPHIC	25.4	0.58	43.5	0.65	1.76	8.5	2.8	1.1	7.9	
BADGER LK		OLIGOTROPHIC	5.4	0.42	12.9	0.27	1.65	12.7	3.8	0.4		
BALM CK RES		EUTROPHIC	7.0							7.5	8.0	
BEALE LK		MESOTROPHIC	1.7							7.8	6.5	
BEULAH RES		EUTROPHIC	10.1	0.67	15.1	0.30	1.02	10.9	3.4	1.3	7.8	
BIG LK		ULTRALIGOTROPHIC	6.0							0.2	7.2	
BILL CHINDOK RES		EUTROPHIC	31.1	0.17	182.9	2.70	1.41	10.5	3.3	2.3	9.4	
BLUE LK	MULT	EUTROPHIC	3.5							2.5	7.7	
BLUE LK	JEFF	OLIGOTROPHIC	42.7							0.2	6.9	
BLUE R RES		MESOTROPHIC	27.7	0.25	110.8	1.40	1.50	8.4	2.8	2.0	7.6	
BOBBY LK		OLIGOTROPHIC	4.4							0.3	7.0	
BREITENBUSH LK		OLIGOTROPHIC	2.0							0.3	7.6	
BULL RUN LK		OLIGOTROPHIC	20.0	9.00	2.2	0.14	4.00	15.7	4.5	0.4	6.9	
BULL RUN RES #1		OLIGOTROPHIC	21.9	0.00	273.8	3.60	1.28	10.3	3.2		6.9	
BULL RUN RES #2		OLIGOTROPHIC	13.7	0.04	342.5	4.50	1.20	10.9	3.4		6.8	
BULLY CK RES		EUTROPHIC	9.0	1.00	9.0	0.20	2.00	11.1	3.4	3.6	8.5	
BUMHEAD RES		EUTROPHIC	2.5	0.17	14.7	0.30	1.41	14.4	4.2	8.0	7.6	
BYBEE LK		EUTROPHIC	0.3								8.4	
CAPE MEARES LK		EUTROPHIC	1.1								7.4	
CHARLTON LK		ULTRALIGOTROPHIC	10.5							0.1	6.0	
CHICKAHOMINY RES		EUTROPHIC	2.9	0.33	8.8	0.20	1.57	14.5	4.2	3.3	7.7	
CLEAR LK	MASCO	OLIGOTROPHIC	4.8	0.42	11.4	0.22	1.65	11.7	3.6	0.5	7.2	
CLEAR LK	LINN	ULTRALIGOTROPHIC	24.4	0.04	610.0	8.00	1.20	10.9	3.4	0.5	6.7	
CLEAR LK	DOUG	OLIGOTROPHIC	16.5	2.7	6.1	0.17	2.64	10.5	3.3		7.4	
CLEAR LK		OLIGOTROPHIC	12.2							2.4	6.9	
CLEMONX LK		OLIGOTROPHIC	5.2	0.33	15.0	0.30	1.57	12.1	3.7	0.9	6.8	
COFFENBURY LK		MESOTROPHIC	1.5							0.6	7.6	
COLD SPGS RES		HYPEREUTROPHIC	9.7	0.67	14.5	0.30	1.02	11.4	3.5	9.3	7.9	
DELLARD LK		MESOTROPHIC	6.5	0.83	8.0	0.20	1.91	13.2	3.9	4.2	7.0	
COOPER CK RES		EUTROPHIC	7.1	0.75	9.5	0.20	1.07	11.3	3.5		7.0	
COTTAGE GRV RES		MESOTROPHIC	9.0	0.17	52.9	0.72	1.41	9.6	3.1	0.8	7.7	
COTTONWOOD MEADOW LK		EUTROPHIC	1.5	0.00	10.0	0.35	1.20	14.6	4.2	4.7	9.2	
COTTONWOOD RES		EUTROPHIC	4.9	0.17	28.8	0.48	1.41	11.8	3.6	2.6	7.8	
COUGAR RES		MESOTROPHIC	52.1	0.33	157.9	1.00	1.57	7.2	2.5	2.3	7.9	
CRANE PRAIRIE RES		EUTROPHIC	3.3	0.33	10.0	0.22	1.57	14.0	4.1	5.7	9.0	
CRATER LK		OLIGOTROPHIC	328.6	150.00	2.2	0.14	13.25	4.8	1.0	0.4	7.2	
CRESCENT LK		OLIGOTROPHIC	37.8	13.00	2.9	0.15	4.61	11.2	3.5	0.1	7.6	
CROFT LK		MESOTROPHIC	2.3	0.08	28.8	0.50	1.20	13.6	4.0	0.8	6.8	
CRUMP LK		HYPEREUTROPHIC	0.9	0.33	2.7	0.14	1.57	32.6	7.0	29.7	6.0	
CULLABY LK		EUTROPHIC	1.6	0.08	20.0	0.35	1.20	13.6	4.0	3.1		
CULTUS LK		ULTRALIGOTROPHIC	24.2	4.00	6.1	0.18	3.00	9.9	3.1	0.1	7.5	

LAKE NAME	COUNTY	TROPHIC CLASSIFICATION	MEAN DEP z (m)	RES TIME Tw (yr)	Qs (z/Tw) (m/yr)	Permis P Load L(P) (gP/a yr)	(1+ Tw) (yr)	Norm AA Load (mg P/a)	P Ave Chlor a (ug/l)	Sum Chlor a value (ug/l)	chl a (ug/l)	pH (su)
DAVIS LK		MESOTROPHIC	2.0	0.33	6.5	0.20	1.57	15.0	4.3	2.9	8.7	
DEER LK		OLIGOTROPHIC	2.0							1.0	6.5	
DELINMENT LK		EUTROPHIC	2.4							2.4	8.0	
DETROIT RES		MESOTROPHIC	36.9	0.25	147.6	1.00	1.50	8.1	2.7	1.7		
DEVIL LK		EUTROPHIC	3.4								4.1	7.9
DEVILS LK	DESC	OLIGOTROPHIC	1.0								1.1	
DEVILS LK	LINC	EUTROPHIC	3.0	0.17	17.6	0.33	1.41	13.2	3.9	2.5	8.9	
DEXTER RES		MESOTROPHIC	0.2	0.00	102.5	1.40	1.20	10.6	3.3	0.9	7.6	
DIAMOND LK		EUTROPHIC	7.3	1.6	4.6	0.15	2.25	14.5	4.2	3.0	9.5	
DOS LK		EUTROPHIC	4.1	0.5	8.2	0.20	1.71	14.3	4.2	11.5	7.6	
DORCHA RES		MESOTROPHIC	12.9	1.7	7.6	0.19	2.30	10.9	3.4	0.7	7.9	
DORIS LK		ULTRALIGOTROPHIC	7.2	1.4	5.1	0.16	2.18	14.3	4.1	0.2		
DREWS RES		EUTROPHIC	4.8	1.7	2.8	0.15	2.30	23.1	6.0	7.5	7.5	
EAST LK		MESOTROPHIC	20.3	10.0	1.1	0.11	5.24	18.5	5.1	0.7	7.9	
ECKMAN RES		EUTROPHIC	1.2	0.04	30.0	0.50	1.20	13.9	4.1	6.5	9.3	
EEL LK		MESOTROPHIC	10.5	0.5	21.0	0.35	1.71	9.8	3.1	0.9	7.4	
ELK LK	MARION	OLIGOTROPHIC	3.0	0.13	29.2	0.50	1.36	12.6	3.0	1.6	7.1	
ELK LK	DESC	OLIGOTROPHIC	3.7	1.0	3.7	0.15	2.00	20.3	5.4	0.9	7.7	
EMIGRANT RES		EUTROPHIC	16.1							1.0	7.9	
FALL CK RES		MESOTROPHIC	20.5	0.29	70.7	1.00	1.54	9.2	3.0	1.6	7.8	
FERN RIDGE RES		MESOTROPHIC	3.2	0.25	12.8	0.27	1.50	14.1	4.1	2.5	7.8	
FISH LK	BAKER	OLIGOTROPHIC	4.0	1.0	4.0	0.15	2.00	18.7	5.1	3.0	7.0	
FISH LK	HARNEY	MESOTROPHIC	18.8	0.5	37.6	0.60	1.71	9.3	3.0	5.0	7.2	
FISH LK	JACK	MESOTROPHIC	4.5	2.0	2.3	0.14	2.41	25.8	6.5	1.9	7.2	
FISH LK	DOUG	OLIGOTROPHIC	5.3	3.1	1.7	0.12	2.76	25.4	6.4	0.3	7.0	
FLORAS LK		MESOTROPHIC	5.5	0.17	32.4	0.50	1.41	10.9	3.4	0.7	7.6	
FOSTER RES		MESOTROPHIC	15.2	0.08	190.0	2.50	1.20	10.7	3.3	0.4	7.2	
FOUNTLE LK		OLIGOTROPHIC	16.7	3.1	5.4	0.16	2.76	10.8	3.4	0.2	6.2	
GARRISON LK		EUTROPHIC	2.5	0.08	31.3	0.50	1.20	12.5	3.7	27.2	9.3	
GERBER RES		EUTROPHIC	6.3	1.0	4.6	0.15	2.34	13.9	4.1	5.0	7.3	
GLACIER LK		OLIGOTROPHIC	15.9	1.8	8.0	0.22	2.34	10.6	3.3	0.4	7.3	
GOLD LK		MESOTROPHIC	3.5								1.9	7.3
GOOSE LK		HYPEREUTROPHIC	2.5	4.5	0.6	0.10	3.12	57.7	12.0	10.0	9.3	
GREEN PETER RES		MESOTROPHIC	34.7	4.8	7.2	0.21	3.19	9.1	3.0	0.6	7.3	
HARNEY LK		EUTROPHIC									5.2	9.5
HARRIETTE LK		ULTRALIGOTROPHIC	10.0								0.2	
HART LK		EUTROPHIC	1.6	0.5	3.2	1.40	1.71	256.3	37.3	3.9	8.0	
HAYSTACK RES		EUTROPHIC	0.3	0.25	33.2	0.50	1.50	10.0	3.2	4.4	7.2	
HEAVENLY TWIN LK		OLIGOTROPHIC	1.4								0.3	
HENRY HABB RES		MESOTROPHIC	15.6	1.0	15.6	0.30	2.00	9.6	3.1	5.1	6.6	
HILLS CK RES		MESOTROPHIC	39.6	0.12	330.0	4.50	1.35	10.1	3.2	0.3	8.1	
HORSFALL/SPIRIT LK		EUTROPHIC	0.4								12.9	6.1
HOSMER LK		MESOTROPHIC	1.0								2.7	7.1
HOWARD PRAIRIE RES		MESOTROPHIC	10.7								3.0	7.7
HYATT RES		EUTROPHIC	5.4								18.5	7.3
ISLAND LK		OLIGOTROPHIC	1.4								3.0	7.0
J C BOYLE RES		EUTROPHIC	3.3	0.02	165.0	2.00	1.14	10.6	3.3	21.4	7.8	

TABLE 2

PREDICTED SUMMER AVERAGE CHLOROPHYLL A VALUES FOR SELECTED OREGON LAKES.

(SOURCE: ATLAS OF OREGON LAKES)

LAKE NAME	COUNTY	TROPHIC CLASSIFICATION	MEAN DEP z (m)	RES TIME Tw (yr)	Qs (z/Tw) (m/yr)	Persis P Load L(P) (gP/m yr)	(1+ Tw) (yr)	Norm AA Load (g P/m)	P Ave Sum Chlor a (ug/l)	Qs (z/Tw) (ug/l)	pH (su)
JUBILEE RES		MESOTROPHIC	4.9	0.17	28.8	0.58	1.41	12.3	3.7	2.5	7.3
LK OF THE WOODS		MESOTROPHIC	8.1	2.2	3.7	0.15	2.48	16.4	4.6	0.8	7.4
LANGSON RES		EUTROPHIC	1.7	0.17	10.0	0.20	1.41	14.2	4.1	9.7	6.9
LAURENCE RES		MESOTROPHIC	13.4	0.25	53.6	0.75	1.58	9.3	3.0	3.0	7.4
LAVA LK		OLIGOTROPHIC	6.0	1.3	4.6	0.16	2.14	16.2	4.6	3.5	7.9
LEWOLD RES		MESOTROPHIC	9.0	0.42	21.4	0.35	1.65	9.9	3.1	15.2	9.5
LINTON LK		OLIGOTROPHIC	9.3							0.2	
L CULTUS LK		OLIGOTROPHIC	5.1	0.75	6.8	0.19	1.87	15.0	4.3	1.1	8.1
L LAVA LK		MESOTROPHIC	2.4	0.17	14.1	0.30	1.41	15.0	4.3	1.9	7.8
LOOKOUT PT RES		MESOTROPHIC	31.7	0.16	198.1	2.60	1.40	9.4	3.0	0.8	8.0
LOON LK		OLIGOTROPHIC	16.3	0.00	283.8	2.60	1.20	9.9	3.2	0.5	7.8
LOST CK RES		MESOTROPHIC	41.5	0.33	125.8	1.80	1.57	9.1	2.9	0.5	7.7
LOST LK	LINN	MESOTROPHIC	1.3							1.3	7.9
LOST LK	HOOD	OLIGOTROPHIC	23.5	1.5	15.7	0.30	2.22	8.6	2.8	0.8	8.5
LOST R RES		EUTROPHIC								8.8	8.5
LOWER EDEBLED LK		ULTRALIGOTROPHIC	21.2	1.0	21.2	0.35	2.00	8.3	2.7	0.1	7.8
LOWER ERMA BELL LK		OLIGOTROPHIC	14.1							1.1	6.5
LYTLE LK		MESOTROPHIC	1.0	0.04	25.0	0.42	1.20	14.0	4.1	6.7	6.7
MARONE LK		MESOTROPHIC	8.8	5.8	1.5	0.12	3.41	23.2	6.0	4.8	8.7
MALHEUR LK		EUTROPHIC	0.5	7.4	0.1	0.10	3.72	397.8	52.1	7.8	7.8
MALHEUR RES		EUTROPHIC	11.6	0.83	14.0	0.38	1.91	11.2	3.5	25.3	9.1
MANN LK		HYPEREUTROPHIC	1.0							2.6	8.7
MARION LK		MESOTROPHIC	19.4	0.42	46.2	0.68	1.65	8.9	2.9	0.2	8.5
MCKAY RES		EUTROPHIC	14.4	0.92	15.7	0.30	1.96	9.8	3.1	3.7	8.8
MERCER LK		MESOTROPHIC	7.1	0.33	21.5	0.35	1.57	10.3	3.2	9.2	8.7
MIDDLE GREEN LK		OLIGOTROPHIC	5.4	0.42	12.9	0.30	1.65	14.2	4.1	0.2	
MILLER LK		OLIGOTROPHIC	23.6	2.9	8.1	0.26	2.78	9.1	2.9	1.9	
MINAM LK		OLIGOTROPHIC	3.0	0.42	7.1	0.19	1.65	16.1	4.6	0.3	7.2
MINK LK		ULTRALIGOTROPHIC	11.3							0.2	
MIRROR LK		OLIGOTROPHIC	9.0	0.58	15.5	0.12	1.76	4.4	1.7	0.1	7.8
MIRROR POND		MESOTROPHIC								6.2	7.5
MONON LK		ULTRALIGOTROPHIC	2.2							0.2	
MORGAN LK		EUTROPHIC	5.0							1.8	8.1
MOWICH LK		ULTRALIGOTROPHIC	5.7	0.17	33.5	0.55	1.41	11.6	3.6	0.1	
MUNSEL LK		MESOTROPHIC	9.3	1.0	9.3	0.28	2.00	10.6	3.3	0.9	7.1
NORTH FR RES		MESOTROPHIC	13.2	0.02	668.0	0.20	1.14	10.9	3.4	1.4	
N TENMILE LK		EUTROPHIC	3.4	0.17	20.0	0.35	1.41	12.4	3.7	5.7	7.1
N TWIN LK		MESOTROPHIC	12.2	19.0	0.6	0.10	5.36	29.1	7.1	1.8	8.2
OBENCHAIN RES		MESOTROPHIC	1.5	0.58	2.6	0.13	1.76	28.5	7.0	2.6	8.7
ODHCO RES		EUTROPHIC	8.4	0.42	20.0	0.35	1.65	10.6	3.3	5.1	8.4
ODELL LK		MESOTROPHIC	48.2	8.0	5.0	0.16	3.83	8.3	2.8	2.2	9.3
OLALLA RES		MESOTROPHIC	8.2							1.2	6.5
OLALLIE LK		ULTRALIGOTROPHIC	5.0							0.3	
OLIVE LK		MESOTROPHIC	7.7	0.83	9.3	0.22	1.51	12.4	3.7	4.3	7.6
OSWEGO LK		HYPEREUTROPHIC	7.8	0.17	45.9	0.68	1.41	10.5	3.3	2.3	9.2
OWHEE RES		EUTROPHIC	24.6	1.7	14.5	0.30	2.30	9.0	2.9	1.4	8.4

LAKE NAME	COUNTY	TROPHIC CLASSIFICATION	MEAN DEP z (m)	RES TIME Tw (yr)	Qs (z/Tw) (m/yr)	Persis P Load L(P) (gP/m yr)	(1+ Tw) (yr)	Norm AA Load (g P/m)	P Ave Sum Chlor a (ug/l)	Qs (z/Tw) (ug/l)	pH (su)
PAMELIA LK		MESOTROPHIC	1.0	0.08	12.5	0.27	1.28	16.8	4.7		7.0
PAULINA LK		MESOTROPHIC	49.7	46.0	1.1	0.11	7.78	13.1	3.9	24.7	8.5
PENLAND RES		MESOTROPHIC	2.5	4.0	0.6	0.10	3.80	53.3	11.3	5.4	8.0
PHILLIPS RES		MESOTROPHIC	12.6	0.83	15.2	0.30	1.91	10.3	3.3	2.5	8.2
PINE HOLLOW RES		MESOTROPHIC	6.4							0.9	
PLAT I RES		MESOTROPHIC	1.4							0.3	7.0
PRINEVILLE RES		EUTROPHIC	15.5	0.67	23.1	0.42	1.82	10.0	3.2	1.5	8.4
RIVER MILL RES		MESOTROPHIC	7.4	0.02	378.0	4.90	1.14	11.6	3.5	1.1	
ROCK CK RES	WASCO	MESOTROPHIC	3.5	0.08	43.8	0.65	1.28	11.6	3.5	1.0	
ROCK CK RES	HARNEY	EUTROPHIC	4.7							3.1	7.4
ROSLYN RES		MESOTROPHIC	2.4								1.7 7.4
ROUND VALLEY RES		EUTROPHIC	1.4	1.4	1.0	0.11	2.18	50.4	10.8	7.2	8.2
SAUNDERS LK		MESOTROPHIC	3.4							1.2	
SCOTT LK		OLIGOTROPHIC	1.1							0.2	6.5
SELMAC RES		MESOTROPHIC	2.1							2.4	7.5
SILTCOOS LK		EUTROPHIC	3.3	0.17	19.4	0.35	1.41	12.0	3.8	8.4	8.3
SIMTUSTUS RES		EUTROPHIC	15.9	0.17	93.5	1.30	1.41	9.8	3.1	19.1	8.9
SMITH LK	CLATSOP	EUTROPHIC	0.9							3.4	7.8
SMITH LK	MULT	EUTROPHIC	0.3							0.3	8.4
SMITH RES		OLIGOTROPHIC	26.2	0.21	124.8	1.80	1.46	9.9	3.1	0.5	7.2
S TWIN LK		MESOTROPHIC	18.2	22.0	0.5	0.10	5.69	37.9	8.7	1.0	8.3
SPARKS LK		OLIGOTROPHIC	0.4							0.3	6.5
SPRING LK		HYPEREUTROPHIC	0.5							1.7	
SQUAN LK		MESOTROPHIC	16.4	1.5	10.9	0.25	2.22	10.3	3.2	2.8	8.2
STRAWBERRY LK		OLIGOTROPHIC	2.7	0.08	33.8	0.55	1.28	12.7	3.8	0.3	6.5
STRAWBERRY RES		MESOTROPHIC	1.6	1.0	1.6	0.12	2.00	37.5	8.7	2.2	6.9
STURGEON LK		EUTROPHIC	0.2							0.2	
SUMMER LK		HYPEREUTROPHIC	0.3	3.5	0.1	0.10	2.87	486.4	52.9	53.1	9.7
SUMMIT LK		ULTRALIGOTROPHIC	7.0	1.0	7.0	0.19	2.00	13.6	4.0	8.1	6.7
SUNSET LK		EUTROPHIC	2.5							8.3	8.2
SUTTLE LK		EUTROPHIC	13.5	5.2	2.6	0.13	3.28	15.3	4.4	15.7	8.4
SUTTON LK		EUTROPHIC	5.8	0.08	72.5	1.10	1.28	11.8	3.6	8.8	6.8
TAKENITCH LK		MESOTROPHIC	3.3	0.17	19.4	0.35	1.41	12.8	3.8	5.7	7.3
TENMILE LK		EUTROPHIC	3.0	0.08	37.5	0.57	1.28	11.0	3.6	5.6	7.0
THIEF VALLEY RES		EUTROPHIC	6.2	0.13	47.7	0.65	1.36	10.0	3.2	5.7	8.4
THOMPSON VALLEY RES		MESOTROPHIC	1.3							0.7	7.6
THREE CK LK		OLIGOTROPHIC	3.4	0.5	6.8	0.19	1.71	16.4	4.6	0.7	6.9
THREEMILE LK		MESOTROPHIC	3.9	0.17	22.9	0.40	1.41	12.3	3.7		7.6
TIMOTHY RES		MESOTROPHIC	13.6	0.58	23.4	0.42	1.76	18.2	3.2	3.0	7.3
TODD LK		OLIGOTROPHIC	6.4	0.58	11.0	0.25	1.76	12.9	3.8	0.9	
TOKETE RES		MESOTROPHIC	3.4	0.088	425.0	5.40	1.09	11.7	3.6	1.5	8.5
TORREY LK		OLIGOTROPHIC	1.6							0.4	7.1
TRAIL BRIDGE RES		OLIGOTROPHIC	8.3	0.02	415.0	5.40	1.14	11.4	3.5	0.3	7.4
TRIANGLE LK		MESOTROPHIC	15.8	0.08	197.5	2.60	1.28	10.3	3.2	2.1	7.0
TRILLIUM LK		MESOTROPHIC	1.9	0.17	11.2	0.25	1.41	15.8	4.5	3.0	6.6

TABLE 2

PREDICTED SUMMER AVERAGE CHLOROPHYLL A VALUES FOR SELECTED OREGON LAKES.(SOURCE: ATLAS OF OREGON LAKES.)

LAKE NAME	COUNTY	TROPHIC CLASSIFICATION	MEAN DEP z (m)	RES TIME Tw (yr)	Qs (z/Tw) (m/yr)	Perenis P Load L(P) (gP/m ² yr)	(1+ Tw) (yr)	Norm AA P Load (mg P/m ²)	Ave Sun Chlor a value (ug/l)	Sun Chl a value (ug/l)	pH (su)
UNITY RES		EUTROPHIC	0.2	0.43	19.1	0.35	1.66	11.1	3.4	17.7	9.6
UPPER COW LK		HYPEREUTROPHIC	2.2	0.42	5.2	0.16	1.65	18.5	5.1	5.6	7.8
UPPER KLAMATH LK		HYPEREUTROPHIC	4.2	0.04	105.0	1.40	1.20	11.1	3.4	4.4	9.1
UPPER TUMALO RES		MESOTROPHIC	1.8							0.6	6.4
VALSETZ RES		MESOTROPHIC	3.5	0.08	43.0	0.65	1.20	11.6	3.5	1.6	7.0
VERNONIA MILLPOND		MESOTROPHIC	0.5							3.1	6.7
WANTON LK		OLIGOTROPHIC	18.2	1.4	13.0	0.20	2.18	9.9	3.1	0.7	6.9
WALDO LK		ULTRALIGOTROPHIC	39.0	32.0	1.2	0.11	6.66	13.6	4.0	0.1	6.7
WALLOWA LK		OLIGOTROPHIC	49.1	2.5	19.6	0.35	2.58	6.9	2.4	1.9	8.2
WALTON RES		MESOTROPHIC	3.5	0.5	7.0	0.19	1.71	15.9	4.5	3.2	8.3
WARM SPRINGS RES		EUTROPHIC	20.7	2.2	9.4	0.22	2.48	9.4	3.0	3.7	8.1
WICKIUP RES		MESOTROPHIC	6.1	0.42	14.5	0.30	1.65	12.5	3.8	1.7	7.6
WILLOW RES		EUTROPHIC	7.2	0.5	14.4	0.30	1.71	12.2	3.7	1.9	7.7
WILLOW VALLEY RES		EUTROPHIC	3.5	0.33	10.6	0.25	1.57	15.0	4.3	5.2	7.2
WINDPEE LK		OLIGOTROPHIC	1.6							0.3	6.6
WOSHINK LK		OLIGOTROPHIC	9.9	1.2	8.2	0.20	2.10	11.6	3.5	1.0	7.5
WOLF Ck RES		EUTROPHIC	14.2	1.0	7.9	0.20	2.34	10.8	3.4	4.1	8.0



STATE OF OREGON
Environmental Quality
Laboratories & Applied Research

INTEROFFICE MEMO

TO: Interested Parties

DATE: October 16, 1985

FROM: Andrew L. Schaedel

SUBJECT: Nutrient Standards

At the September 27, 1985 meeting, the Environmental Quality Commission (EQC) reviewed an "Informational Report - Water Quality Standards for Nutrients" (attached) and received testimony on the subject. Two options which address nuisance aquatic growth and nutrient standards were proposed (pages 6&7 in the attachment). The Commission requested that the Department take both options out to public hearing to receive further testimony before taking any action. After receiving a summary of public comment, the Commission may adopt either option, both options, a combination or modification of options or take no action.

The Commission also recommended that the nutrient standard option be restricted to a seasonal basis. The Department is suggesting that this standard be limited to the summer period. This period is suggested because it covers the peak recreational use season, the period of peak nuisance aquatic growth and the low flow period.

The Department has conducted a preliminary analysis of ambient river data collected since 1978. The purpose of the analysis was to suggest which major rivers of the State may be in violation of the suggested standards. The results are summarized in Table 1.

If you have further questions on the attached material, please contact Andy Schaedel at 503-229-5983 or toll free at 1-800-452-4011.

TABLE 1

PRELIMINARY ANALYSIS OF STREAM SEGMENTS EXCEEDING
 PROPOSED NUTRIENT STANDARDS
 (BASED ON DEQ AMBIENT RIVER DATA 1978 - 1984)

RIVER SEGMENT (RIVER MILES)	CHLOROPHYLL a THREE MONTH AVERAGE	TOTAL PHOSPHORUS SUMMER AVERAGE
COQUILLE R NR COQUILLE (RM 0-36)	X	
UMPQUA R BELOW ROSEBURG (RM 47-103)	X	X
S. UMPQUA R NR ROSEBURG (RM 0-15)	X	X
ROGUE R BELOW GRANTS PASS (RM 27-95)		X
ROGUE R NR GRANTS PASS (RM 95-111)		X
ROGUE R NR MEDFORD (RM 111-127)		X
BEAR CK NR MEDFORD (RM 0-23)	X	X
L. BUTTE CK NR EAGLE POINT (RM 0-17)		X
WILLAMETTE R NR PORTLAND (RM 3-26)	X	X
WILLAMETTE R NR CANBY (RM 26-45)	X	X
WILLAMETTE R NR NEWBERG (RM 45-63)	X	X
TUALATIN R BELOW HILLSBORO (RM 0-39)	X	X
PUDDING R NR CANBY (RM 0-30)		X
YAMHILL R BELOW MCMINNVILLE (RM 0-11)		X
S. YAMHILL R NR MCMINNVILLE (RM 0-25)	X	
MARYS R NR CORVALLIS (RM 0-17)	X	X
HOOD R NR HOOD R (RM 0-12)		X
DESCHUTES R NR MOODY (RM 0-46)	X	X
DESCHUTES R NR WARM SPRINGS (RM 47-100)	X	X
DESCHUTES R BELOW BEND (RM 100-164)	X	
DESCHUTES R NR SUNRIVER (RM 164-182)	X	
CROOKED R BELOW PRINEVILLE (RM 0-70)	X	X
UMATILLA R NR HERMISTON (RM 0-35)	X	X
UMATILLA R BELOW PENDLETON (RM 35-57)	X	X
GRANDE RONDE R BELOW LA GRANDE (RM 96-160)	X	X
POWDER R BELOW BAKER (RM 0-72)	X	X
BURNT R NR HUNTINGTON (RM 0-42)	X	X
MALHEUR R NR ONTARIO (RM 0-69)	X	X
WILLOW CK NR VALE (RM 0-27)		X
BULLY CK NR VALE (RM 0-24)		X
OWYHEE R NR ADRIAN (RM 0-18)		X
KLAMATH R BELOW KEND (RM 224-250)	X	X
KLAMATH R BELOW KLAMATH FALLS (RM 210-224)	X	X
KLAMATH STRAIT NEAR MIDLAND	X	X
LINK R NR KLAMATH FALLS	X	X
LOST R NR MERRIL (RM 5-65)	X	X
WILLIAMSON R NR CHILOGUIN (RM 0-11)		X

Oregon Department of Environmental Quality

A CHANCE TO COMMENT ON...

Nutrient Standards -- Public Hearing

Date Prepared: October 11, 1985
Hearing Dates: November 18, 1985,
November 25, 1985,
December 3, 1985
Record Closed: December 6, 1985 --
5:00 p.m.

**WHO IS
AFFECTED:**

All residents, businesses, industries and local governments in the State of Oregon.

**WHAT IS
PROPOSED:**

The Department proposes to add nutrient standards to existing Water Quality Standards contained in OAR Chapter 340.

**WHAT ARE THE
HIGHLIGHTS:**

The Department recently conducted its triennial review of the Water Quality Standards contained in OAR Chapter 340, Division 41. Based on this review, the issue of standards which address nutrients and/or nuisance aquatic growth was raised. At the July 17, 1985, Environmental Quality Commission (EQC) meeting, the Department was directed to develop an issue paper which proposes Water Quality Standards for nutrients. This paper was presented at the September 27, 1985, EQC meeting. The Commission directed the Department to take two proposed options out to public hearing.

The first option addresses nuisance growth conditions. A chlorophyll a standard of 0.01 mg/l shall not be exceeded as an average over a three (3) month period. If exceeded, the water body is declared to be in non-attainment. The Department will conduct further study (in accordance with a schedule approved by the Commission) to determine probable causes, beneficial use impacts, control strategy alternatives, or other appropriate actions. Necessary public hearings will be held and a control strategy implemented upon authorization and adoption by the Commission.

The second option addresses nutrients. Specific concentrations for total phosphate phosphorus (as a summer average), nitrate nitrogen and un-ionized ammonia shall not be exceeded. If exceeded, the standard shall become an effluent standard for point source discharges to such water. Best management practices for non-point sources shall be evaluated and revised as necessary to attain compliance. Where standards are not exceeded, increments allocated to new or expanded sources shall not exceed 10 percent of the difference between the ambient level and the standard. Specific standards for individual water bodies may replace the suggested standard.

FOR FURTHER INFORMATION:

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



P.O. Box 1760
Portland, OR 97207

8/16/84

Based on public hearing testimony, the Commission may adopt either option, both options, a combination of the options, modifications of the options or take no further action.

The fiscal and economic impact of adopting nutrient standards could be large and far-reaching. No specific cost estimates are available as they would depend on which nutrient standard option or combination of options is adopted and various characteristics of each specific water body and waste treatment facility. Public comment is invited on the nutrient standard options as well as any projection of fiscal and economic impact.

**HOW TO
COMMENT:**

Public Hearings

- Portland -- November 18, 1985, 1:30 p.m. -- Commission Room, Department of Fish & Wildlife, 506 SW Mill Street, Portland, Oregon
- La Grande -- November 25, 1985, 7:00 p.m. -- Room 309, Hoke, Eastern Oregon State College, 8th & K Avenue, La Grande, Oregon
- Medford -- December 3, 1985, 1:30 p.m. -- Auditorium, Jackson County Courthouse, Oakdale between 8th and Main, Medford, Oregon

Written comments should be sent to the Department of Environmental Quality, Water Quality Division, P.O. Box 1760, Portland, OR 97207. The comment period will end December 6, 1985, 5:00 p.m.

Any questions or requests for draft rules and background information should be directed to Andy Schaedel, 229-5983 or toll free 1-800-452-4011.

**WHAT IS THE
NEXT STEP:**

After the hearing record has been evaluated, the rules as proposed or revised will be presented for Commission approval.

DER

STATEMENT OF NEED FOR RULEMAKING

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

(1) Legal Authority

ORS 468.735 provides that the Commission by rule may establish standards of quality and purity for waters of the state in accordance with the public policy set forth in ORS 468.710. ORS 183.545 requires a review every three (3) years of state agency Administrative Rules to minimize the economic effect these rules may have on businesses. ORS 183.550 requires, among other factors, that public comments be considered in the review and evaluation of these rules.

(2) Need for the Rule

The Environmental Quality Commission, at its September 27, 1985 meeting reviewed a report which presented two possible options for the establishment of nutrient standards. The Commission instructed Department of Environmental Quality staff to hold hearings on both approaches and to also consider testimony for combining all or parts of the approaches. The approaches to nutrient standards are summarized below:

1. Nuisance Aquatic Growth -- Specifies an average chlorophyll a concentration not be exceeded over a three (3) month period. If exceeded, the water body is declared in non-attainment and further studies are conducted to determine causes, beneficial use impacts, control strategies or other appropriate actions.
2. Nutrient Standards -- Specific limits for total phosphate phosphorus, nitrate nitrogen and un-ionized ammonia are established. If exceeded, the limits become an effluent standard for point sources and best management practices are evaluated and revised for non-point sources to attain compliance. Limits are specified for new or expanded sources in attainment areas. Specific standards for individual water bodies may be specified.

Either option, both options, a modification or combination of these options or no action may be taken by the Commission after the hearing record has been evaluated.

(3) Principal Documents Relied Upon in this Rulemaking

Clean Water Act amended in 1981.

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

Agenda Item No. Q, September 27, 1985, EQC Meeting; Information Report -- Water Quality Standards for Nutrients.

ORS 468.735; ORS 468.710; ORS 183.545; and ORS 183.550.

(4) Fiscal and Economic Impact

Adoption and implementation of nutrient standards could result in increased costs to local governments, small businesses, and individuals for treatment and control of point source and non-point source wastes. Specifically, increased costs for wastewater treatment could be incurred by municipalities, private utilities, and industries to reduce nutrient loadings to surface waters. These costs would break down into two categories: (1) capital construction costs for advanced waste treatment facilities to provide nutrient removal, and (2) increased operating costs.

The possibility of requiring land treatment, thus eliminating a discharge to surface waters exists. The potential costs could be quite significant. No specific cost estimates are available at this time, as they depend on a variety of factors including which nutrient option is chosen and characteristics of specific water bodies and waste treatment facilities.

In addition, increased costs could be incurred by a wide range of individuals and governmental entities for the improvement of management practices. These costs would relate to improving management practices to better control non-point sources of nutrients in the areas of fertilizer applications, erosion control, animal waste management, and storm water drainage.

In summary, the fiscal and economic impact of adopting nutrient standards could be large and far-reaching. The impact is not well defined, as it depends on which nutrient standard option or combination of options is adopted and is water body specific. Public comment on any fiscal and economic impact is welcome and may be submitted in the same manner as indicated for testimony in this notice.

(5) Land Use Consistency

The Department has concluded that the proposal conforms with the Statewide Planning Goals and Guidelines.

Goal 6 (Air, Water and Local Resources Quality): Nutrient standards are designed to improve water in water bodies where nuisance or other deleterious conditions are caused by excessive concentration of nutrients, and to maintain water quality statewide.

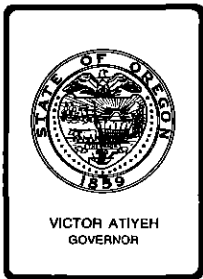
Goal 11 (Public Facilities and Services): To attain compliance with nutrient standards, additional costs for capital improvements and operation of wastewater treatment facilities may be incurred depending on which nutrient standard option or combination of options is adopted and on the specific water body. Additional planning to insure timely, orderly and efficient arrangement of facilities to provide needed nutrient removal to meet a standard will be required in many cases.

The rule does not appear to conflict with other Goals.

Public comment on any land use issue involved is welcome and may be submitted in the same manner as indicated for testimony in this notice. It is requested that local, state, and federal agencies review the proposed action and comment on possible conflicts with their programs affecting land use and with Statewide Planning goals within their expertise and jurisdiction.

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

Andrew L. Schaedel
229-5983
October 11, 1985
WH448.1



Department of Environmental Quality

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MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. Q, September 27, 1985, EQC Meeting

Information Report -- Water Quality Standards for Nutrients

Background

At the July 17, 1985 meeting, the Commission considered Agenda Item J, Proposed Adoption of Amendments to Water Quality Standards Regulations, OAR Chapter 340, Division 41. As a part of that package, the Department proposed that issue papers be prepared by Spring 1986 for additional potential rule amendments. Potential nutrient standards were included as one proposed issue paper.

Testimony was given by representatives of environmental organizations and the Lake Oswego Corporation requesting immediate adoption of nutrient standards. The testimony suggested that nutrient standards were necessary to protect water quality from excessive algae and plant growth and that sufficient information exists to support adoption of standards. The department indicated that substantial information would have to be assembled but that priorities could be rearranged to accelerate the schedule for nutrient standard development.

A motion was passed by the Commission to direct the staff to come back at the September meeting with a specific idea on how to accelerate the adoption of interim and/or permanent nutrient standards.

The Department has initiated review of the extensive body of literature regarding the development and application of nutrient standards. EPA has sponsored periodic literature reviews which have been summarized in water quality criteria guidance documents as follows:

"Water Quality Criteria", Report of the National Technical Advisory Committee to the Secretary of the Interior, April 1, 1968 (often referred to as the "Green Book").

"Water Quality Criteria 1972", A report of the Committee on Water Quality Criteria, Environmental Studies Board, National Academy of Sciences, National Academy of Engineering, 1972 (often referred to as the "Blue Book").

"Quality Criteria for Water", July 1976, U. S. Environmental Protection Agency (often referred to as the "Red Book").

Since these summary documents were prepared, much more literature has become available which supplements and in some cases contradicts earlier information. More recent documents of particular interest include:

"A Review of the EPA Red Book: Quality Criteria for Water", April 1979, Water Quality Section, American Fisheries Society.

"Summary Analysis of the North American (U. S. Portion) OECD Eutrophication Project: Nutrient Loading - Lake Response Relationships and Trophic State Indices", January 1978, by Walter Rast and G. Fred Lee.

Based on the review of these and other documents to date, this report summarizes general background information on the significance of nutrients in water bodies, reviews possible nutrient control approaches, and recommends an approach toward development of interim standards.

Nutrients and Aquatic Growth

A more detailed discussion of the significance of nutrients in water bodies is presented in Attachment A. The following is a brief summary of that discussion.

The term nutrients applies broadly to those chemicals necessary to support life. However, for the purpose of this discussion, it is limited to forms of phosphorus and nitrogen used in plant growth. These chemicals are most commonly found to either limit aquatic growth when in low concentrations or to stimulate growth when in excess concentrations.

Plants vary as to the amount and kind of nutrient required and the process used to obtain nutrients. For example, rooted aquatic plants can obtain nutrients from the sediment as well as the water column and blue-green algae can obtain nitrogen from the atmosphere. Even with all the nutrients necessary for plant growth present, growth will not take place unless environmental factors such as sunlight, current velocity, temperature and substrate are suitable. Environmental factors necessary for the type of plant community and water body being addressed must be considered in order to properly develop nutrient criteria to control aquatic plant growth. For example, for deep stratified lakes where phosphorus is the limiting nutrient, a load-response relationship has been developed between the total phosphorus loading and the mean depth and retention time in order to predict algal growth.

Nutrient Standards - Background

Several efforts have compiled information on potential pollutant parameters including nutrients. These efforts summarized available literature to

establish criteria upon which water quality standards can be based. The three water quality criteria documents previously cited are examples. The term "criterion" means a designated concentration of a constituent that when not exceeded, will protect an organism, community or a prescribed use or quality with an adequate degree of safety. A criterion may be a narrative statement instead of a constituent concentration. A water quality standard connotes a legal entity for a particular water body or an effluent. Therefore, the criteria were intended as guidelines only, to be used in conjunction with a thorough knowledge of local conditions.

The "red book" is the first criteria document to discuss specific parameter levels for nutrients. Previous criteria documents ("green book" and "blue book") discuss factors that affected recreational and aesthetic values of water. These documents recognized the role of nutrients in eutrophication but no numeric criteria were recommended. Instead, narrative criteria was used to describe nuisance or objectionable conditions and recommendations that waters be virtually free of substances that attribute to these conditions were made. It was stated that "specific numbers would add little to the usefulness of the descriptive recommendations because of the varying acuteness of sensory perception and because of the variability of substances and conditions so largely dependent on local conditions" (USEPA 1972). In essence, the criteria described were developed to protect the beneficial uses of swimming, boating, fishing and aesthetics by addressing nuisance growth rather than factors (such as nutrients) which may cause the growth. These documents recommended maintaining algal growth at natural levels and stressed the desirability of case-by-case studies for assessing the need for management programs. (See Attachment B for further background information). Numeric criteria were recommended for un-ionized ammonia, a toxic form of ammonia, (0.02 mg/l) to protect aquatic life and for Nitrate nitrogen (10.0 mg/l N) to protect public water supply usage.

Most states including Oregon adopted the narrative criteria as part of their water quality standards. Typical language from current Oregon Water Quality Standards address general nuisance conditions as follows:

- (2) No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause violation of the following standards in the waters of the Basin...
- (h) The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation, or industry shall not be allowed.

- (i) The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palability of fish shall not be allowed.
 - (j) The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed.
 - (k) Objectionable discoloration, scum, oily sleek or floating solids, or coating of aquatic life with oil films shall not be allowed.
 - (l) Aesthetic conditions offensive to the human senses of sight, taste, smell, or touch shall not be allowed.
- ...

In addition, Oregon standards recognize the need to protect lakes and reservoirs from nutrient enrichment due to point sources by prohibiting the discharge of wastes to lakes or reservoirs without EQC approval (340-41-026(4)).

The 1976 "red book" suggested a rationale to support a criterion for consideration for phosphate phosphorus. Total Phosphate as Phosphorus values suggested were:

- 0.025 mg/l - P for lakes or reservoirs
- 0.050 mg/l - P in streams at the point it enters a lake or reservoir
- 0.10 mg/l - P in other flowing waters

A number of exceptions that reduce the affect of phosphorus in lake eutrophy were suggested. These included:

- (1) The role of turbidity or color in reducing growth;
- (2) Lake morphometry factoring into growth response;
- (3) Other nutrients being limiting; and
- (4) Phosphorus control not being sufficiently effective under present technology to make phosphorus limiting.

No discussion of the role of nitrogen in eutrophication was presented. Therefore, no national criteria for nutrients were presented (Attachment C contains pertinent sections from the "red book"). The "red book" retained narrative criteria relating to nuisance conditions and their impact on aesthetic values.

A review of the "red book" criteria for phosphate phosphorus by the American Fishery Society (Attachment D) suggested the "red book" discussion to be simplistic. Specifically, the reliability of predicting water quality problems due to algae based on a phosphorus concentration at one time during the year was questioned. The American Fishery Society recommended an approach using annual phosphorus loading curves relative to the mean depth and retention time of stratified lakes where phosphorus is a limiting nutrient. These loading curves can be related to summer average chlorophyll a values (an indicator of algal cell mass). Chlorophyll a is a parameter commonly used to assess lake eutrophication. The review pointed out the need for additional criteria development for water bodies where algal growth is limited by nitrogen or other elements, by light, or where attached algae or macrophytes are the primary form of aquatic growth.

USEPA has not suggested further nutrient criteria to date. "Red book" criteria modifications have been made on a parameter by parameter basis with most of the work focusing on "toxic" chemicals and suggesting flexible criteria rather than a single numeric guideline. Several states have adopted the rationale suggested for a phosphate phosphorus criteria as part of their water quality standards (See Attachments E and F for a summary of State standards for Phosphorus and Nitrogen, respectively).

The wording of the current Oregon water quality standards does not provide a numerical definition describing "nuisance condition" or a course of action to take upon the identification of such a condition. Essentially, it provides a means of addressing a nuisance condition once it occurs. The phosphorus loading model for stratified lakes appears to be a useful tool, however, it requires site specific study to use it properly. In the absence of a specific standard, chlorophyll a values of either 0.01 or 0.015 mg/l and "red book" total phosphate phosphorus concentrations have been used as screening guidelines to identify potential problem areas where further study is appropriate.

Development of Alternative Standards

Issues associated with the development of standards include:

- (1) Selection of appropriate parameters and parameter values; and
- (2) Description of courses of action to be taken when the standard is not attained (Implementation program).

The Department is suggesting one of two basic approaches to better address nutrients standards at this time. The most significant difference between the approaches lies in implementation actions when the standards are exceeded. The first alternative suggests the adoption of chlorophyll a (0.010 mg/l) as a standard for identifying nuisance growth of phytoplankton (floating algae). The second alternative suggests a standard based on "red book" rationale for total phosphate phosphorus to address nutrient conditions.

In addition, criteria for un-ionized ammonia (aquatic life protection) and nitrate (water supply) are included (See Attachment C for further discussion).

Alternative one suggests a course of action that is somewhat similar to the air quality designation of attainment/non-attainment areas. Upon determination of non-compliance with the standard, the water body is declared to be in non-attainment. Further study is then carried out to determine the extent, probable causes, use impact and to propose control strategies or other appropriate action as part of the implementation plan to be reviewed and adopted by the Commission. The second alternative proposes a fixed course of action that will directly address point and non-point sources of pollution in order to gain compliance. A range of alternatives exists that falls within and between these two approaches.

Specific rule language for the two alternatives is presented next followed by a brief discussion of the rationale, advantages and disadvantages of each.

Alternative No. 1

STANDARDS APPLICABLE TO ALL BASINS

Nuisance Aquatic Growths

340-41-150 The following standard and implementation program shall be applied to lakes, reservoirs and streams to prevent nuisance growths of phytoplankton:

- (1) No wastes shall be discharged and no activities shall be conducted which will cause the level of Chlorophyll a in the waters of the state to exceed an average of 0.01 mg/l measured over any 3 consecutive month period.
- (2) Upon determination by the Department that the standard in Paragraph (1) is exceeded, the Department shall:
 - (a) Declare the appropriate stream reach or water body to be in non-attainment with the standard.
 - (b) In accordance with a schedule approved by the Commission, conduct such studies as are necessary to describe present water quality; determine the probable causes of the standard violation and beneficial use impact; and develop a proposed control strategy for attaining compliance including standards for

additional pollutant parameters, pollutant discharge load limitations, and such other provisions as may be appropriate;

- (c) Conduct necessary public hearings preliminary to adoption of a control strategy and additional standards after obtaining commission authorization;
- (d) Implement the strategy upon adoption by the Commission.

Alternative No. 2

STANDARDS APPLICABLE TO ALL BASINS

Nutrient Standards

340-41-150(1) No wastes shall be discharged and no activities shall be conducted which will cause the average concentrations measured in any three consecutive months (except as noted) for the following nutrients to be exceeded:

- (a) Total phosphate phosphorus in lakes-----0.025 mg/l as P
- (b) Total phosphate phosphorus in streams entering lakes----0.05 mg/l as P
- (c) Total phosphate phosphorus in other streams-----0.1 mg/l as P
- (d) Nitrate nitrogen, (N)-----10.0 mg/l as N
- (e) Un-ionized ammonia (individual value)-----0.02 mg/l

- (2) Upon determination that any of the above standards are exceeded, the standards shall be considered to be effluent standards for point source discharges to such waters. Permits for such discharges shall be modified to incorporate the appropriate standards together with a schedule for implementation. In addition, best management practices for non-point sources shall be evaluated and revised as necessary to attain compliance with the standards.
- (3) Where ambient levels of these nutrients are not exceeded, increments allocated to any new or expanded source shall not exceed 10% of the difference between the ambient level and the standard.
- (4) The standards and implementation program set forth in Paragraphs (1), (2), and (3) above shall be considered interim standards until replaced by specific standards for individual stream reaches or water bodies.

Discussion of Alternative 1

Rationale: Chlorophyll a was selected as the screening parameter to better quantify nuisance growth of phytoplankton. The relationship of chlorophyll a to algae concentrations is reasonably well established and has been used as a basis for lake classification and management schemes.

The concentration was based on work of C. N. Sawyer (1947) and is generally supported by other investigators. Sawyer related the "greenness" of water to chlorophyll a concentrations and found that concentrations of 0.010 mg/l or greater are often associated with water classified as eutrophic and possessing deteriorated water quality for beneficial uses. The three month average was suggested by the department to represent more typical conditions and to limit the influence of short-term blooms found in many lakes in the spring. Many researchers focus on a summer average to represent peak growth and water use conditions. The three-month average would include that period.

The recommended course of action is a further study because specific knowledge of nutrient relationships and loading is needed to develop a compliance strategy. Chlorophyll a is not discharged by sources but is influenced by a variety of factors including nutrient levels and environmental conditions. A procedure of declaring a water body to be in non-attainment, requiring further investigation, development of control strategies or other appropriate provisions and the adoption of the strategy upon hearing and EQC approval would better address the issue of nuisance growth than that currently being followed.

This alternative offers the following advantages:

- It provides a more direct or objective indicator of nuisance phytoplankton conditions than a nutrient value or narrative statement.
- Final control strategy is based on analysis of site specific data which provides reasonable assurance that the required controls will achieve a desired environmental benefit.
- Hearing process assures that ramifications of issues are understood prior to implementation.

Disadvantages include:

- It does not address periphyton or macrophytes (attached growth or rooted vegetation).
- There are limited rationale available for selection of the parameter concentration and averaging method.
- Further study (more data) is required rather than proposing immediate action for compliance.
- The standard does not directly translate to nutrients which are measurable and discharged from point sources.
- Further site specific studies may be resource intensive requiring a longer time period to achieve compliance with the standard.

Discussion of Alternative 2

Rationale: Total phosphate phosphorus concentrations were selected based on "red book" rationale for a criterion to control nuisance aquatic growth. The un-ionized ammonia level was suggested to protect freshwater aquatic life

from toxic affects and the nitrate nitrogen level was suggested to protect water supply use (both red book criteria).

The three-month average for total phosphate phosphorus and nitrate nitrogen was suggested by Department staff to represent more typical conditions. It may be desirable to focus the averaging period to spring and summer conditions, but no rationale for doing this was presented in the red book and this would reduce the potential screening of areas where annual loads are of a concern.

Numeric standards for nutrient parameters lend themselves to a more rigid course of action upon determination of non-compliance. When standards are not achieved, the standard becomes the point source effluent standard so that conditions do not get worse (the receiving water does not offer a dilution alternative). A further investigation of non-point sources is necessary in the case of non-compliance. In the case of compliance, new or expanded point sources are limited to a loading that would not exceed 10% of the difference between the ambient and standard levels. Finally, it is recognized that water bodies differ in their natural nutrient concentrations, therefore the standard is expected to be modified on a specific reach or water body basis.

This alternative offers the following advantages:

- Parameters and values are based on rationale presented in the "red book" (which is easy to reference).
- When a standard is exceeded, allowable discharge concentrations are automatically determined (i.e., the problem translates to a regulatory action).
- The fixed course of action leaves little doubt as to the strategy to achieve compliance.

Disadvantages include:

- There is no universal relationship between nutrient levels and aquatic growth (i.e., high nutrient concentrations do not necessarily produce nuisance aquatic growth).
- Does not address periphyton or macrophyton (attached growth or rooted vegetation).
- Course of action may be overly restrictive or costly and may not achieve environmental benefit (i.e., nutrient removal may be required with no discernable impact on nuisance aquatic growth).
- Standard may not be achievable under any circumstances due to natural conditions.

Discussion

The above alternatives are presented as possible interim standards that could proceed to hearing for possible adoption. Combinations of these alternatives could also be used. For example, nutrient parameter values in

Alternative 2 could be added to Alternative 1 to determine waters which are not in attainment.

A preliminary analysis of ambient river data collected at approximately 100 sites since 1975 showed that 18 sites exceeded the chlorophyll a standard and 57 sites exceeded the total phosphorus standard. All sites exceeding the chlorophyll standard also exceeded the total phosphorus standard. It was interesting to note that the Willamette River exceeded the total phosphorus criteria from Albany to the mouth especially during the high flow months between October and March. The chlorophyll a criteria was barely exceeded at one site in the Portland Harbor. This tends to support the U. S. Geological Survey conclusion that nutrients exceed levels for excessive growth but algal productivity is low and is limited by low light availability and short retention times of the water.

Director's Recommendation:

Based on information developed to date, the department would propose to proceed immediately to public hearing to consider adoption of Alternative 1 as a nuisance aquatic growth standard.

In addition, the department would propose to:

1. Develop an issue paper on nutrients that proposes further additions and refinements to this standard for consideration along with other proposed water quality standard revisions in the spring of 1986.
2. Include advisory language in permits that notifies sources of intended new instream standards and the potential for new requirements.
3. Complete the development of a detailed work plan for data collection and management plan revision for the Tualatin Sub basin and secure funding for the work effort. Data collection should begin by no later than January 1986. Preliminary target for management plan update hearings would be in the spring of 1987.



Fred Hansen

Attachments: A. Significance of Nutrients in Water Bodies
B. Excerpts from USEPA 1972 "Blue Book"
C. Excerpts from USEPA 1976 "Red Book"
D. Excerpts from AFS Review of EPA "Red Book"
E. Review of State Standards for Phosphorus
F. Review of State Standards for Nitrogen

Andy Schaedel:m
WM568
229-5983
September 16, 1985

ATTACHMENT A

Significance of Nutrients in Water Bodies

When discussing water quality, the term "nutrients" refers to the chemicals necessary to support growth of biological forms in water including algae, fungi, and bacteria. Nutrient chemicals are generally classified as macronutrients, micronutrients (trace elements), and organic nutrients. Macronutrients include carbon, calcium, potassium, magnesium, sodium, sulfur, nitrogen and phosphorus. Of these macronutrients, phosphorus is usually the controlling and controllable nutrient. Micronutrients include silica, manganese, zinc, copper, molybdenum, boron, titanium, chromium, cobalt, and perhaps vanadium. Examples of organic nutrients include biotin, vitamin B-12, thiamine, and glycylglycine.

The variety and quantity of biological species present in a water body will depend on the amounts and kinds of nutrients present in the water body, along with such factors as current, velocity flow, depth, temperature, available sunlight, turbidity and bottom type. A change in any of the conditions present could result in a change in the observed plant communities.

The most common concern with excess nutrients is the occurrence of "nuisance" plant growth that may interfere with the beneficial uses of a water body. Beneficial uses that can be affected include:

swimming, boating, fishing, water supply, animal watering and aesthetics.

Aquatic growth can be divided into three plant communities. These communities are:

- (1) Phytoplankton - community of plants that are generally microscopic and non-motile and thus float with the current, (e.g. suspended algae).
- (2) Periphyton - community of plants that are generally microscopic but are attached to the surfaces of submerged objects; (e.g. attached algae); and
- (3) Macrophyton - community of larger plants that are either attached to the bottom or are free-floating (e.g. rooted aquatic plants, duckweed, lily pads).

Whether or not these communities will exist in bodies of water will depend on physical factors such as current velocity, depth, and bottom substrate. The following table is a general guide of the "nuisance concern for each community as compared to the type of water body.

Relative Concern of Excessive Growth Potential
by Plant Community and Water Body

	<u>Phytoplankton</u>	<u>Periphyton</u>	<u>Macrophyton</u>
Flowing rivers	Low	High	Low
Sluggish rivers	High	Low	Medium
Deep stratified lakes	High	Low	Shallow shoreline areas
Shallow lakes	High	Low	High
Reservoirs	High	Low	Low

(Based on staff assessment and literature review.)

The approach to the development of nutrient standards must consider the plant community and type of water body. A more detailed discussion of nutrient concerns by plant community follows:

Phytoplankton

A comparatively large amount of scientific investigation has been undertaken in an effort to better understand nutrient relationships in lakes. Studies have sought to understand the causes and potential controls of "excessive phytoplankton production" that has accompanied increased urbanization, industrialization, artificial soil fertilization and soil mantle disruption within the drainage basins tributary to lakes.

Lakes have been classified as follows (Trophic Status):

Oligotrophic — low surface-to-volume ratio, a nutrient concentration that supports only a low level of aquatic productivity, a high dissolved oxygen concentration extending to the deep waters, and sediments largely inorganic in composition.

Eutrophic — high surface to volume ratio, an abundance of nutrients producing heavy growth of phytoplankton or macrophyton or both, contains highly organic sediments, and may have seasonal or continuous low dissolved oxygen concentrations in its deeper waters.

Mesotrophic — conditions lie between those of oligotrophic and eutrophic lakes.

Dystrophic — has waters brownish from humic materials, a relatively low pH, a reduced rate of bacterial decomposition, bottom sediments usually composed of partially decomposed vegetation, and low aquatic biomass productivity.

Oligotrophic or nutrient poor lakes are generally poor fish producers compared to mesotrophic or slightly eutrophic lakes. Eutrophic lakes may be unappealing for swimming or other contact recreation.

Nutrients are not the only factors influencing plant growth in lakes. Lake depth, hydraulic residence time, temperature, and solar incidence are among other factors controlling plant production.

An example in Oregon would be the differences between the productivity in Suttle Lake and Blue Lake in the Central Oregon Cascade Mountains. Blue Lake drains into Suttle Lake which in turn drains into Lake Creek and then to the Metolius River. The table below presents comparative information on the two lakes:

Comparison of Selected Data for
Blue and Suttle Lakes in Oregon

	<u>Blue Lake</u>	<u>Suttle Lake</u>
Drainage Basin Area	17 square miles	21 square miles
Lake Area	54 acres	253 acres
Lake Volume	7,600 acre ft.	11,200 acre ft.
Maximum Depth	314 ft.	75 ft.
Average Depth	140 ft.	44 ft.
Retention Time	Not determined.	5.2 years
Water Quality (7/21/82)		
Temperature	59°F	65°F
pH	6.9	8.4
Transparency	52.5 ft.	5.6 ft.
Phosphorous	0.029 mg/l	0.024 mg/l
Nitrate-N	0.02 mg/l	0.02 mg/l
Chlorophyll <u>a</u>	0.002 mg/l	0.016 mg/l
Alkalinity	16 mg/l	15 mg/l
Conductivity	50 umos/cm	50 umos/cm
Dissolved Oxygen	8.2 mg/l	8.3 mg/l
Trophic Status	Oligotrophic	Eutrophic
Temp. Profile	Pronounced Thermal Stratification	Weak Thermal Stratification

If the nutrient (phosphorus) content were the primary factor controlling algal growth, then one would expect the chlorophyll a values and trophic status to be similar for these two lakes.

Studies have with apparent reliability established relationships between mean depth, average hydraulic residence time, and total phosphorus loading in lakes that thermally stratify and phosphorus can be shown to be the nutrient which limits plant growth. In addition, a reasonable relationship has been demonstrated in such cases between phosphorus levels and chlorophyll a (a measure of the relative mass of phytoplankton present).

Using these relationships, a model has been developed to establish a concentration of chlorophyll a in the lake that should not be exceeded to protect the beneficial uses from excessive algae concentrations. It is further possible to estimate the total annual loading of phosphorus that should not be exceeded in order to achieve the objective. It is then necessary to quantify the present total annual loading of phosphorus to the lake, identify the individual sources or source categories contributing the phosphorus, evaluate potential options and costs for limiting or reducing loading for each source or source category, and finally determining whether desired conditions can be achieved. Thus, for a deeper, thermally stratified lake where phosphorus can be shown to be the limiting nutrient, and where total annual nutrient loading levels and sources are known, the tools appear to be available to establish theoretical maximum allowable phosphorus loads. (See Figure 1)

These tools may also apply to reservoirs that thermally stratify. However, the inflow and outflow patterns and the resultant conditions for distribution of nutrients may require modifications of the model.

Shallow lakes do not normally stratify, thus the nutrients in bottom sediments can be recycled for phytoplankton production. Therefore, management approaches and predictive models must take into account the influence of bottom sediments in shallow, unstratified lakes. Much research is currently being carried out on shallow lakes and impoundments but predictive models for establishing nutrient loading relationships have not been completed.

Nutrient impacts on rivers appear to have been studied less than lakes. Potential reasons include a greater lack of control over environmental factors that is desirable in research situations, and a lower occurrence of nuisance algae levels in flowing streams. Nuisance level algae concentrations can occur in very sluggish stream reaches where conditions approach those of shallow unstratified lakes and reservoirs. Predictive relationships between chlorophyll a, physical conditions, or levels of limiting nutrients have not generally been established. Case by case study is necessary to determine the potential for controlling nutrients or other conditions so as to limit algae production.

For example, USGS concluded that the Willamette River had summertime concentrations of nitrogen and phosphorus that exceeded the generally accepted levels for excessive algal growth. However, the productivity of the river was low, with algal communities present that do not form nuisance

conditions. Further testing found that nutrient addition did not affect algal production. USGS suggested that the short retention time and low light availability due to turbidity limited algal growth.

The department has attempted to apply this phosphorus load approach to Lake Oswego. Assuming that the lake stratifies, has a mean depth of 7.8 meters, and a mean residence time of 2.4 months, the maximum permissible loading of phosphorus would be 0.6 grams per square meter per year or 1975 pounds total phosphorus per year. Assuming the total load entered the lake through the diversion canal (an inaccurate assumption), and an annual average inflow through the canal of 70 cubic feet per second, the maximum allowable concentration of total phosphorus would be 0.014 mg/l. The median concentration of phosphorus in the Tualatin at Cherry Grove, above all known waste discharges, is 0.03 mg/l. The median concentration of phosphorus above the USA Rock Creek Plant discharge approaches 0.1 mg/l. Levels below the USA Durham plant discharge and mouth of Fanno Creek approximate 0.25 mg/l. USA is presently removing about 75% of the phosphorus in the influent waste during the summer months by addition of coagulant chemicals in the treatment process.

The above calculations and information raise a number of questions with respect to the Tualatin. Is phosphorus the limiting nutrient so that this approach is applicable? Will a reduction of phosphorus (or other nutrient) yield any noticeable change in algae levels in Lake Oswego? Is it technologically possible to reduce nutrients enough to be of benefit to the lake, particularly since concentrations in the basin headwaters (natural levels) exceed the theoretically allowable concentration? What portions of the phosphorus entering Lake Oswego annually comes from the Tualatin River? What portion comes from the land and development surrounding the lake itself?

What portion recycles from the bottom sediments? For the nutrient in the Tualatin River, what portion comes from point source discharges, urban runoff, agricultural runoff, and natural sources? If the Unified Sewerage Agency diverted 100% of its sewage effluent from the Tualatin basin (pipe it to the Willamette or Columbia River for example), what would be the expected benefit to Lake Oswego algae concentrations? Are there other approaches that could benefit the lake, such as increased inlet flow to reduce residence time, or reduction of nutrients for a limited seasonal period other than that presently required, or some other means? The department believes that significant additional information is needed before a nutrient control strategy for the Tualatin Basin can be established.

Periphyton

Periphyton are most typically a concern in shallow, clear flowing waters where there is a substrate for attachment and sufficient clarity for light penetration. These conditions may exist in shallow lakes, reservoirs and

sluggish rivers. Most research has focused on nuisance periphytic forms (such as Sphaerotilus and Cladophora) which, unlike phytoplankton, show dramatic effects immediately below organic pollution sources. Periphyton abundance and composition are governed by the water quality if proper physical conditions are present.

It is often difficult to collect quantitative samples of periphyton as they are dependent on gaining a representative surface for sampling. Growth on a surface may vary depending on stream canopy, orientation, substrate, velocity, predation, etc. Many studies use artificial substrates which have their own drawbacks. Most studies have focused on identifying general nuisance growth conditions or are site specific intensive surveys. Common water quality measurements, such as water column chlorophyll a or nutrient levels, do not necessarily reflect periphytic concentrations. Unlike phytoplankton, little research has been carried out to suggest a quantifiable level of nuisance growth or nutrient concentrations except in general, but readily discernable (visible), terms. Nuisance growth of periphyton most typically interferes with aesthetics, fish spawning and swimming uses.

Macrophyton

Macrophyton can grow in shallow water (depths up to 10 meters but more typically from 0 to 3 meters) and get much of their nutrient supply from the sediment. Their presence and growth depends on currents, substrate, depth, light and nutrients. They are typically predominant in small ponds, and in shallow lakes and slow moving waters. Rooted aquatic plants can obtain nutrients from the sediment, and will be present regardless of nutrient concentrations in the water column. Increased nutrient levels may increase macrophyte growth since the nutrient loads would likely contribute to the sediment.

Nuisance growth of macrophytes most typically interfere with boating, swimming and fishing uses. Typical water column measurements such as nutrient and chlorophyll a concentrations do not necessarily reflect macrophyten concentrations. Unlike phytoplankton, little work has been carried out to suggest a quantifiable level of nuisance growth or nutrient concentration. In addition, common approaches used in lake management to address macrophyton require manipulation of their environment not nutrient control. Examples are: dredging (Mirror Pond); herbicides (Blue Lake); lake drawdown (Blue Lake); grazing (with Grass Carp); covering of sediments; etc.

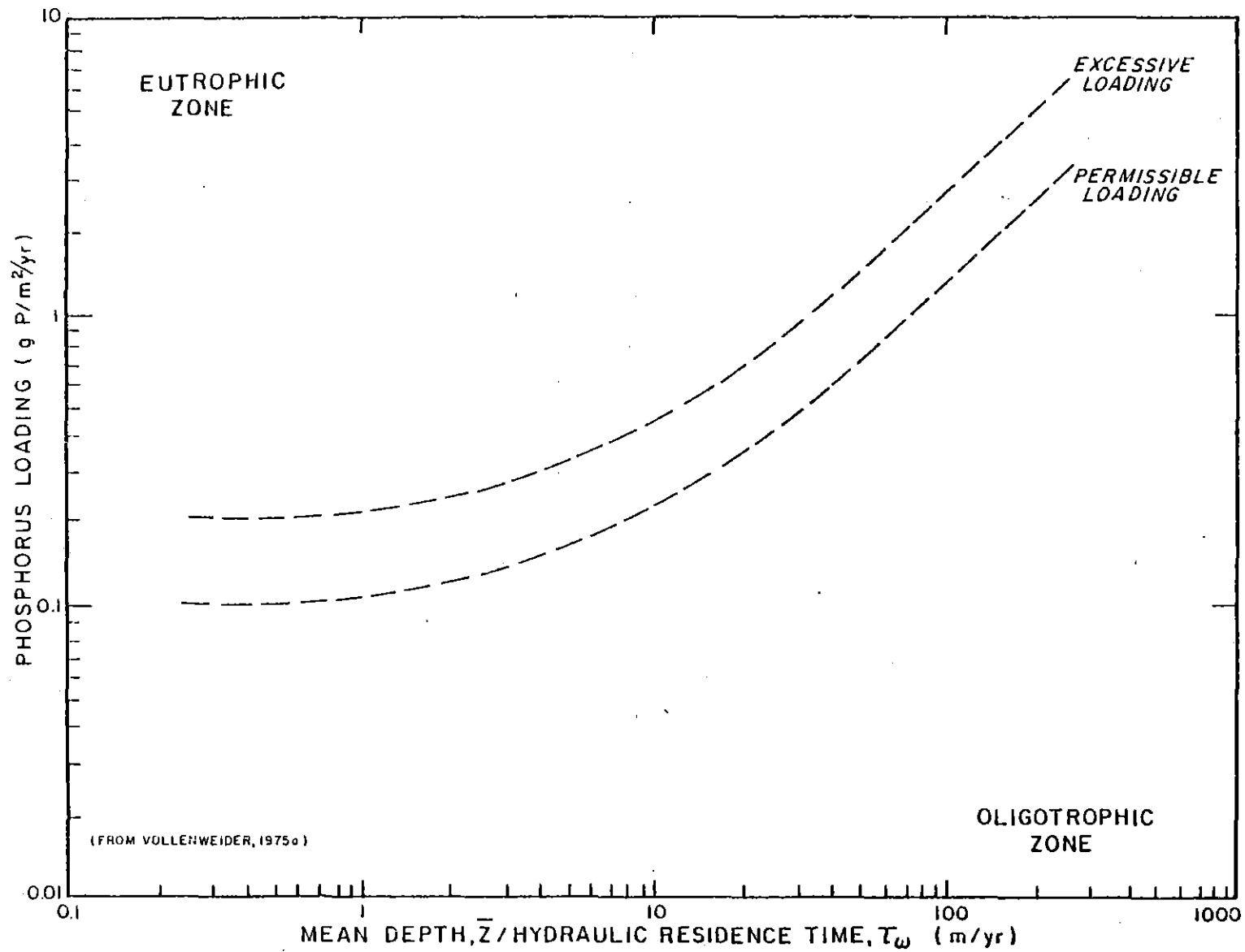


Figure 1. Modified Vollenweider Total Phosphorus Loading and Mean Depth/Hydraulic Residence Time Relationship.

Ref: After Rast and Lee, 1978

WATER QUALITY FOR PRESERVING AESTHETIC VALUES

Aesthetics is classically defined as the branch of philosophy that provides a theory of the beautiful. In this Section attention will be focused on the aesthetics of water in natural and man-made environments and the extent to which the beauty of that water can be preserved or enhanced by the establishment of water quality recommendations.

Although perceptions of many forms of beauty are profoundly subjective and experienced differently by each individual, there is an apparent sameness in the human response to the beauties of water. Aesthetically pleasing waters add to the quality of human experience. Water may be pleasant to look upon, to walk or rest beside, or simply to contemplate. It may enhance the visual scene wherever it appears, in cities or in the wilderness. It may enhance values of adjoining properties, public or private. It may provide a focal point of pride in the community. The perception of beauty and ugliness cannot be strictly defined. Either natural or man-made visual effects may add or detract, depending on many variables such as distance from the observer or the composition and texture of the surroundings. As one writer has said when comparing recreational values with aesthetics, "Of probably greater value is the relaxation and mental well-being achieved by viewing and absorbing the scenic grandeur of the great and restless Missouri. Many people crowd the 'high-line' drives along the bluffs to view this mighty river and achieve a certain restfulness from the proximity of nature" (Porges et al. 1952)¹⁹.

Similarly, aesthetic experience can be enhanced or destroyed by space relationships. Power boats on a two-acre lake are likely to be more hazardous than fun, and the water will be so choppy and turbid that people will hardly enjoy swimming near the shore. On the other hand, a sailboat on Lake Michigan can be viewed with pleasure. If a designated scenic area is surrounded by a wire fence, the naturalness is obviously tainted. If animals can only be viewed in restricted pens, the enjoyment is likely to be less than if they could be seen moving at will in their natural habitat.

MANAGEMENT FOR AESTHETICS

The management of water for aesthetic purposes must be planned and executed in the context of the uses of the land,

the shoreline, and the water surfaces. People must be the ultimate consideration. Aesthetic values relate to accessibility, perspective, space, human expectations, and the opportunity to derive a pleasurable reaction from the senses.

Congress has affirmed and reaffirmed its determination to enhance water quality in a series of actions strengthening the federal role in water pollution control and federal support for water pollution control programs of state and local governments and industry. In a number of states, political leaders and voters have supported programs to protect or even restore water quality with aesthetics as one of the values.

The recognition, identification, and protection of the aesthetic qualities of water should be an objective of all water quality management programs. The retention of suitable, aesthetic quality is more likely to be achieved through strict control of discharges at the source than by excessive dependence on assimilation by receiving waters. Paradoxically, the values that aesthetically pleasing water provide are most urgently needed where pollution problems are most serious as in the urban areas and particularly in the central portions of cities where population and industry are likely to be heavily concentrated.

Unfortunately, one of the greatest unknowns is the value of aesthetics to people. No workable formula incorporating a valid benefit-to-cost ratio has yet been devised to reflect tangible and intangible benefits accruing to conflicting uses or misuses and the cost of providing or avoiding them. This dilemma could be circumvented by boldly stating that aesthetic values are worth the cost of achieving them. The present public reaction to water quality might well support this position, but efforts in this area have not yet proceeded far enough to produce values worthy of wide acceptance. (See Appendix I.)

BASIS OF RECOMMENDATIONS FOR AESTHETIC PURPOSES

All surface waters should be aesthetically pleasing. But natural conditions vary widely, and because of this a series of descriptive rather than numerical recommendations is made. The descriptions are intended to provide, in general terms, for the protection of surface waters from substances or conditions arising from other than natural sources that

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might degrade or tend to degrade the aesthetic quality of the water. Substances or conditions arising from natural sources may affect water quality independently of human activities. Human activities that augment degradation from natural sources, such as accelerated erosion from surface disturbances, are not considered natural. The recommendations are also intended to cover degradation from "discharges or waste," a phrase embracing undesirable inputs from all sources attributable to human activities whether surface flows, point discharges, or subsurface drainages.

The recommendations that follow are essentially finite criteria. The absence of visible debris, oil, scum, and other matter resulting from human activity is a strict requirement for aesthetic acceptability. Similarly, recommended values for objectionable color, odor, taste, and turbidity, although less precise, must be measured as no significant increase over background. Characteristics such as excessive nutrients and temperature elevations that encourage objectionable abundance of organisms, e.g., a bloom of blue-green algae resulting from discharge of a waste with a high nutrient content and an elevated temperature, must be considered.

These recommendations become finite when applied as intended in the context of natural background conditions. Specific numbers would add little to the usefulness of the descriptive recommendations because of the varying acute-

ness of sensory perception and because of the variability of substances and conditions so largely dependent on local conditions.

The phrase "virtually free" of an objectionable constituent as used in the recommendations implies the concept of freedom from the undesirable effects of the constituent but not necessarily freedom from the constituent itself. This recognizes the practical impossibility of complete absence and the inevitability of the presence of potential pollutants to some degree.

Recommendations

Surface waters will be aesthetically pleasing if they are virtually free of substances attributable to discharges or waste as follows:

- materials that will settle to form objectionable deposits;
- floating debris, oil, scum, and other matter;
- substances producing objectionable color, odor, taste, or turbidity;
- substances and conditions or combinations thereof in concentrations which produce undesirable aquatic life.

Snails serving as intermediate hosts include *Lymnaea*, *Physa*, and *Gyraulus* (Cort 1950).⁴³ Although swimmers' itch has wide distribution, in the United States it is principally endemic to the north central lake region. Occasional incidence is reported in marine waters (Stunkard and Hinchliffe 1952).⁶²

About 90 per cent of severe swimmers' itch outbreaks are associated with *Cercaria stagnicola* shed from varieties of the snail *Lymnaea emarginata*. This relationship is promoted by (1) clean, sandy beaches ideal for swimming and preferred by the snail; (2) peak populations of the snail host that develop in sandy-bottomed lakes of glacial origin; (3) the greatest development of adult snails that do not die off until toward the end of the bathing season; and (4) the cycle of cercarial infection so timed that the greatest numbers of cercariae emerge during the hot weather in the middle of the summer when the greatest amount of bathing is done (Brackett 1941).³⁹ Infected vector snails are also found throughout the United States in swamps, muddy ponds, and ditches; but dermatitis rarely results, because humans seldom use these areas without protective clothing.

In some marine recreational waters jellyfish or sea nettles are serious problems. Some species possess stinging mechanisms whose cnidoblast filaments can penetrate human skin causing painful, inflamed weals. The effects of water quality on their abundance is not known, but Schultz and Cargo (1971)⁶¹ reported that the summer sea nettle, *Chrysaora quinquecirrha*, has been a problem in Chesapeake Bay since colonial days. When these nettles are abundant, swimming is practically eliminated and fishermen's nets and traps are clogged.

Conclusion

The role of water quality in either limiting or augmenting the production of vector and nuisance organisms involves many interrelationships which are not clearly understood. Since organic wastes generally directly or indirectly increase biomass production, there may be an attendant increase in vector or nuisance organisms. Some wastes favor their production by creating water quality or habitat conditions that limit their predators and competitors. Increased production of vector and nuisance organisms may degrade a healthy and desirable human environment and be accompanied by a lessening of recreational and aesthetic values (see the discussion of Aquatic Life and Wildlife in this Section, p. 35.)

EUTROPHICATION AND NUTRIENTS

Man's recent concern with eutrophy relates primarily to lakes, reservoirs, rivers, estuaries, and coastal waters that have been or are being over-fertilized through society's

carelessness to a point where beneficial uses are impaired or threatened. With increasing urbanization, industrialization, artificial soil fertilization, and soil mantle disruption, eutrophication has become a serious problem affecting the aesthetic and recreational enjoyment of many of the nation's waters.

Defining Eutrophication and Nutrients

Lakes have been classified in accordance with their trophic level or bathymetry as eutrophic, oligotrophic, mesotrophic, or dystrophic (National Academy of Sciences 1969,⁹⁷ Russell-Hunter 1970,¹⁰⁸ Warren 1971,¹¹⁴ Stewart and Rohlich 1967).¹⁰⁷ A typical eutrophic lake has a high surface-to-volume ratio, and an abundance of nutrients producing heavy growth of aquatic plants and other vegetation; it contains highly organic sediments, and may have seasonal or continuous low dissolved-oxygen concentrations in its deeper waters. A typical oligotrophic lake has a low surface-to-volume ratio, a nutrient content that supports only a low level of aquatic productivity, a high dissolved-oxygen concentration extending to the deep waters, and sediments largely inorganic in composition. The characteristics of mesotrophic lakes lie between those of eutrophic and oligotrophic lakes. A dystrophic lake has waters brownish from humic materials, a relatively low pH, a reduced rate of bacterial decomposition, bottom sediments usually composed of partially decomposed vegetation, and low aquatic biomass productivity. Dystrophication is a lake-aging process different from that of eutrophication. Whereas the senescent stage in eutrophication may be a productive marsh or swamp, dystrophication leads to a peat bog rich in humic materials but low in productivity.

Eutrophication refers to the addition of nutrients to bodies of water and to the effects of those nutrients. The theory that there is a natural, gradual, and steady increase in external nutrient supply throughout the existence of a lake is widely held, but there is no support for this idea of natural eutrophication (Beeton and Edmondson 1972).⁷⁴ The paleolimnological literature supports instead a concept of trophic equilibrium such as that introduced by Hutchinson (1969).⁹¹ According to this concept the progressive changes that occur as a lake ages constitute an ecological succession effected in part by the change in the shape of the basin brought about by its filling. As the basin fills and the volume decreases, the resulting shallowness increases the cycling of available nutrients and this usually increases plant production.

There are many naturally eutrophic lakes of such recreational value that extensive efforts have been made to control their overproduction of nuisance aquatic plants and algae. In the past, man has often accepted as a natural phenomenon the loss or decreased value of a resource through eutrophication. He has drained shallow, senescent lakes for agricultural purposes or filled them to form building

sites. The increasing value of lakes for recreation, however, will reorder man's priorities, and instead of accepting such alternative uses of lakes, he will divert his reclamation efforts to salvaging and renovating their recreational values.

Artificial or cultural eutrophication results from increased nutrient supplies through human activity. Many aquatic systems have suffered cultural eutrophication in the past 50 years as a consequence of continually increasing nutrient loading from the wastes of society. Man-induced nutrients come largely from the discharge of municipal and industrial wastewaters and from the land runoff effects of agricultural practices and disruption of the soil mantle and its vegetative cover in the course of land development and construction. If eutrophication is not to become the future major deterrent to the recreational and aesthetic enjoyment of water, it is essential that unnatural additions of nutrients be kept out of water bodies through improved wastewater treatment and land management.

Effects of Eutrophication and Nutrients

Green Lake, a lowland lake with high recreation use in Seattle, is an example of a natural eutrophic lake (Sylvester and Anderson 1960),¹⁰⁹ formed some 25,000 years ago after the retreat of the Vashon glacier. During the ensuing years, about two-thirds of the original lake volume was filled with inorganic and organic sediments. A core taken near the center of the lake to a sediment depth of 20.5 feet represented a sediment accumulation over a period of approximately 6,700 years. Organic, nutrient, and chlorophyll analyses on samples from the different sediment depths indicated a relatively constant rate of sedimentation, suggesting that Green Lake has been in a natural state of eutrophy for several thousands of years.

The recreational and aesthetic potential of the lake was reduced for most users by littoral and emergent vegetation and by heavy blooms of blue-green algae in late summer. The aquatic weeds provided harborage for production of mosquitoes and interfered with boating, swimming, fishing, access to the beach, and model boat activities. The heavy, blue-green algal blooms adhered to swimmers. The wind blew the algal masses onto the shore where they decomposed with a disagreeable odor. They dried like a blue-green paint on objects along the shoreline, rendered boating and fishing unattractive, and accentuated water line marks on boats.

Nevertheless, through the continuous addition of low-nutrient dilution water by the City of Seattle (Oglesby 1969),⁹⁸ Green lake has been reclaimed through a reversal of the trophic development to mesotrophic and is now recreationally and aesthetically acceptable.

Lake Washington is an example of a large, deep, oligotrophic-mesotrophic lake that turned eutrophic in about 35 years, primarily through the discharge of treated and untreated domestic sewage. Even to laymen, the change was rapid, dramatic, and spectacular. In the period of a year, the apparent color of the lake water turned from

bluish-green to rust as a result of massive growths of the blue-green alga, *Oscillatoria rubescens*. This threat to aesthetic and recreational enjoyment was a key factor in voter approval of Metro, a metropolitan sewer district. Metro has greatly reduced the nutrient content of the lake and consequent algal growth by diverting wastewater discharges out of the drainage basin (Edmondson 1969,⁹² 1970).⁹³

Lake Sammamish at the northern inlet of Lake Washington appeared to be responding to the enrichment it received from treated sewage and other nutrient waste, although it had not yet produced nuisance conditions to the extent found in Lake Washington (Edmondson 1970).⁹² However, subsequent diversion of that waste by Metro has resulted in little or no detectable recovery in three years, a period that proved adequate for substantial recovery in Lake Washington (Emery et al. 1972).⁹⁴ Lake Sebasticook, Maine, affords another example of undesirable enrichment. Although previously in an acceptable condition, it became obnoxious during the 1960's in response to sewage and a wide variety of industrial wastes (HEW 1966).¹¹² The nutrient income of Lake Winnisquam, New Hampshire, has been studied to determine the cause of nuisance blooms of blue-green algae (Edmondson 1969).⁹² The well-known lakes at Madison, Wisconsin, including Monona, Waubesa, and Mendota, have been the object of detailed studies of nutrient sources and their deteriorating effect on water quality (Sawyer 1947,¹⁰⁰ Mackenthun et al. 1960,⁹⁶ Edmondson 1961,⁹⁰ 1968).⁹¹

A desirable aspect of eutrophication is the ability of mesotrophic or slightly eutrophic lakes typically to produce greater crops of fish than their oligotrophic or nutrient-poor counterparts. As long as nuisance blooms of algae and extensive aquatic weed beds do not hinder the growth of desirable fish species or obstruct the mechanics and aesthetics of fishing or other beneficial uses, some enrichment may be desirable. Fertilization is a tool in commercial and sport fishery management used to produce greater crops of fish. Many prairie lakes in the east slope foothills of the Rocky Mountains would be classed as eutrophic according to the characteristics discussed below, yet many of these lakes are exceptional trout producers because of the high natural fertility of the prairie (Sunde et al. 1970).¹⁰⁸ As an example of an accepted eutrophic condition, their waters are dense with plankton, but few would consider reducing the enrichment of these lakes.

Streams and estuaries, as well as lakes, show symptoms of over-enrichment, but there is less opportunity for buildup of nutrients because of the continual transport of water. Although aquatic growths can develop to nuisance proportions in streams and estuaries as a result of over-enrichment, manipulation of the nutrient input can modify the situation more rapidly than in lakes.

Man's fertilization of some rivers, estuaries, and marine embayments has produced undesirable aquatic growths of algae, water weeds, and slime organisms such as *Cladophora*,

Ulva, *Potamogeton*, and *Sphaerotilus*. In addition to interfering with other uses, as in clogging fishing nets with slime (Lincoln and Foster 1943),⁹⁴ the accompanying water-quality changes in some instances upset the natural fauna and flora and cause undesirable shifts in the species composition of the community.

Determination of Trophic Conditions

It should be emphasized that (a) eutrophication has a significant relationship to the use of water for recreational and aesthetic enjoyment as well as the other water uses discussed in this book; (b) this relationship may be desirable or undesirable, depending upon the type of recreational and aesthetic enjoyment sought; and (c) the possible disadvantages or advantages of eutrophication may be viewed subjectively as they relate to a particular water use. There are no generally accepted guidelines for judging whether a state of eutrophy exists or by what criteria it may be measured, such as production of biomass, rate of productivity, appearance, or change in water quality. Ranges in primary productivity and oxygen deficit have been suggested as indicative of eutrophy, mesotrophy, and oligotrophy by Edmondson (1970)⁹³ and Rodhe (1969),¹⁰⁴ but these ranges have had no official recognition.

The trophic state and natural rate of eutrophication that exists, or would exist, in the absence of man's activities is the basis of reference in judging man-induced eutrophication. The determination of the natural state in many water bodies will require the careful examination of past data, referral to published historical accounts, recall by "old-timers," and perhaps the examination of sediment cores for indicator species and chemical composition. The following guidelines are suggested in determining the reference trophic states of lakes or detecting changes in trophic states. Determination of the reference trophic state accompanied by studies of the nutrient budget may reveal that the lake is already in an advanced state of eutrophy. For temperate lakes, a significant change in indicator communities or a significant increase in any of the other four indices, detectable over a five-year period or less, is considered sufficient evidence that accelerated eutrophication is occurring. An undetectable change over a shorter period would not necessarily indicate a lack of accelerated eutrophication. A change detectable only after five years may still indicate unnaturally accelerated eutrophication, but five years is suggested as a realistic maximum for the average monitoring endeavor. Where cultural eutrophication is suspected and changes in indices are not observable, analysis of sediment cores may be necessary to establish the natural state. The dynamic characteristics and individuality of lakes may produce exceptions to these guidelines. They are not infallible indicators of interference with recreation, but for now they may serve as a beginning, subject to modification as more complete data on the range of trophic conditions and their associated effects become available.

Primary Productivity Ranges in the photosynthetic rate, measured by radioactive carbon assimilation, have been suggested by Rodhe (1969)¹⁰⁴ as indicative of trophic conditions (Table I-2).

Biomass Chlorophyll *a* is used as a versatile measure of algal biomass. The ranges presented for mean summer chlorophyll *a* concentration determined in epilimnetic water supplies collected at least biweekly and analyzed according to *Standard Methods* (American Public Health Assoc., American Water Works Assoc., and Water Pollution Control Federation 1971)⁷⁰ are indices of the trophic stage of a lake: oligotrophic, 0-4 mg chlorophyll *a*/m³; eutrophic, 10-100 mg chlorophyll *a*/m³.

These ranges are suggested after reviewing data on chlorophyll concentrations and other indicators of trophic state in several lakes throughout the United States and Canada. Of greatest significance are data from Lake Washington which show that during peak enrichment, mean summer chlorophyll *a* content rose to about 27 mg/m³ and that the lake was definitely eutrophic. The post nutrient diversion summer mean declined to about 7 mg/m³, and the lake is now more typically mesotrophic (Edmondson 1970;⁹³ chlorophyll *a* values corrected to conform to recent analytical techniques). Unenriched and relatively low productive lakes at higher elevations in the Lake Washington drainage basin show mean summer chlorophyll *a* contents of 1 to 2 mg/m³. Moses Lake, which can be considered hypereutrophic, shows a summer mean of 90 mg/m³ chlorophyll *a* (Bush and Welch 1972).⁷⁶

Oxygen Deficit Criteria for rate of depletion of hypolimnetic oxygen in relation to trophic state were reported by Mortimer (1941)⁹⁶ as follows:

<i>oligotrophic</i>	<i>eutrophic</i>
<250 mg O ₂ /m ² /day	>550 mg O ₂ /m ² /day

This is the rate of depletion of hypolimnetic oxygen determined by the change in mean concentration of hypolimnetic oxygen per unit time multiplied by the mean depth of the hypolimnion. The observed time interval should be at least a month, preferably longer, during summer stratification.

TABLE I-2—Ranges in Photosynthetic Rate for Primary Productivity Determinations*

Period	Oligotrophic	Eutrophic
Mean daily rates in a growing season, mgC/m ² /day....	30-100	300-3000
Total annual rates, gC/m ² /year.....	7-75	75-700

* Measured by total carbon uptake per square meter of water surface per unit of time. Productivity estimates should be determined from at least monthly measurements according to *Standard Methods*, American Public Health Association, American Water Works Assoc., and Water Pollution Control Federation 1971⁷⁰; Rodhe 1969.¹⁰⁴

Indicator Communities The representation of certain species in a community grouping in fresh water environments is often a sensitive indicator of the trophic state. Nutrient enrichment in streams causes changes in the size of faunal and floral populations, kinds of species, and numbers of species (Richardson 1928,¹⁰³ Ellis 1937,⁸⁴ Patrick 1949,⁹⁹ Tarzwell and Gaufin 1953¹¹⁰). For example, in a stream typical of the temperate zone in the eastern United States degraded by organic pollution the following shifts in aquatic communities are often found: in the zone of rapid decomposition below a pollution source, bacterial counts are increased; sludgeworms (Tubificidae), rattail maggots (*Eristalis tenax*) and bloodworms (Chironomidae) dominate the benthic fauna; and blue-green algae and the sewage fungus (*Sphaerotilus*) become common (Patrick 1949,⁹⁹ Tarzwell and Gaufin 1953,¹¹⁰ Patrick et al. 1967¹⁰⁰). Various blue-green algae such as *Schizothrix calcicola*, *Microcoleus vaginatus*, *Microcystis aeruginosa*, and *Anabaena* sp. are commonly found in nutrient-rich waters, and blooms of these and other algae frequently detract from the aesthetic and recreational value of lakes. Diatoms such as *Nitzschia palea*, *Gomphonema parvulum*, *Navicula cryptocephala*, *Cyclotella meneghiniana*, and *Melosira varians* are also often abundant in nutrient-rich water (Patrick and Reimer 1966).¹⁰¹ Midges, leeches, blackfly larvae, *Physa* snails, and fingernail clams are frequently abundant in the recovery zone.

Nutrients Chemicals necessary to the growth and reproduction of rooted or floating flowering plants, ferns, algae, fungi, or bacteria are considered to be nutrient chemicals. All these chemicals are not yet known, but those that have been identified are classified as macronutrients, trace elements or micronutrients, and organic nutrients. The macronutrients are calcium, potassium, magnesium, sodium, sulfur, carbon and carbonates, nitrogen, and phosphorus. The micronutrients are silica, manganese, zinc, copper, molybdenum, boron, titanium, chromium, cobalt, and perhaps vanadium (Chu 1942,⁷⁷ Arnon and Wessell 1953,⁷² Hansen et al. 1954).⁹⁸ Examples of organic nutrients are biotin, B₁₂, thiamine, and glycylglycine (Droop 1962).⁷⁹ Some of the amino acids and simple sugars have also been shown to be nutrients for heterotrophs or partial heterotrophs.

Plants vary as to the amounts and kinds of nutrients they require, and as a result one species or group of species of algae or aquatic plants may gain dominance over another group because of the variation in concentration of nutrient chemicals. Even though all the nutrients necessary for plant growth are present, growth will not take place unless environmental factors such as light, temperature, and substrate are suitable. Man's use of the watershed also influences the sediment load and nutrient levels in surface waters (Leopold et al. 1964,⁸² Bormann and Likens 1967).⁷⁸

Thomas (1953)¹¹¹ found that the important factor in artificial eutrophication was the high phosphorus content of domestic wastes. Nitrogen became the limiting growth factor if the algal demand for phosphorus was met. Nu-

merous studies have verified these conclusions (American Society of Limnology and Oceanography 1972).⁷¹

Sawyer (1947)¹⁰⁶ determined critical levels of inorganic nitrogen (300 µg/l N) and inorganic phosphorus (10 µg/l P) at the time of spring overturn in Wisconsin lakes. If exceeded, these levels would probably produce nuisance blooms of algae during the summer. Nutrient concentrations should be maximum when measured at the spring overturn and at the start of the growing season. Nutrient concentrations during active growth periods may only indicate the difference between amounts absorbed in biomass (suspended and settled) and the initial amount biologically available. The values, therefore, would not be indicative of potential algal production. Nutrient content should be determined at least monthly (including the time of spring overturn) from the surface, mid-depth, and bottom. These values can be related to water volume in each stratum, and nutrient concentrations based on total lake volume can be derived.

One of the most convincing relationships between maximum phosphate content at the time of lake overturn and eutrophication as indicated by algal biomass has been shown in Lake Washington (Edmondson 1970).⁸³ During the years when algal densities progressed to nuisance levels, mean winter PO₄-P increased from 10-20 µg/l to 57 µg/l. Following diversion of the sewage mean PO₄-P decreased once again to the preenrichment level. Correlated with the PO₄-P reduction was mean summer chlorophyll *a* content, which decreased from a mean of 27 µg/l at peak enrichment to less than 10 µg/l, six years after diversion was initiated.

Although difficult to assess, the rate of nutrient inflow more closely represents nutrient availability than does nutrient concentration because of the dynamic character of these nonconservative materials. Loading rates are usually determined annually on the basis of monthly monitoring of water flow, nutrient concentration in natural surface and groundwater, and wastewater inflows.

Vollenweider (1968)¹¹³ related nutrient loading to mean depths for various well-known lakes and identified trophic states associated with induced eutrophication. These findings showed shallow lakes to be clearly more sensitive to nutrient income per unit area than deep lakes, because nutrient reuse to perpetuate nuisance growth of algae increased as depth decreased. From this standpoint nutrient loading was a more valid criterion than nutrient concentration in judging trophic state. Examples of nutrient loadings which produced nuisance conditions were about 0.3 g/m²/yr P and 4 g/m²/yr N for a lake with a mean depth of 20 meters, and about 0.8 g/m²/yr P and 11 g/m²/yr N for a lake with a mean depth of 100 meters.

These suggested criteria apply only if other requirements of algal growth are met, such as available light and water retention time. If these factors limit growth rate and the increase of biomass, large amounts of nutrients may move through the system unused, and nuisance conditions may not occur (Welch 1969).¹¹⁵

Carbon (C) is required by all photosynthetic plants. It may be in the form of CO_2 in solution, HCO_3^- , or CO_3^{2-} . Carbamate carboxylate, which may form by the complexing of calcium or other carbonates and amino compounds in alkaline water, is an efficient source of CO_2 (Hutchinson 1967).⁸⁰ Usually carbon is not a limiting factor in water (Goldman et al. 1971).⁸⁸ However, King (1970)⁹² estimated that concentrations of CO_2 less than 3 micromoles at equilibrium favored blue-green algae, and concentrations greater than this favored green algae.

Cations such as calcium, magnesium, sodium, and potassium are required by algae and higher aquatic plants for growth, but the optimum amounts and ratios vary. Furthermore, few situations exist in which these would be in such low supply as to be limiting to plants. Trace elements either singly or in combination are important for the growth of algae (Goldman 1964).⁸⁸ For example molybdenum has been demonstrated to be a limiting nutrient in Castle Lake. Deficiencies in trace elements are more likely to occur in oligotrophic than in eutrophic waters (Goldman 1972).⁸⁷

The vitamins important in promoting optimum growth in algae are biotin, thiamin, and B_{12} . All major groups require one or more of these vitamins, but particular species may or may not require them. As Provasoli and D'Agostino (1969)¹⁰² pointed out, little is known about the requirement for these vitamins for growth of algae in polluted water.

Under natural conditions it is difficult to determine the effect of change in concentrations of a single chemical on the growth of organisms. The principal reasons are that growth results from the interaction of many chemical, physical, and biological factors on the functioning of an organism; and that nutrients arise from a mixture of chemicals from farm, industrial, and sanitary wastes, and runoff from fields. However, the increase in amounts and types of nutrients can be traced by shifts in species forming aquatic communities. Such biotic shifts have occurred in western Lake Erie (Beeton 1969).⁷⁵ Since 1900 the watershed of western Lake Erie has changed with the rapidly increasing human population and industrial development, as a result of which the lake has received large quantities of sanitary, industrial, and agricultural organic wastes. The lake has become modified by increased concentrations of dissolved solids, lower transparency, and low dissolved oxygen concentration. Blooms of blue-green algae and shifts in invertebrate populations have markedly increased in the 1960's (Davis 1964,⁷⁸ Beeton 1969).⁷²

Summary of Measurement of Nutrient Enrichment

Several conditions can be used to measure nutrient enrichment or its effects:

- a steady decrease over several years in the dissolved oxygen content of the hypolimnion when measured prior to fall overturn, and an increase in anaerobic areas in the lower portion of the hypolimnion;

- an increase in dissolved materials, especially nutrients such as nitrogen, phosphorus, and simple carbohydrates;
- an increase in suspended solids, especially organic materials;
- a shift in the structure of communities of aquatic organisms involving a shift in kinds of species and relative abundances of species and biomass;
- a steady though slow decrease in light penetration;
- an increase in organic materials and nutrients, especially phosphorus, in bottom deposits;
- increases in total phosphorus in the spring of the year.

Recommendations

The principal recommendations for aesthetic and recreational uses of lakes, ponds, rivers, estuaries, and near-shore coastal waters are that these uses continue to be pleasing and undiminished by effects of cultural activities that increase plant nutrients. The trophic level and natural rate of eutrophication that exists, or would exist, in these waters in the absence of man's activities is considered the reference level and the commonly desirable level to be maintained. Such water should not have a demonstrable accelerated production of algae growth in excess of rates normally expected for the same type of waterbody in nature without man-made influences.

The concentrations of phosphorus and nitrogen mentioned in the text as leading to accelerated eutrophication were developed from studies for certain aquatic systems: maintenance of lower concentrations may or may not prevent eutrophic conditions. All the factors causing nuisance plant growths and the level of each which should not be exceeded are not known. However, nuisance growths will be limited if the addition of all wastes such as sewage, food processing, cannery, and industrial wastes containing nutrients, vitamins, trace elements, and growth stimulants are carefully controlled and nothing is added that causes a slow overall decrease of average dissolved oxygen concentration in the hypolimnion and an increase in the extent and duration of anaerobic conditions.

AQUATIC VASCULAR PLANTS

Aquatic vascular plants affect water quality, other aquatic organisms, and the uses man makes of the water. Generally, the effects are inversely proportional to the volume of the water body and directly proportional to the use man wishes to make of that water. Thus the impact is often most significant in marshes, ponds, canals, irrigation ditches, rivers, shallow lakes, estuaries and embayments, public water supply sources, and man-made impoundments. Dense

growths of aquatic vascular plants are not necessarily due to human alteration of the environment. Where an appropriate environment for plant growth occurs, it is extremely difficult to prevent the growth without changing the environment. Addition of plant nutrients can cause aquatic vascular plants to increase to nuisance proportions in waters where natural fertility levels are insufficient to maintain dense populations (Lind and Cottam 1969).¹⁴⁷ In other waters where artificial nutrient additions are not a problem, natural fertility alone may support nuisance growths (Frink 1967).¹³⁵

Interrelationships With Water Quality

Through their metabolic processes, manner of growth, and eventual decay, aquatic vascular plants can have significant effects on such environmental factors as dissolved oxygen and carbon dioxide, carbonate and bicarbonate alkalinity, pH, nutrient supplies, light penetration, evaporation, water circulation, current velocity, and sediment composition. The difficulty in understanding the interrelationships among plant growth and water quality is described in part by Lathwell et al. (1969).¹⁴⁴ Diurnal oxygen rhythm with maximum concentrations in the afternoon and minimums just before dawn is a universally-recognized limnological phenomenon, and metabolic activities of vascular plants can contribute to these rhythms. The effect of aquatic plants on dissolved oxygen within a reach of stream at a particular time of day is a function of the plant density and distribution, plant species, light intensity, water depth, turbidity, temperature, and ambient dissolved oxygen. Oxygen production is proportional to plant density only to a certain limit; when this limit is exceeded, net oxygen production begins to decrease and, with increasing density, the plants become net oxygen consumers (Owens et al. 1969).¹⁴⁹ It is hypothesized that this phenomenon occurs because the plants become so dense that some are shaded by other overlying plants. Westlake (1966)¹⁷³ developed a model for predicting the effects of aquatic vascular plant density and distribution on oxygen balance which demonstrates that if the weeds are concentrated within a small area, the net effect of the weeds may be to consume more oxygen than that produced, even though the average density may be relatively low.

After reviewing the literature on the direct effects of plants on the oxygen balance, Sculthorpe (1967)¹⁶² concluded that the extent of oxygen enrichment at all sites varies with changing light intensity, temperature, and plant population density and distribution. On a cloudy, cool day community respiration may exceed even the maximum photosynthetic rate. Although vigorous oxygen production occurs in the growing season, the plants eventually die and decay, and the resulting oxygen consumption is spread over the cooler seasons of the year.

Light penetration is significantly reduced by dense stands of aquatic vascular plants, and this reduces photosynthetic

rates at shallow depths. Buscemi (1958)¹⁵⁹ found that under dense beds of *Elodea* the dissolved oxygen concentration fell sharply with depth and marked stratification was produced. Severe oxygen depletion under floating mats of water hyacinth (Lynch et al. 1947),¹⁵⁰ duckweed and water lettuce (Yount 1963)¹⁷⁰ have occurred. Extensive covers of floating or emergent plants shelter the surface from the wind, reduce turbulence and reaeration, hinder mixing, and promote thermal stratification. Dense growths of phytoplankton may also shade-out submerged macrophytes, and this phenomenon is used to advantage in fisheries pond culture. Fertilization of ponds to promote phytoplankton growth is recommended as a means of reducing the standing crop of submerged vascular plants (Swingle 1947,¹⁶⁷ Surber 1961¹⁶⁸).

Interrelationships of plants with water chemistry were reported by Straskraba (1965)¹⁶⁵ when foliage of dense populations of *Nuphar*, *Ceratophyllum*, and *Myriophyllum* were aggregated on the surface. He found pronounced stratification of temperature and chemical factors and reported that the variations of oxygen, pH, and alkalinity were clearly dependent on the photosynthesis and respiration of the plants. Photosynthesis also involves carbon dioxide, and Sculthorpe (1967)¹⁶² found that for every rise of 2 mg/l of dissolved oxygen the total carbon dioxide should drop 2.75 mg/l and be accompanied by a rise in the pH. A rise in pH will allow greater concentrations of un-ionized ammonia (see Freshwater Aquatic Life, p. 140).

Hannan and Anderson (1971)¹³⁷ studied diurnal oxygen balance, carbonate and bicarbonate alkalinity and pH on a seasonal basis in two Texas ponds less than 1 m deep which supported dense growths of submerged rooted macrophytes. One pond received seepage water containing free carbon dioxide and supported a greater plant biomass. This pond exhibited a diurnal dissolved-oxygen range in summer from 0.8 to 16.4 mg/l, and a winter range from 0.3 to 18.0 mg/l. The other pond's summer diurnal dissolved-oxygen range was 3.8 to 14.9 mg/l and the winter range was 8.3 to 12.3 mg/l. They concluded that (a) when macrophytes use bicarbonate as a carbon source, they liberate carbonate and hydroxyl ions, resulting in an increase in pH and a lowered bicarbonate alkalinity; and (b) the pH of a macrophyte community is a function of the carbon dioxide-bicarbonate-carbonate ionization phenomena as altered by photosynthesis and community respiration.

Dense colonies of aquatic macrophytes may occupy up to 10 per cent of the total volume of a river and reduce the maximum velocity of the current to less than 75 per cent of that in uncolonized reaches (Hillebrand 1950,¹³⁹ as reported by Sculthorpe 1967¹⁶²). This can increase sediment deposition and lessen channel capacity by raising the substrate, thus increasing the chance of flooding. Newly deposited silt may be quickly stabilized by aquatic plants, further affecting flow.

Loss of water by transpiration varies between species and

growth forms. Otis (1914)¹⁵⁸ showed that the rate of transpiration of *Nymphaea odorata* was slightly less than the rate of evaporation from a free water surface of equivalent area, but that of several emergent species was up to three times greater. Sculthorpe (1967)¹⁶² postulated that transpiration from the leaves of free-floating rosettes could be at rates six times greater than evaporation from an equivalent water surface. Loss of water through water hyacinth was reported by Das (1969)¹²³ at 7.8 times that of open water.

Interrelationships With Other Biota

Aquatic macrophytes provide a direct or indirect source of food for aquatic invertebrates and fish and for wildlife. The plants provide increased substrate for colonization by epiphytic algae, bacteria, and other microorganisms which provide food for the larger invertebrates which, in turn, provide food for fish. Sculthorpe (1967)¹⁶² presented a well-documented summary of the importance of a wide variety of aquatic macrophytes to fish, birds, and mammals. Sago pondweed (*Potamogeton pectinatus*) illustrates the opposite extreme in man's attitude toward aquatic macrophytes: Timmons (1966)¹⁶⁹ called it the most noxious plant in irrigation and drainage ditches of the American west, whereas Martin and Uhler (1939)¹⁵⁵ considered it the most important duck food plant in the United States.

Aquatic vegetation and flottage breaking the water surface enhance mosquito production by protecting larvae from wave action and aquatic predators and interfering with mosquito control procedures. Two major vectors of malaria in the United States are *Anopheles quadrimaculatus* east of the Rocky Mountains, and *A. freeborni* to the west (Carpenter and La Casse 1955).¹³⁰ Anopheline mosquitoes are generally recognized as permanent pool breeders. The more important breeding sites of these two mosquitoes are freshwater lakes, swamps, marshes, impoundment margins, ponds, and seepage areas (Carpenter and La Casse 1955).¹³⁰ The role of various aquatic plant types in relation to the production and control of *A. quadrimaculatus* on artificial ponds and reservoirs indicates that the greatest problems are created by macrophytes that are (1) free-floating, (2) submersed and anchored but which break the water surface, (3) floating leaf anchored, and (4) emersed floating-mat anchored (U.S. Department of Health, Education, and Welfare, Public Health Service, and Tennessee Valley Authority 1947).¹⁶⁹ In addition to vector mosquitoes, pestiferous mosquitoes develop in association with plant parts in shoreline areas. Jenkins (1964)¹⁴² provided an annotated list and bibliography of papers dealing with aquatic vegetation and mosquitoes.

Generally, submersed vascular plants have lower nutrient requirements than filamentous algae or phytoplankton (Mulligan and Baranowski 1969).¹⁶⁷ Plants with root systems in the substrate do not have to compete with phytoplankton, periphyton, or non-rooted macrophytes for the phosphorus in the sediments.

Boyd (1971b),¹²⁸ relating his earlier work on emergent species (Boyd 1969,¹²² 1970a,¹²³ 1971a¹²⁵) to that of Stake (1967,¹⁶³ 1968¹⁶⁴) on submersed species, stated that in the southern United States most of the total net nutrient accumulation by aquatic vascular plants occurs by midspring before peak dry matter standing crop is reached, and that nutrients stored during early spring growth are utilized for growth later. Thus nutrients are removed from the environment early in the season, giving the vascular hydrophytes a competitive advantage over phytoplankton. Boyd (1967)¹²¹ also reported that the quantity of phosphorus in aquatic plants frequently exceeds that of the total water volume. These phenomena may account for the high productivity in terms of macrophytes which can occur in infertile waters. However, if the dissolved phosphorus level is not a limiting factor for the phytoplankton, the ability to utilize sediment phosphorus is not a competitive advantage for rooted plants.

Further interaction between aquatic vascular plants and phytoplankton has been demonstrated recently in studies showing that concentrations of dissolved organic matter can control plant growth in lakes by regulating the availability of trace metals and other nutrients essential to plant photosynthesis. An array of organic-inorganic interactions shown to suppress plant growth in hardwater lakes (Wetzel 1969,¹⁷⁴ 1971¹⁷⁵) appear to operate in other lake types and streams (Breger 1970,¹⁷² Malcolm et al. 1970,¹⁵² Allen 1971¹¹⁶). Wetzel and Allen in press (1971)¹⁷⁶ and Wetzel and Manny (1972)¹⁷⁷ showed that aquatic macrophytes near inlets of lakes can influence phytoplankton growth by removing nutrients as they enter the lake while at the same time producing dissolved organic compounds that complex with other nutrients necessary to phytoplankton growth. Manny (1971,¹⁸³ 1972¹⁵⁴) showed several mechanisms by which dissolved organic nitrogen (DON) compounds regulate plant growth and rates of bacterial nutrient regeneration. These control mechanisms can be disrupted by nutrients from municipal and agricultural wastes and dissolved organic matter from inadequately treated wastes.

Effects on Recreation and Aesthetics

It is difficult to estimate the magnitude of the adverse effects of aquatic macrophytes in terms of loss of recreational opportunities or degree of interference with recreational pursuits. For example, extensive growths of aquatic macrophytes interfere with boating of all kinds; but the extent of interference depends, among other things, on the growth form of the plants, the density of the colonization, the fraction of the waterbody covered, and the purposes, attitudes, and tolerance of the boaters. Extremes of opinion on the degree of impact create difficulty in estimating a monetary, physical, or psychological loss.

Dense growths of aquatic macrophytes are generally objectionable to the swimmer, diver, water skier, and scuba enthusiast. Plants or plant parts can be at least a nuisance to swimmers and, in extreme cases, can be a factor in

drowning. Plants obstruct a diver's view of the bottom and underwater hazards, and fronds can become entangled in a scuba diver's gear. Water skiers' preparations in shallow water are hampered by dense growths of plants, and fear of falling into such growths while skiing detracts from enjoyment of the sport.

Rafts of free-floating plants or attached plants which have been dislodged from the substrate often drift onto beaches or into swimming areas, and time and labor are entailed in restoring their attractiveness. Drying and decaying aquatic plants often produce objectionable odors and provide breeding areas for a variety of insects.

Sport fishermen have mixed feelings about aquatic macrophytes. Fishing is often good around patches of lily pads, over deeply-submerged plants, and on the edges of beds of submerged weeds which rise near the surface. On the other hand, dense growths may restrict the movement and feeding of larger fish and limit the fishable area of a waterbody. Aquatic plants entangle lures and baits and can prevent fishermen from reaching desirable fishing areas.

Marshes and aquatic macrophytes in sparse or moderate densities along watercourse and waterbody margins augment nature study and shoreline exploration and add to the naturalistic value of camping and recreation sites. It is only when the density of the growths, or their growth forms, become a nuisance and interfere with man's activities that he finds them objectionable. An indication of how often that occurs is provided by McCarthy (1961),¹⁵⁶ who reported that on the basis of a questionnaire sent to all states in 1960, there were over 2,000 aquatic vegetation control projects conducted annually, and that most states considered excessive growth of aquatic vegetation a serious and increasing problem.

The aesthetic value of aquatic macrophytes is in the mind of the beholder. The age-old appeal of aquatic plants is reflected in their importance as motifs in ancient architecture, art, and mythology. Aquatic gardens continue to be popular tourist attractions and landscaping features, and wild aquatic plant communities have strong appeal to the artist, the photographer, and the public. To many, these plants make a contribution of their own to the beauty of man's environment.

Control Considerations

Aquatic vascular plants can be controlled by several methods: chemical (Hall 1961,¹⁵⁸ Little 1968¹⁴⁹); biological (Avault et al. 1968,¹¹⁷ Maddox et al. 1971,¹⁵¹ Blackburn et al. 1971¹²⁰); mechanical (Livermore and Wunderlich 1969¹⁴⁰); and naturalistic environmental manipulation (Penfound 1953).¹⁶⁰ General reviews of control techniques have been made by Holm et al. (1969),¹⁴¹ Sculthorpe (1967),¹⁶² and Lawrence (1968).¹⁴⁵

Harvesting aquatic vascular plants to reduce nutrients as a means of eutrophication control has been investigated

by Boyd (1970b),¹²⁴ Yount and Crossman (1970),¹⁷¹ and Peterson (1971).¹⁶¹ Although many investigators have reported important nutrients in various aquatic plants, the high moisture content of the vegetation as it is harvested has been an impediment to economic usefulness. Peterson (1971)¹⁶¹ reported the cost per pound of phosphorus, nitrogen, and carbon removed from a large lake supporting dense growths of aquatic vascular plants as \$61.19, \$8.24 and \$0.61 respectively.

Nevertheless, improved methods of harvesting and processing promise to reduce the costs of removing these bothersome plants and reclaiming their nutrients for animal and human rations or for soil enrichment. Investigation into the nutritive value of various aquatic plants has frequently been an adjunct of research on the efficiency and economy of harvesting and processing these plants in an effort to remove nuisance growth from lakes and streams. Extensive harvesting of aquatic vegetation from plant-clogged Caddo Lake (Texas-Louisiana) was followed by plant analysis and feeding trials. The dehydrated material was found to be rich in protein and xanthophyll (Creger et al. 1963,¹³² Couch et al. 1963¹³¹). Bailey (1965)¹¹⁸ reported an average of 380 milligrams of xanthophyll per pound of vacuum oven-dried aquatic plant material with about 19 per cent protein. Hentges (1970),¹³⁸ in cooperation with Bagnall (1970),¹¹⁹ in preliminary tests with cattle fed press-dehydrated aquatic forage, found that pelleted *Hydrilla verticillata* (Florida elodea) could be fed satisfactorily as 75 per cent of a balanced ration. Bruhn et al. (1971)¹²³ and Koegel et al. (1972)¹⁴³ found 44 per cent mineral and 21 per cent protein composition in the dry matter of the heat coagulum of the expressed juice of Eurasian water milfoil (*Myriophyllum spicatum*). The press residue, further reduced by cutting and pressing to 16 per cent of the original volume and 32 per cent of the original weight, could readily be spread for lawn or garden mulch.

Control measures are undertaken when plant growth interferes with human activities beyond some ill-defined point, but too little effort has been expended to determine the causes of infestations and too little concern has been given the true nature of the biological problem (Boyd 1971b).¹²⁶ Each aquatic macrophyte problem under consideration for control should be treated as unique, the biology of the plant should be well understood, and all the local factors thoroughly investigated before a technique is selected. Once aquatic macrophytes are killed, space for other plants becomes available. Nutrients contained in the original plants are released for use by other species. Long-term control normally requires continued efforts. Herbicides may be directly toxic to fish, fish eggs, or invertebrates important as fish food (Eipper 1959,¹³⁴ Walker 1965,¹⁷² Hiltibran 1967).¹⁴⁰ (See the discussion of Pesticides, pp. 182-186, in Section III.) On man-made lakes, reservoirs and ponds the potential for invasion by undesirable aquatic

plants may be lessened by employing naturalistic methods which limit the available habitat and requirements of particular species. It is difficult to predict what biotic form will replace the species eliminated. Boyd (1971b)¹²⁶ states that in some Florida lakes, herbicide applications have upset the balance between rooted aquatics and phytoplankton, resulting in nuisance phytoplankton blooms that were sometimes more objectionable than the original situation.

Control of aquatic vascular plants can be a positive factor in fisheries management (Leonard and Cain 1961);¹⁴⁸ but when control projects are contemplated in multi-purpose waters, consideration should be given to existing interdependencies between man and the aquatic community. For example: what biomass of aquatic vascular plants is necessary to support waterfowl; what biomass will permit boating; what is a tolerable condition for swimming; must the shoreline be clear of plants for wading; will shore erosion increase if the shoreline vegetation is removed? The interference of aquatic vascular plant communities in human activities should be controlled with methods that stop short of attempted plant eradication.

Recommendation

The complex interrelationships among aquatic vascular plants, associated biota, water quality, and the activities of humans call for case-by-case evaluation in assessing the need for management programs. If management is undertaken, study of its potential impacts on the aquatic ecosystem and on various water uses should precede its implementation.

INTRODUCTION OF SPECIES

Extent and Types of Introductions

Purposeful or accidental introductions of foreign aquatic organisms or transplantations of organisms from one drainage system to another can profoundly influence the aesthetic appeal and the recreational or commercial potential of affected waterbodies. The introduction of a single species may alter an entire aquatic ecosystem (Lachner et al. 1970).¹⁸⁸ An example of extreme alteration occurred with the invasion of the Great Lakes by the sea lamprey (*Petromyzon marinus*) (Moffett 1957,¹⁹⁰ Smith 1964¹⁹⁷). Introduced and transplanted species account for about half of the fish fauna of Connecticut (Whitworth et al. 1968),¹⁹⁹ California (Shapovalov et al. 1959),¹⁹⁵ Arizona, and Utah (Miller 1961).¹⁸⁹ The nature of the original aquatic fauna is obscured in many cases, and some indigenous species have been adversely affected through predation, competition, hybridization, or alteration of habitat by the introduced species. Exotics that have established reproducing populations in the United States (exclusive of the Hawaiian

Islands) include 25 species of fish (Lachner et al. 1970),¹⁸⁸ more than 50 species of land and aquatic mollusks (Abbott 1950),¹⁷⁸ and over 20 species of aquatic vascular plants (Hotchkiss 1967)¹⁸⁵ in addition to aquatic rodents, reptiles, amphibians, insects, and crustaceans.

Growths of native aquatic vascular plants and a variety of exotic species commonly interfere with recreation and fishing activities (see p. 25) and a variety of other water uses including industrial and agricultural use (Holm et al. 1969,¹⁸⁴ Sculthorpe 1967).¹⁹⁴ Water hyacinth (*Eichhornia crassipes*) caused loss of almost \$43 million through combined deleterious effects in Florida, Alabama, Mississippi, and Louisiana in 1956 (Wunderlich 1962).²⁰⁰ Penfound and Earle (1948)¹⁹² estimated that the annual loss caused by water hyacinth in Louisiana before the growths were brought under control averaged \$5 million and in some years reached \$15 million. Water chestnut (*Trapa natans*) produced beds covering 10,000 acres within ten years of its introduction near Washington, D.C. (Rawls 1964).¹⁹³ The beds blocked navigation and provided breeding sites for mosquitoes, and their hard spined seed cases on the shorelines and bottom were a serious nuisance to swimmers, waders, and people walking the shores. Eurasian milfoil (*Myriophyllum spicatum*) infested 100,000 acres in Chesapeake Bay. The plants blocked navigation, prevented recreational boating and swimming, interfered with seafood harvest, increased siltation, and encouraged mosquitoes (Cronin 1967).¹⁸²

Invertebrate introductions include the Asian clam (*Corbicula manilensis*), a serious pest in the clogging of industrial and municipal raw water intake systems and irrigation canals (Sinclair 1971),¹⁹⁶ and an oriental oyster drill (*Tritonalia japonica*) considered the most destructive drill in the Puget Sound area (Korringa 1952).¹⁸⁷

Some Results of Introductions

Some introductions of exotics, e.g., brown trout (*Salmo trutta*), and some transplants, e.g., striped bass (*Morone saxatilis*) from the Atlantic to the Pacific and coho salmon (*Oncorhynchus kisutch*) from the Pacific to the Great Lakes, have been spectacularly successful in providing sport and commercial fishing opportunities. Benefits of introductions and transplantations of many species in a variety of aquatic situations are discussed by several authors in *A Century of Fisheries in North America* (Benson 1970).¹⁷⁹

The success of other introductions has been questionable or controversial. In the case of carp (*Cyprinus carpio*), the introduction actually decreased aesthetic values because of the increased turbidity caused by the habits of the carp. The increased turbidity in turn decreased the biological productivity of the waterbody. The presence of carp has lowered the sportfishing potential of many waterbodies because of a variety of ecological interactions. The grass carp or white amur (*Ctenopharyngodon idella*), a recent impor-

QUALITY CRITERIA FOR WATER

QUALITY CRITERIA FOR WATER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460

OFFICE OF WATER AND
HAZARDOUS MATERIALS

To the Reader:

Thousands of fine scientists throughout the country have contributed directly or indirectly to this publication of "Quality Criteria for Water." This volume represents a stocktaking effort on the part of this Agency to identify as precisely as possible at this time, on a national scale, the various water constituents that combine to form the concept of "Quality Criteria for Water." This process of definition will continue far into the future because research related to water quality is a never-ending evolutionary process, and the water environment is so complex that man's efforts to define it will never attain finite precision.

Water quality criteria do not have direct regulatory use, but they form the basis for judgment in several Environmental Protection Agency and State programs that are associated with water quality considerations. The criteria presented in this publication should not be used as absolute values for water quality. As stated in the chapter on "The Philosophy of Quality Criteria," variability exists in the natural quality of water and certain organisms become adapted to that quality, which may be considered extreme in other areas. These criteria represent scientific judgments based upon literature and research about the concentration-effect relationship of a particular water quality constituent to a particular aquatic species within the limits of experimental investigation. They should be used with considered judgment and with an understanding of their development. The judgment associated with their use should include the natural quality of water under consideration, the kinds of organisms that it contains, the association of those species to the particular species described in this volume upon which criteria values have been placed, and the local hydrologic conditions.

It must be emphasized that national criteria can never be developed to meet the individual needs of each of the Nation's waterways—the natural variability within the aquatic ecosystem can never be identified with a single numerical value. Water quality criteria will change in the future as our knowledge and perception of the intricacies of water improve. There is no question but that criteria for some constituents will change within a period of only two years based upon research now in progress. That is a mark of continuing progressive research effort, as

well as a mark of a better understanding by man of the environment that he inhabits.

This, then, is the challenge for the future: to expand upon our present baseline of knowledge of the cause-effect relationships of water constituents to aquatic life and of the antagonistic and synergistic reactions among many quality constituents in water; and to mold such future knowledge into realistic, environmentally protective criteria to insure that the water resource can fulfill society's needs.



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PHOSPHORUS

CRITERION

0.10 ug/l yellow (elemental) phosphorus for marine or estuarine waters.

INTRODUCTION

Phosphorus in the elemental form is particularly toxic and is subject to bioaccumulation in much the same way as mercury. Phosphorus as phosphate is one of the major nutrients required for plant nutrition and is essential for life. In excess of a critical concentration, phosphates stimulate plant growth. During the past 30 years, the belief has developed that increased standing crops of aquatic plants frequently are caused by increased supplies of phosphorus. Such phenomena are associated with a condition of accelerated eutrophication or aging of waters. Generally, it is recognized that phosphorus is not the sole cause of eutrophication but there is evidence that frequently it is the key element required by freshwater plants, and generally, is present in the least amount relative to need. Therefore, an increase in phosphorus allows use of other already present nutrients for plant growth. Further, of all of the elements required for plant growth in the water environment, phosphorus is the most easily controlled by man.

Large deposits of phosphate rock are found near the western shore of central Florida, as well as in a number of other states. Deposits in Florida are found in the form of pebbles which vary in size from fine sand to about the size of a human foot. These pebbles are embedded in a matrix of clay and sand. The phosphate rock beds lie within a few feet of the surface and mining is accomplished by use of hydraulic water jets and a washing operation that separates the phosphate from waste materials. The process is similar to that of strip-mining. Florida, Idaho, Montana, North Carolina, South Carolina, Tennessee, Utah, Virginia, and Wyoming share phosphate mining activities.

Phosphates enter waterways from several different sources. The human body excretes about 1 pound per year of phosphorus expressed as "P." The use of phosphate detergents and other domestic phosphates increases the per capita contribution to about 3½ pounds per year of phosphorus as P. Some industries, such as potato processing, have wastewaters high in phosphates. Varying amounts of phosphorus drain to watercourses from the land. This drainage may be surface runoff of rainfall, effluent from tile lines, or return flow from irrigation. Cattle feedlots, concentrations of domestic duck or wild duck populations, and tree leaves, as well as atmospheric fallout are all contributing sources.

Evidence indicates that: (1) high phosphorus concentrations are associated with accelerated eutrophication of waters, when other growth-promoting factors are present; (2) aquatic plant problems develop in reservoirs and other standing waters at phosphorus values lower than those critical in flowing streams; (3) reservoirs and lakes collect phosphates from influent streams and store a portion of them within consolidated sediments, thus serving as a phosphate sink; and, (4) phosphorus concentrations critical to noxious plant growth vary, and nuisance growths may result from a particular concentration of phosphate in one geographical area but not in another. The amount or percentage of inflowing nutrients that may be retained by a lake or reservoir is variable and will depend upon: (1) the nutrient loading to the lake or reservoir; (2) the volume of the euphotic zone; (3) the extent of biological activities; (4) the detention time within the lake basin or the time available for biological activities; and, (5) the level of discharge from the lake or of the penstock from the reservoir.

Once nutrients are combined within the aquatic ecosystem, their removal is tedious and expensive. Phosphates are used by algae and higher aquatic plants and an excess may be stored within the plant cell. With decomposition of the plant cell, some phosphorus may be released immediately through bacterial action for recycling within the biotic community, while the remainder may be deposited with sediments. Much of the material that becomes combined with the consolidated sediments within the lake bottom is bound permanently and will not be recycled into the system.

RATIONALE

Elemental Phosphorus

Isom (1960) reported an LC_{50} of 0.105 mg/l at 48 hours and 0.025 mg/l at 160 hours for bluegill sunfish, *Lepomis macrochirus*, exposed to yellow phosphorus in distilled water at 26° C and pH 7. The 125- and 195-hour LC_{50} s of yellow phosphorus to Atlantic cod, *Gadus morhua*, and Atlantic salmon, *Salmo salar*, smolts in continuous exposure experiments were 1.89 and 0.79 ug/l, respectively (Fletcher and Hoyle, 1972). No evidence of an incipient lethal level was observed since the lowest concentration of elemental phosphorus (P_4) tested was 0.79 ug/l. Salmon that were exposed to elemental phosphorus concentrations of 40 ug/l or less developed a distinct external red color and showed signs of extensive hemolysis. The predominant features of P_4 poisoning in salmon were external redness, hemolysis, and reduced hematocrits.

Following the opening of an elemental phosphorus production plant in Long Harbour, Placentia Bay, Newfoundland, divers observed dead fish upon the bottom throughout the harbour (Peer, 1972). Mortalities were confined to a water depth of less than 18 meters. There was visual evidence of selective mortality among benthos. Live mussels were found within 300 meters of the effluent pipe, while all scallops within this area were dead.

Fish will concentrate elemental phosphorus from water containing as little as 1 ug/l (Idler, 1969). In one set of experiments, a cod swimming in water containing 1 ug/l elemental phosphorus for 18 hours concentrated phosphorus to 50 ug/kg in muscle, 150 ug/kg in fatty tissue, and 25,000 ug/kg in the liver (Idler, 1969; Jangaard, 1970). The experimental findings showed that phosphorus is quite stable in the fish tissues.

The criterion of 0.10 ug/l elemental phosphorus for marine or estuarine waters is 1/10 of demonstrated lethal levels to important marine organisms and of levels that have been found to result in significant bioaccumulation.

Phosphate Phosphorus

Although a total phosphorus criterion to control nuisance aquatic growths is not presented, it is believed that the following rationale to support such a criterion, which currently is evolving, should be considered.

Total phosphate phosphorus concentrations in excess of 100 ug/l P may interfere with coagulation in water treatment plants. When such concentrations exceed 25 ug/l at the time of the spring turnover on a volume-weighted basis in lakes or reservoirs, they may occasionally stimulate excessive or nuisance growths of algae and other aquatic plants. Algal growths impart undesirable tastes and odors to water, interfere with water treatment, become aesthetically unpleasant, and alter the chemistry of the water supply. They contribute to the phenomenon of cultural eutrophication.

To prevent the development of biological nuisances and to control accelerated or cultural eutrophication, total phosphates as phosphorus (P) should not exceed 50 ug/l in any stream at the point where it enters any lake or reservoir, or 25 ug/l within the lake or reservoir. A desired goal for the prevention of plant nuisances in streams or other flowing waters not discharging directly to lakes or impoundments is 100 ug/l total P (Mackenthun, 1973). Most relatively uncontaminated lake districts are known to have surface waters that contain from 10 to 30 ug/l total phosphorus as P (Hutchinson, 1957).

The majority of the Nation's eutrophication problems are associated with lakes or reservoirs, and currently more data support the establishment of a limiting phosphorus level in those waters than in streams or rivers that do not directly impact such water. Natural conditions also dictate the consideration of either a more or less stringent phosphorus level. Eutrophication problems may occur in waters where the phosphorus concentration is less than that indicated above and, obviously, there would be a need in such waters to have nutrient limits that are more stringent. Likewise, there are those waters within the Nation where phosphorus is not now a limiting nutrient and where the need for phosphorus limits is substantially diminished. Such conditions are described in the last paragraph of this rationale.

Two basic needs must be met in establishing a phosphorus criterion for flowing waters: one is to control the development of plant nuisances within the flowing water and, in turn, to control and prevent animal

pests that may become associated with such plants; the other is to protect the downstream receiving waterway, regardless of its proximity in linear distance. It is evident that a portion of that phosphorus that enters a stream or other flowing waterway eventually will reach a receiving lake or estuary either as a component of the fluid mass, as bed load sediments that are carried downstream, or as floating organic materials that may drift just above the stream's bed or float on its surface. Superimposed on the loading from the inflowing waterway, additional phosphorus may enter the lake or estuary as fallout from the air shed or as a direct introduction from shoreline areas.

Another method to control the inflow of nutrients, particularly phosphates, into a lake is that of prescribing an annual loading to the receiving water. Vollenweider (1973) suggests total phosphorus (P) loadings in grams per square meter of surface area per year that will be a critical level for eutrophic conditions within the receiving waterway for a particular water volume where the mean depth of the lake in meters is divided by the hydraulic detention time in years. Vollenweider's data (Table 13) suggest a range of loading values that should result in oligotrophic lake water quality.

Table 13.

Mean depth/hydraulic detention time	Oligotrophic or permissible loading	Eutrophic or critical loading
(meters/year)	(grams/meter ² /year)	(grams/meter ² /year)
0.5	0.07	0.14
1.0	0.10	0.20
2.5	0.16	0.32
5.0	0.22	0.45
7.5	0.27	0.55
10.0	0.32	0.63
25.0	0.50	1.00
50.0	0.71	1.41
75.0	0.87	1.73
100.0	1.00	2.00

There may be waterways wherein higher concentrations or loadings of total phosphorus do not produce eutrophy, as well as those waterways wherein lower concentrations or loadings of total phosphorus may be associated with populations of nuisance organisms. Waters now containing less than the specified amounts of phosphorus should not be degraded by the introduction of additional phosphates.

It should be recognized that a number of specific exceptions can occur to reduce the threat of phosphorus as a contributor to lake eutrophy. Often, naturally occurring phenomena limit the development of plant nuisances; often there are technological or cost-effective limitations to the control of introduced pollutants. Exceptions to the threat of phosphorus in eutrophication occur in waters (1) highly laden with natural silts or colors which reduce the penetration of sunlight needed for plant photosynthesis; (2) whose morphometric features of

steep banks, great depth, and substantial flows contribute to a history of no plant problems; (3) that are managed primarily for waterfowl or other wildlife; (4) where an identified nutrient other than phosphorus is limiting to plant growth and the level and nature of such limiting nutrient would not be expected to increase to an extent that would influence eutrophication; and (5) where phosphorus control cannot be sufficiently effective under present technology to make phosphorus the limiting nutrient. No national criterion is presented for phosphate phosphorus for the control of eutrophication.

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AESTHETIC QUALITIES

CRITERIA

All waters free from substances attributable to wastewater or other discharges that:

- (1) settle to form objectionable deposits;
- (2) float as debris, scum, oil, or other matter to form nuisances;
- (3) produce objectionable color, odor, taste, or turbidity;
- (4) injure or are toxic or produce adverse physiological responses in humans, animals or plants; and
- (5) produce undesirable or nuisance aquatic life.

RATIONALE

Aesthetic qualities of water address the general principles laid down in common law. They embody the beauty and quality of water and their concepts may vary within the minds of individuals encountering the waterway. A rationale for these qualities cannot be developed with quantifying definitions; however, decisions concerning such quality factors can portray the best in the public interest.

Aesthetic qualities provide the general rules to protect water against environmental insults; they provide minimal requirements for freedom from pollution; they are essential to the enjoyment of the Nation's waterways.

NITRATES, NITRITES

CRITERION

10 mg/l nitrate nitrogen (N) for domestic water supply (health).

INTRODUCTION

Two gases (molecular nitrogen and nitrous oxide) and five forms of nongaseous, combined nitrogen (amino and amide groups, ammonium, nitrite, and nitrate) are important in the nitrogen cycle. The amino and amide groups are found in soil organic matter and as constituents of plant and animal protein. The ammonium ion is either released from proteinaceous organic matter and urea, or is synthesized in industrial processes involving atmospheric nitrogen fixation. The nitrite ion is formed from the nitrate or the ammonium ions by certain microorganisms found in soil, water, sewage, and the digestive tract. The nitrate ion is formed by the complete oxidation of ammonium ions by soil or water microorganisms; nitrite is an intermediate product of this nitrification process. In oxygenated natural water systems nitrite is rapidly oxidized to nitrate. Growing plants assimilate nitrate or ammonium ions and convert them to protein. A process known as denitrification takes place when nitrate-containing soils become anaerobic and the conversion to nitrite, molecular nitrogen, or nitrous oxide occurs. Ammonium ions may also be produced in some circumstances.

Among the major point sources of nitrogen entry into water bodies are municipal and industrial wastewaters, septic tanks, and feedlot discharges. Diffuse sources of nitrogen include farm-site fertilizer and animal wastes, lawn fertilizer, leachate from waste disposal in dumps or sanitary landfills, atmospheric fallout, nitric oxide and nitrite discharges from automobile exhausts and other combustion processes, and losses from natural sources such as mineralization of soil organic matter (NAS, 1972). Water reuse systems in some fish hatcheries employ a nitrification process for ammonia reduction; this may result in exposure of the hatchery fish to elevated levels of nitrite (Russo, et al. 1974).

RATIONALE

In quantities normally found in food or feed, nitrates become toxic only under conditions in which they are, or may be, reduced to nitrites. Otherwise, at "reasonable" concentrations, nitrates are rapidly excreted in the urine. High intake of nitrates constitutes a hazard primarily to warmblooded animals under conditions that are favorable to their

reduction to nitrite. Under certain circumstances, nitrate can be reduced to nitrite in the gastrointestinal tract which then reaches the bloodstream and reacts directly with hemoglobin to produce methemoglobin, with consequent impairment of oxygen transport.

The reaction of nitrite with hemoglobin can be hazardous in infants under 3 months of age. Serious and occasionally fatal poisonings in infants have occurred following ingestion of untreated well waters shown to contain nitrate at concentrations greater than 10 mg/l nitrate nitrogen (N) (NAS, 1974). High nitrate concentrations frequently are found in shallow farm and rural community wells, often as the result of inadequate protection from barnyard drainage or from septic tanks (USPHS, 1961; Stewart, et al. 1967). Increased concentrations of nitrates also have been found in streams from farm tile drainage in areas of intense fertilization and farm crop production (Harmeson, et al. 1971). Approximately 2,000 cases of infant methemoglobinemia have been reported in Europe and North America since 1945; 7 to 8 percent of the affected infants died (Walton, 1951; Sattelmacher, 1962). Many infants have drunk water in which the nitrate nitrogen content was greater than 10 mg/l without developing methemoglobinemia. Many public water supplies in the United States contain levels that routinely are in excess of this amount, but only one U.S. case of infant methemoglobinemia associated with a public water supply has ever been reported (Vigil, et al. 1965). The differences in susceptibility to methemoglobinemia are not yet understood but appear to be related to a combination of factors including nitrate concentration, enteric bacteria, and the lower acidity characteristic of the digestive systems of baby mammals. Methemoglobinemia symptoms and other toxic effects were observed when high nitrate well waters containing pathogenic bacteria were fed to laboratory mammals (Wolff and Wasserman, 1972). Conventional water treatment has no significant effect on nitrate removal from water (NAS, 1974).

Because of the potential risk of methemoglobinemia to bottle-fed infants, and in view of the absence of substantiated physiological effects at nitrate concentrations below 10 mg/l nitrate nitrogen, this level is the criterion for domestic water supplies. Waters with nitrite nitrogen concentrations over 1 mg/l should not be used for infant feeding. Waters with a significant nitrite concentration usually would be heavily polluted and probably bacteriologically unacceptable.

Westin (1974) determined that the respective 96-hour and 7-day LC_{50} values for chinook salmon, *Oncorhynchus tshawytscha*, were 1,310 and 1,080 mg/l nitrate nitrogen in fresh water and 990 and 900 mg/l nitrate nitrogen in 15 o/oo saline water. For fingerling rainbow trout, *Salmo gairdneri*, the respective 96-hour and 7-day LC_{50} values were 1,360 and 1,060 mg/l nitrate nitrogen in fresh water, and 1,050 and 900 mg/l nitrate nitrogen in 15 o/oo saline water. Trama (1954) reported that the 96-hour LC_{50} for bluegills, *Lepomis macrochirus*, at 20° C was 2,000 mg/l nitrate nitrogen (sodium nitrate) and 420 mg/l nitrate nitrogen (potassium nitrate). Knepp and Arkin (1973) observed that largemouth bass, *Micropterus salmoides*, and channel catfish, *Ictalurus punctatus*, could be maintained at concentrations up to 400 mg/l nitrate (90 mg/l

nitrate nitrogen) without significant effect upon their growth and feeding activities.

The 96-hour and 7-day LC₅₀ values for chinook salmon, *Oncorhynchus tshawytscha*, were found to be 0.9 and 0.7 mg/l nitrite nitrogen in fresh water (Westin, 1974). Smith and Williams (1974) tested the effects of nitrite nitrogen and observed that yearling rainbow trout, *Salmo gairdneri*, suffered a 55 percent mortality after 24 hours at 0.55 mg/l, fingerling rainbow trout suffered a 50 percent mortality after 24 hours of exposure at 1.6 mg/l, and chinook salmon, *Oncorhynchus tshawytscha*, suffered a 40 percent mortality within 24 hours at 0.5 mg/l. There were no mortalities among rainbow trout exposed to 0.15 mg/l nitrite nitrogen for 48 hours. These data indicate that salmonids are more sensitive to nitrite toxicity than are other fish species, e.g., minnows, *Phoxinus laevis*, that suffered a 50 percent mortality within 1.5 hours of exposure to 2,030 mg/l nitrite nitrogen, but required 14 days of exposure for mortality to occur at 10 mg/l (Klingler, 1957), and carp, *Cyprinus carpio*, when raised in a water reuse system, tolerated up to 1.8 mg/l nitrite nitrogen (Saeki, 1965).

Gillette, et al. (1952) observed that the critical range for creek chub, *Semotilus atromaculatus*, was 80 to 400 mg/l nitrite nitrogen. Wallen, et al. (1957) reported a 24-hour LC₅₀ of 1.6 mg/l nitrite nitrogen, and 48- and 96-hour LC₅₀ values of 1.5 mg/l nitrite nitrogen for mosquitofish, *Gambusia affinis*. McCoy (1972) tested the nitrite susceptibility of 13 fish species and found that logperch, *Percina caprodes*, were the most sensitive species tested (mortality at 5 mg/l nitrite nitrogen in less than 3 hours of exposure), whereas carp, *Cyprinus carpio*, and black bullheads, *Ictalurus melas*, survived 40 mg/l nitrite nitrogen for a 48-hour exposure period; the common white sucker, *Catostomus commersoni*, and the quillback, *Carpionodes cyprinus*, survived 100 mg/l for 48 and 36 hours, respectively.

Russo, et al. (1974) performed flow-through nitrite bioassays in hard water (hardness = 199 mg/l CaCO₃, alkalinity = 176 mg/l CaCO₃, pH = 7.9) on rainbow trout, *Salmo gairdneri*, of four different sizes, and obtained 96-hour LC₅₀ values ranging from 0.19 to 0.39 mg/l nitrite nitrogen. Duplicate bioassays on 12-gram rainbow trout were continued long enough for their toxicity curves to level off, and asymptotic LC₅₀ concentrations of 0.14 and 0.15 mg/l were reached in 8 days; on day 19, additional mortalities occurred. For 2-gram rainbow trout, the minimum tested level of nitrite nitrogen at which no mortalities were observed after 10 days was 0.14 mg/l; for the 235-gram trout, the minimum level with no mortality after 10 days was 0.06 mg/l.

It is concluded that: (1) levels of nitrate nitrogen at or below 90 mg/l would have no adverse effects on warm water fish (Knepp and Arkin, 1973); (2) nitrite nitrogen at or below 5 mg/l should be protective of most warm water fish (McCoy, 1972); and (3) nitrite nitrogen at or below 0.06 mg/l should be protective of salmonid fishes (Russo, et al. 1974; Russo and Thurston, 1975). These levels either are not known to occur or would be unlikely to occur in natural surface waters.

Recognizing that concentrations of nitrate or nitrite that would exhibit toxic effects on warm or cold water fish could rarely occur in nature, restrictive criteria are not recommended.

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AMMONIA

CRITERION

0.02 mg/l (as un-ionized ammonia) for freshwater aquatic life.

Table 2.—Concentrations of total ammonia ($\text{NH}_3 + \text{NH}_4^+$) which contain an un-ionized ammonia concentration of 0.020 mg/l NH_3 (mg/l)^a

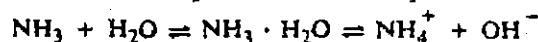
Temperature (°C)	pH Value								
	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
5	160.	51.	16.	5.1	1.6	0.53	0.18	0.071	0.036
10	110.	34.	11.	3.4	1.1	0.36	0.13	0.054	0.031
15	73.	23.	7.3	2.3	0.75	0.25	0.093	0.043	0.027
20	50.	16.	5.1	1.6	0.52	0.18	0.070	0.036	0.025
25	35.	11.	3.5	1.1	0.37	0.13	0.055	0.031	0.024
30	25.	7.9	2.5	0.81	0.27	0.099	0.045	0.023	0.022

^a[Abstracted from Thurston et al. (1974)]

INTRODUCTION

Ammonia is a pungent, colorless, gaseous, alkaline compound of nitrogen and hydrogen that is highly soluble in water. It is a biologically active compound present in most waters as a normal biological degradation product of nitrogenous organic matter. It may also reach ground and surface waters through discharge of industrial wastes containing ammonia as a byproduct, or wastes from industrial processes using "ammonia water."

When ammonia dissolves in water, some of the ammonia reacts with the water to form ammonium ions. A chemical equilibrium is established which contains un-ionized ammonia (NH_3), ionized ammonia (NH_4^+), and hydroxide ions (OH^-). The equilibrium for these chemical species can be expressed in simplified form by the following equation:



In the above equation, NH_3 represents ammonia gas combining with water. The term $\text{NH}_3 \cdot \text{H}_2\text{O}$ represents the un-ionized ammonia molecule which is loosely attached to water molecules. Dissolved un-ionized ammonia will be represented for convenience as NH_3 . The ionized form of ammonia will be represented as NH_4^+ . The term total ammonia will refer to the sum of these ($\text{NH}_3 + \text{NH}_4^+$).

The toxicity of aqueous solutions of ammonia is attributed to the NH_3 species. Because of the equilibrium relationship among NH_3 , NH_4^+ , and OH^- , the toxicity of ammonia is very much dependent upon pH as well

as the concentration of total ammonia. Other factors also affect the concentration of NH_3 in water solutions, the most important of which are temperature and ionic strength. The concentration of NH_3 increases with increasing temperature, and decreases with increasing ionic strength. In aqueous ammonia solutions of dilute saline concentrations, the NH_3 concentration decreases with increasing salinity.

Percent NH_3 for aqueous ammonia solutions of zero salinity at different values of pH and temperature is given in Table 3. This percentage can be used to determine the amount of total ammonia which is in the most toxic (NH_3) form.

Table 3.—Percent un-ionized ammonia in aqueous ammonia solutions*

Temperature (°C)	pH Value								
	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
5....	0.013	0.040	0.12	0.30	1.2	3.8	11.	28.	56.
10....	0.019	0.059	0.19	0.59	1.8	5.6	16.	37.	65.
15....	0.027	0.087	0.27	0.86	2.7	8.0	21.	46.	73.
20....	0.040	0.13	0.40	1.2	3.8	11.	28.	56.	80.
25....	0.057	0.18	0.57	1.8	5.4	15.	36.	64.	85.
30....	0.080	0.25	0.80	2.5	7.5	20.	45.	72.	89.

*[Thurston, et al. (1974)]

RATIONALE

It has been known since early in this century that ammonia is toxic to fishes and that the toxicity varies with the pH of the water. Chipman (1934) demonstrated that undissociated ammonia (NH_3) was the chemical species toxic to goldfish, amphipods, and cladocerans. He concluded from his studies that the toxicity of ammonium salts was pH-dependent and was directly related to the concentration of undissociated ammonia. Chipman's work was confirmed by Wuhrmann, et al. (1947) who concluded that the NH_3 fraction was toxic to fish and that the NH_4^+ fraction had little or no toxicity. Further studies by Wuhrmann and Woker (1948) and Downing and Merckens (1955) agreed with these earlier findings. Tabata (1962), however, has attributed some degree of toxicity to fishes and invertebrates by the NH_4^+ species (less than 1/50th that of NH_3).

In most natural waters, the pH range is such that the NH_4^+ fraction of ammonia predominates; however, in highly alkaline waters, the NH_3 fraction can reach toxic levels. Many laboratory experiments of relatively short duration have demonstrated that the lethal concentrations for a variety of fish species are in the range of 0.2 to 2.0 mg/l NH_3 , with trout being the most sensitive and carp the most resistant. Although coarse fish such as carp survive longer in toxic solutions than do salmonids, the difference in sensitivity among fish species to prolonged exposure is probably small (European Inland Fisheries Advisory Commission, 1970). The lowest lethal concentration reported for salmonids is 0.2 mg/l NH_3 for rainbow trout fry, *Salmo gairdneri*

(Liebmann, 1960). The toxic concentration for Atlantic salmon smolts, *Salmo salar* (Herbert and Shurben, 1965), and for rainbow trout (Ball, 1967) was found to be only slightly higher. Although a concentration of NH_3 below 0.2 mg/l may not kill a significant proportion of a fish population, such concentration may still exert an adverse physiological or histopathological effect (Flis, 1968; Lloyd and Orr, 1969; Smith and Piper, 1975). Fromm (1970) found that at concentrations of 3 mg/l ammonia as N, the trout became hyperexcitable; at 5 mg/l, ammonia excretion by rainbow trout was inhibited; and at 8 mg/l, 50 percent died within 24 hours. Burrows (1964) found progressive gill hyperplasia in fingerling chinook salmon, *Oncorhynchus tshawytscha*, during a 6-week exposure to a total ammonia concentration (expressed as NH_4) of 0.3 mg/l (0.002 mg/l NH_3), which was the lowest concentration applied. Reichenbach-Klinke (1967) also noted gill hyperplasia, as well as pathological effects on the liver and blood of various species at a concentration of 0.27 mg/l NH_3 . Flis (1968) noted that exposure of carp, *Cyprinus carpio*, to sublethal NH_3 concentrations resulted in extensive necrotic changes and tissue disintegration in various organs.

Herbert and Shurben (1965) reported that the resistance of yearling rainbow trout to ammonia increased with salinity (i.e., dilution with about 30 percent seawater) but above that level resistance appeared to decrease. Katz and Pierro (1967) subjected fingerling coho salmon, *Oncorhynchus kisutch*, to an ammonia waste at salinity levels of 20, 25, and 29 parts per thousand (i.e., dilution with about 57-83 percent seawater) and also found that toxicity increased with increased salinity. In saline waters the $\text{NH}_4^+/\text{NH}_3$ ratio must be adjusted by consideration of the activity of the charged species and total ionic strength of the solution. In dilute saline waters this ratio will change to favor NH_4^+ , and thereby reduce the concentration of the toxic NH_3 species. At higher salinity levels the reported toxic effects of ammonia to fish must therefore be attributed to some mechanism other than changes in the $\text{NH}_4^+/\text{NH}_3$ ratio. Data on the effect of ammonia on marine species are limited and the information on anadromous species generally has been reported in conjunction with studies on freshwater species.

Although the NH_3 fraction of total ammonia increases with temperature, the toxic effect of NH_3 versus temperature is not clear. Burrows (1964) has reported that the recovery rate from hyperplasia in gill tissues of chinook salmon, *Oncorhynchus tshawytscha*, exposed first to ammonia at sublethal levels and then to fresh water was less at 6°C than at 14°C. In this experiment, comparison was made between two different age classes of salmon.

Levels of un-ionized ammonia in the range of 0.20 to 2 mg/l have been shown to be toxic to some species of freshwater aquatic life. To provide safety for those life forms not examined, 1/10th of the lower value of this toxic effect range results in a criterion of 0.020 mg/l of un-ionized ammonia. This criterion is slightly lower than that recommended for European inland fisheries (EIFAC, 1970) for temperatures above 5°C and pH values below 8.5. Measurement of values of total ammonia for calculation of values in the range of 0.020 mg/l NH_3 is well within current analytical capability.

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A REVIEW OF THE EPA RED BOOK:
QUALITY CRITERIA FOR WATER

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April 1979

PHOSPHORUS

EPA Criterion

0.10 µg/l yellow (elemental) phosphorus for marine or estuarine waters.

Reviewers: G.F. Lee (Coordinator), R.A. Jones, B.A. Manny, J.G. Pearson, D.L. Swanson, R.G. Wetzel, and J.C. Wright

The Red Book discussion and criterion for elemental phosphorus should have been in a section separate from that of phosphate phosphorus. Elemental phosphorus is a highly toxic element which occurs in the environment under very rare conditions. Phosphate phosphorus is a naturally occurring material which is of water quality significance because it may lead to excessive fertilization problems. The nature of the sources and effects on environmental quality for these two forms of phosphorus are significantly different and, therefore, should be separated into two sections in order to avoid confusion. This review discusses each of the two forms separately.

A. ELEMENTAL PHOSPHORUS

I. Criterion

In general, the review panel had limited familiarity with the problems of elemental phosphorus. However, one member (Pearson) was in the process of reviewing a comprehensive report on the environmental impact of elemental phosphorus (Bentley et al. In press). Based on the information provided by him, it is the conclusion of the panel that consideration should be given to altering the criterion for elemental phosphorus to 0.04 µg/liter P for both fresh and marine waters. This represents a change from the 0.1 µg/liter P criterion recommended by the U.S. EPA for marine waters. The review panel feels there is sufficient evidence at this time to justify a re-evaluation of the elemental phosphorus criterion and recommends that as part of the next revision of the EPA water quality criteria, a critical review be conducted of the information that is available at that time. By then, the unpublished information which was made available to this panel, which suggests that a 0.04 µg/liter P criterion should be used, will have been published and the technical community will have had the opportunity to review this information critically and judge its appropriateness.

II. Introduction

It is recommended that Red Book paragraph 2, page 187, be deleted from any future writeups of the criteria for phosphorus. It adds little to the understanding of the behavior of phosphorus in natural waters and its significance in causing water quality problems. The presence of phosphate rock, per se, does not necessarily lead to a water quality problem. This paragraph is extraneous to the overall writeup and should be deleted.

III. Rationale

In both the "Introduction" and the "Rationale", mention is made of the bioaccumulation of elemental phosphorus within fish. No discussion is presented on the significance of this bioaccumulation, however. If the significance is unknown, then the text should say so. If any significance is attributed to bioaccumulation of elemental phosphorus, then this should be presented in the discussion of elemental phosphorus in natural waters. There are some questions about whether or not elemental phosphorus can bioaccumulate in a potentially toxic form.

Page 187, P.3. The reference to "yellow phosphorus" should be changed to "elemental phosphorus". A statement should be included to explain what is meant by "P₄", i.e., why elemental phosphorus is called P₄. It is recommended that someone thoroughly familiar with the nomenclature of elemental phosphorus review any revisions of the elemental phosphorus section before publication of a revised EPA criteria.

Page 188, P.2, 2.2-3. What is the justification for the 1/10th factor? Justification should be provided for this factor in relating the "demonstrated lethal levels" and levels that have been found to result in "significant bioaccumulation" to the criterion.

Page 188, P.2, 2.4. What is meant by "significant bioaccumulation"? An explanation should be provided as to the meaning of the word "significant".

B. PHOSPHATE PHOSPHORUS

I. Criterion

No criterion is provided for phosphate phosphorus. Instead, a discussion is presented on various methods that have been used to estimate the impact of phosphate phosphorus on excessive fertilization of natural waters. It is the recommendation of this review panel that the phosphorus loading approach formulated by Vollenweider (1975, 1976) and modified and expanded by Rast and Lee (1978) be utilized to establish the relationship between phosphorus load to a lake, impoundment, or estuary, and the excessive fertilization problems that may occur in the water body arising from the growth of planktonic algae. This recommendation is further discussed in detail in a subsequent section of this review.

II. Introduction

From an overall point of view, the discussion of the significance of

phosphate phosphorus is highly simplistic. Specific points of concern in the "Introduction" are listed below.

Page 186, P.1, 2.4-5. This sentence should be rephrased and clarified. The term "critical concentrations" has different meanings to different individuals. Available phosphorus, at all concentrations, stimulates algal growth if it is the growth-limiting element. Also in this sentence, the word "phosphates" should be changed to "phosphate". As written, this sentence implies that the cation associated with the phosphate is of some importance in the impact of phosphate on water quality. There is no evidence to support this statement. This problem also occurs at other locations such as page 186, P.3, 2.1. Reference to "phosphates" throughout the phosphate phosphorus section should be changed to "phosphate".

Page 186, P.1, 2.6. "Aquatic plants" should read "algae" since rooted aquatic plants can obtain some of their phosphorus from sediments.

Page 186, P.1, 2.7. This sentence should read, "increased supplies of available phosphorus". It is now well known that only certain forms of phosphorus are available to stimulate algal growth.

Page 186, P.1, 2.8-9. The word "aging" should be deleted. It is a general misconception among those who are not familiar with the eutrophication process of natural waters, that eutrophication is in some way related to the shortening of the life of the lake or impoundment. Eutrophication and the water quality problems associated with excessive fertilization are controlled primarily by the overall phosphorus load (for some lakes: nitrogen or other elements), the lake's morphology as measured by mean depth, and its hydrology as measured by the hydraulic residence time. As discussed by Lee (1973) the water quality of a lake receiving large amounts of culturally derived phosphorus can deteriorate significantly. This, however, does not necessarily result in a significant shortening of the overall life of the lake as measured by the filling of the lake, except during the final stages of a lake's life when it becomes essentially completely filled with aquatic macrophytes. The filling of lakes is determined primarily by the erosion of clastic materials from the watershed and not by the production of phytoplankton in the lake. Work on the chemical characteristics of lake sediments supports this approach. Therefore, where eutrophication is primarily manifested in the production of planktonic algae, highly eutrophic lakes do not, in general, fill at a significantly different rate than oligotrophic lakes. Also, change "waters" to "water bodies".

Page 186, P.1, 2.11. Mention is made that phosphorus stimulates the growth of freshwater plants. "Plants" should be changed to "algae" since the relationship between phosphorus load and macrophyte growth is not clear. However, since macrophytes obtain all or part of their phosphorus from the sediments and since the phosphorus load to a water body contributes phosphorus to the sediments, increased macrophyte growth would likely occur in shallow water bodies when inputs of phosphorus are increased.

Page 186, P.3, 2.2 and 4. A metric equivalent should be given for

the amounts of phosphorus derived from various sources.

Page 186, P.3, 2.4. This sentence should be rewritten to reflect the fact that the total per capita phosphorus in domestic wastewaters today is about three pounds (1.4 kilograms) per year. Approximately one pound (0.45 kilograms) per person per year is derived from human excreta. Synthetic detergents contribute another pound or 0.45 kilograms per person per year. The amount of phosphorus used in synthetic detergents has decreased significantly over the past half a dozen years with the result that the phosphorus content of domestic wastewaters which is attributable to detergents is currently about 35 percent.

Page 186, P.3, 2.8. "Effluent from tile lines" is not meaningful to many of the readers. This should be more clearly delineated as to what is meant. The concentrations of ducks is an awkward way to describe the impact of wild and domestic ducks.

Page 187, P.1, 2.13. In addition to listing the volume of the euphotic zone as an important factor for controlling the amount of nutrients retained in a lake, the volume of the lake and its depth should also be listed.

Page 187, P.1, 2.14. Item (4) should read, "the detention time of water within the lake basin . . .".

Page 187, P.1 and 2. These two paragraphs should be prefaced by a phrase such as "In a simplistic way", or "Simplistically" followed by a listing of the various items. Many of the items and ideas listed, when corrected as noted above, are proper. However, it should be indicated to the reader who is not knowledgeable in the area, that this discussion is a very simplistic overview.

III. Rationale

Page 188, P.3. It is proposed that this paragraph be deleted and that a specific recommendation involving the use of the attached revised Table 13 be used by the EPA as the criterion for those water bodies for which phosphorus is or can be made to be the primary factor limiting planktonic algal growth.

Page 188, P.4, 2.1. The statement that total phosphorus concentrations in excess of 100 µg/liter P interfere with coagulation is not correct. There are certain forms of phosphorus which interfere with water coagulation. These should not be equated to total phosphate.

Page 188, P.4 and 5. The statement in paragraphs 4 and 5 concerning so-called "critical concentrations" of phosphorus for lakes, impoundments, and rivers should be deleted. There are many exceptions to these relationships. This is why the Vollenweider-type relationship involving phosphorus load has developed. One cannot, with any degree of reliability, predict the water quality problems due to algae based on phosphorus concentrations at one time during the year. An attempt to establish, as some states have done, single value critical concentrations, is not in

Table 43-1. Replacement for Red Book Table 13

Mean Depth/Hydraulic Residence Time (m/yr)	Oligotrophic or Permissible Loading (g/m ² /yr)	Eutrophic or Critical Loading (g/m ² /yr)
0.25	0.102	0.205
0.5	0.105	0.21
1.0	0.11	0.22
2.5	0.125	0.25
5.0	0.15	0.30
7.5	0.175	0.35
10.0	0.20	0.40
25.0	0.35	0.70
50.0	0.60	1.2
75.0	0.85	1.7
100.0	1.1	2.2

Based on relationships developed by Vollenweider (1976).

accord with the information available today on the role of phosphorus in causing fertilization problems in water bodies. Listing of numbers such as 25 µg/liter or 50 µg/liter as critical concentrations for phosphorus will tend to promote out-dated approaches for establishing water quality standards. All reference to specific numerical phosphorus concentrations should be deleted from this discussion.

Page 189, P.2. This discussion should be expanded to include reference to the work of Rast and Lee (1978). On behalf of the U.S. EPA as part of the Organization for Economic Cooperation and Development (OECD) Eutrophication Program, they conducted a detailed review of the phosphorus load-lake and impoundment water quality response relationships for a variety of water bodies across the U.S. Rast and Lee have found that the modified Vollenweider approach, involving the relationship between the areal phosphorus load to a water body and the mean depth and hydraulic residence time of the water body, is a valid approach to use to predict water quality characteristics of those water bodies in which algal growth is or can be made to be limited by phosphorus. The current Table 13 is based on an early version of Vollenweider's work. It has subsequently been shown by Rast and Lee that the revised approach developed by Vollenweider (1976) (see revised Table 13) gives a better representation of the nutrient load-response relationships for U.S. water bodies studied as part of the U.S. OECD Eutrophication Program, than does the original version.

A discussion should also be presented on the proper interpretation of "permissible" and "excessive" phosphorus loadings. It is important to point out that the "permissible" and "excessive" loading curves do not represent sharp boundary lines. The fact that a lake has a load that is slightly above the critical loading value does not mean that it has significantly different water quality than a lake that is just below the critical loading level for the same morphological and hydrological relationships. As discussed by Rast and Lee (1978), for a series of lakes, in which algal growth is phosphorus limited and which have the same mean depth/hydraulic residence time ratios but different areal P loadings, there is a gradation of water quality among them which is proportional to the areal P load. The best water quality would be found in lakes which have the lowest areal P load. Conversely, the worst water quality would be found in those water bodies with the highest areal P load.

It should also be pointed out in the text that the permissible and critical loading curves are, in general, based on impairment of the recreational use of water bodies due to planktonic algal growth. These values are not necessarily directly applicable to other impacts of planktonic algal growth such as taste and odors in water supplies and the growth of attached algae or aquatic macrophytes. Rast and Lee (1978) have found that the Vollenweider permissible loading curve approximately corresponds to an average summer chlorophyll a concentration of 2 µg/liter; an average summer Secchi depth of 4.5 m; and a hypolimnetic oxygen depletion rate of 0.3 g O₂/m²/day. The corresponding approximate values for the "excessive" loading line are: 6 µg/liter average summer chlorophyll a; 2.7 m average summer Secchi depth; and 0.6 g O₂/m²/day hypolimnetic

oxygen depletion rate. The results of this work can be used by a water pollution regulatory agency to establish its own permissible and excessive loading values for any given water body, based on the water quality that is desired in the water body.

Page 190, P.1, 2.8-9. This sentence should be deleted. Instead a recommendation should be made for adoption of the revised Table 13 as the criterion for those water bodies which are or can be made to be phosphorus limited and in which the problems of deteriorated water quality are manifested as excessive growths of planktonic algae. It should be pointed out that additional work is needed to develop criteria for water bodies in which algal growth is limited by nitrogen or some other element, or by light, and for water bodies in which the primary aquatic plant growths are aquatic macrophytes and/or attached algae.

IV. References Cited

The reference to Hutchinson (1957) should be deleted as currently used. It does not help in establishing the criterion for phosphate phosphorus. The reference to Mackenthun (1973) also should be deleted or be used only as a general reference to eutrophication problems. The reference to Vollenweider (1973) is incomplete. Other references, cited above, should be included.

Literature Cited

- Bentley, R.E., J.W. Dean, T.A. Hollister, G.A. LeBlanc, S. Sauter, B.H. Sleight, III, and W.G. Wilson. Laboratory evaluation of the toxicity of elemental phosphorus (P_4) to aquatic organisms. E.G. & G. Bionomics, Wareham, MA. (In press).
- Hutchinson, G.E. 1957. A treatise on limnology. Vol. I. Geography, physics, and chemistry. John Wiley and Sons, Inc., New York, NY: 1015 p.
- Lee, G.F. 1973. Eutrophication. Trans. Northeast Fish and Wildlife Conference: 30-90.
- Mackenthun, K.M. 1973. Toward a cleaner aquatic environment. U.S. Environmental Protection Agency, Washington, D.C.
- Rast, W. and G.F. Lee. 1978. Summary analysis of the North American (US Portion) OECD Eutrophication Project: Nutrient load - lake response relationships and trophic state indices. EPA-600/3-78-008, U.S. Environmental Protection Agency.
- Vollenweider, R.A. 1975. Input-output models with special reference to the phosphorus loading concept in limnology. Schweiz. Z. Hydrol. 37: 53-84.
- Vollenweider, R.A. 1976. Advances in defining critical loading levels for phosphorus in lake eutrophication. Mem. Ist. Ital. Idrobiol. 33: 53-83.

PHOSPHORUS

Water Quality Standards
Criteria Summaries
A Compilation of State/Federal Criteria

September 1980

U. S. Environmental Protection Agency
Office of Water Regulations and Standards
Washington, D. C. 20460

INTRODUCTION

This digest is compiled to provide general information to the public as well as to Federal, State, and local officials. It contains excerpts from the individual Federal-State water quality standards establishing pollutant specific criteria for interstate surface waters. The water quality standards program is implemented by the U. S. Environmental Protection Agency where responsibility for providing water quality recommendations, approving State-adopted standards for interstate waters, evaluating adherence to the standards, and overseeing enforcement of standards compliance, has been mandated by Congress.

Standards, a nationwide strategy for surface water quality management, contain three major elements: the use (recreation, drinking water, fish and wildlife propagation, industrial, or agricultural) to be made of the navigable water; criteria to protect these uses; and an antidegradation statement to protect existing high quality waters, from degradation by the addition of pollutants.

Water quality criteria (numerical or narrative specifications) for physical, chemical, temperature, and biological constituents are stated in the July 1976 U. S. Environmental Protection Agency publication Quality Criteria for Water (QCW), available from the Government Printing Office, Washington, D. C. The 1976 QCW, commonly referred to as the "Red Book," is the most current compilation of scientific information used by the Agency as a basis for assessing water quality. This publication is subject to periodic updating and revisions in light of new scientific and technical information.

Criteria for phosphorus in State water quality standards are the subject of this digest. Phosphorus criteria for water are established to provide a threshold level which when exceeded would most likely result in aquatic life toxicity, due to elemental phosphorus, and excessive aquatic plant growth, caused by phosphate phosphorus which is an essential plant nutrient. Phosphorus and phosphates usually enter a waterbody from land runoff, human and animal excretia, decaying vegetation, and industrial processes and detergents. Once combined with other nutrients in a waterbody, their removal becomes tedious and expensive. The 1976 Quality Criteria for Water recommends a phosphorus criterion of:

0.10 ug/l yellow (elemental) phosphorus for marine and estuarine waters.

There is no freshwater criterion.

Since water quality standards experience revisions and upgrading from time to time, following procedures set forth in the Clean Water Act, individual entries in this digest may be superseded. As these revisions are accomplished and allowing for the States to revise their standards accordingly, this digest will be updated and

reissued. Because this publication is not intended for use other than as a general information resource, to obtain the latest information and for special purposes and applications, the reader needs to refer to the current approved water quality standards. These can be obtained from the State water pollution control agencies or the EPA or Regional Offices.

Individual State-adopted criteria follow:

PHOSPHORUS

<u>State</u>	<u>Criteria Value in mg/l</u>	<u>Designated Stream Use</u>
Alabama ¹	Not specified	All
Alaska ²	Not specified	All
Arizona ³	<p>The mean annual total phosphate concentrations of the following waters shall not exceed the values given below nor shall the total phosphate or total nitrate concentrations of more than 10 percent of the samples in any year exceed the 90 percent values given below. Unless otherwise specified, indicated values also apply to tributaries to the named waters.</p> <p>Total phosphates as PO₄ mg/l</p> <p>0.04 Mean annual 0.06 90 pct-value</p> <p>0.06 Mean annual 0.10 90 pct-value</p> <p>0.08 Mean annual 0.12 90 pct-value</p> <p>0.10 Mean annual 0.15 90 pct-value</p> <p>0.50 Mean annual 0.80 90 pct-value</p> <p>0.30 Mean annual 0.50 90 pct-value</p>	<p>Colorado River from Utah border to Willow Beach (main stem)</p> <p>Colorado River from Willow Beach to Parker Dam (main stem)</p> <p>Colorado River from Parker Dam to Imperial Dam (main stem)</p> <p>Colorado River from Imperial Dam to Morelos Dam (main stem)</p> <p>Gila River from New Mexico border to San Carlos Reservoir (excluding San Carlos Reservoir)</p> <p>Gila River from San Carlos Reservoir to Ashurst Hayden Dam (including San Carlos Reservoir)</p>

State

Criteria Value

Designated Stream Use

Arizona
(con't)

0.30 Annual mean
0.50 90 pct-value

San Pedro River

0.20 Annual mean
0.30 90 pct-value

Verde River (except
Granite Creek)

0.20 Mean annual
0.30 90 pct-value

Salt River above Roosevelt
Lake

0.50 Mean annual
0.80 90 pct-value

Santa Cruz River from
international boundary
near Nogales to Sahuarita

0.30 Mean annual
0.50 90 pct-value

Little Colorado River
above Lyman Reservoir

The above standards are intended to protect the beneficial uses of the named waters. Because regulation of nitrates and phosphates alone may not be adequate to protect waters from eutrophication, no substance shall be added to any surface water which produces aquatic growth to the extent that such growths create a public nuisance or interference with beneficial uses of the water defined and designated in Reg. 6-2-65.

Federally promulgated in June, 1976.

Arkansas⁴

The naturally occurring nitrogen/phosphorus ratio shall not be significantly altered due to municipal, industrial, agricultural or other waste discharges, nor shall total phosphorus exceed 100 ug/l in streams or 50 ug/l in lakes and reservoirs due to any such discharges.

All

California^A

Concentration not to be exceeded:
(Total Phosphorus)

0.2 mg/l

Marine habitat, warm
freshwater habitat (Basin
3)

0.1 mg/l

Cold freshwater habitat,
fish spawning (Basin 3)

0.05 mg/l

Water contact recreation
or non-contact water
recreation (Basin 3)

<u>Sta</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Colorado ⁵	Not specified	All
Connecticut ⁶	None other than of natural origin There shall be no point source discharge into any natural lake or pond or tributary surface waters which will raise the phosphorus concentration, of the receiving surface waters, including phosphorus contained in suspended matter to an amount in excess of 0.03 mg/l.	Drinking water supply Recreation, agricultural, industrial, fish, and wildlife habitat
Delaware ^B	Not specified	All
Florida ⁷	0.0001(Elemental)	Shellfish harvesting recreation, fish and wildlife
Georgia ⁸	Not specified	All
Hawaii ⁹	Total phosphorus, not greater than 0.020 mg/l Not greater than 0.025 mg/l Not greater than 0.030 mg/l Not greater than 0.20 mg/l except not greater than 0.05 mg/l for waters entering lakes or reservoirs.	Class AA Class A Class B Classes 1 and 2
Idaho ¹⁰	Not specified	All
Illinois ¹¹	After December 31, 1983, phosphorus as P shall not exceed 0.05 mg/l in any reservoir or lake with a surface area of 20 acres or more, or in any stream at the point where it enters any such reservoir or lake. For the purposes of this Rule (203C) the term 'reservoir or lake' shall not include low level pools constructed in free flowing streams or any body of water which is an integral part of an operation	All, except Lake Michigan

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Illinois (con't)	which includes the application of sludge on land. Point source discharges which comply with Rule 407 of this Chapter shall be in compliance with this Rule 203(c) for purposes of the application of Rule 402 of this chapter.	
	0.007	All Lake Michigan
Indiana ¹²	0.03 mg/1 monthly average	Inner Harbor
	0.04 mg/1 daily average	Gary Harbor, Burns Harbor, and Lake Michigan
	0.1 mg/1 Maximum value, except in waters flowing westward into Illinois.	Grand Calument River and Indiana Harbor Ship Canal
	0.04 mg/1 (total phosphorus)	Wolf Lake and Wolf Lake Channel
	Free from substances attributable to municipal, industrial, agricultural or other sources in concentrations or combinations which will cause or contribute to the growth of aquatic plants or algae in such degree as to create a nuisance, be unsightly or deleterious, or be harmful to salmonid fishes or the natural biota.	Natural spawning, rearing or imprinting areas, and migration route for Salmonid Fishes.
Iowa ¹³	Not specified	All
Kansas ¹⁴	Not specified	All
Kentucky ¹⁵	Not specified	All
Louisiana ¹⁶	Not specified	All
	Nutrients: The naturally occurring nitrogen-phosphorous ratio shall be maintained. On completion of detailed studies on the naturally occurring levels of the various macro and micro nutrients the state will establish numerical limits on nutrients where possible.	All

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Maine ¹⁷	Total phosphorus shall not exceed 15 parts per billion	GP-A
	The total phosphorus concentration shall not exceed 50 parts per billion at measured in samples taken at or near the surface of the water.	GP-B
Maryland ¹⁸	The state recognizes that certain waters of the State are eutrophic or are approaching eutrophic conditions. All discharges to waters which are eutrophic or potentially eutrophic, when so identified by the State, shall be treated as necessary to reduce eutrophic effects. The State shall require that wastewaters, containing nutrients which cause or may cause eutrophication be given advanced waste treatment prior to discharge, or be disposed of by spray irrigation on land, or by other practicable procedures which will avoid direct discharge to surface waters.	
Massachusetts ¹⁹	The discharge of nutrients, primarily phosphorus or nitrogen, to waters of the Commonwealth will be limited or prohibited by the Division as necessary to prevent excessive eutrophication of such waters. There shall be no new or increased discharges of nutrients into lakes and ponds, or tributaries thereto. Existing discharges containing nutrients which encourage eutrophication or growth of weeds or algae shall be treated. Activities which may result in non-point discharges of nutrients shall be conducted in accordance with the best management practices reasonably determined by the Division to be necessary to preclude or minimize such discharges of nutrients.	All
Michigan ²⁰	1.0 (monthly average effluent concentration goal)	All
Minnesota ²¹	The standards provide for an effluent limit of 1.0 mg/l where the effluent affects a lake or reservoir.	All

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Mississippi ²²	Not specified	All
Missouri ^D	Not specified	All
Montana ²³	Not specified	All
Nebraska ²⁴	Not specified	All
Nevada ²⁵	Total phosphate shall not exceed 0.15 in any stream at the point where it enters any reservoir or lake, nor 0.075 in any reservoir or lake, nor 0.30 in streams and other flowing waters.	Drinking water supply with treatment by disinfection only suitable for aquatic life habitat, wildlife propagation, agricultural use, recreation, boating and esthetics.
	Total phosphates shall not exceed 0.3	Drinking water supply with treatment by disinfection and filtration only, for agricultural use, aquatic life and wildlife propagation, recreation, industrial supply and esthetics
	Total phosphates shall not exceed 1.0	Domestic water supply following complete treatment, agricultural use, aquatic life, wildlife propagation, recreation, and industrial supply
	See Nevada State Water Quality Criteria Compilation 1979, for specific stretches of stream.	
New Hampshire ²⁶	None, except as naturally occurs	Water supply (after disinfection)
	None in such concentrations (generally less than 0.015 ppm) that would impair any usages assigned to this class unless naturally occurring	All, except water supply (after disinfection)

State

Criteria Value

Designated Stream Use

New Hampshire
(con't)

There shall be no phosphorus in such concentrations that would impair any usages assigned to the specific class involved. Where treatment to remove phosphorus is required under this regulation such treatment shall remove phosphorus to the maximum extent technically feasible.

All

In all lakes and ponds: There shall be no new point discharge of wastewater containing phosphorus. In addition there shall be no new discharge of wastewater containing phosphorus to tributaries of lakes or ponds that would encourage eutrophication or growth of weeds or algae in such lakes and ponds.

All

Any point discharge of wastewater existing as of the date of adoption of these rules and regulations and containing phosphates in concentrations which encourage eutrophication or growth of weeds or algae, shall be treated to remove such phosphates to the maximum extent technically feasible.

All

The preceding shall not apply to any condition due to natural causes.

New Jersey²⁷

Phosphorus as total P shall not exceed 50 ug/l in any reservoir, lake, pond or in a tributary at the point where it enters such bodies of water, unless it can be demonstrated that total P is not a limiting factor considering the morphological, physical, chemical and other characteristics of the water body.

Fresh, non-tidal designated for public water supply, biota, recreation, industrial, agricultural, and any other reasonable use.

Phosphorus at total P shall not exceed 50 mg/l in any reservoir, lake, pond or in a tributary at the point where it enters such bodies of water, unless it can be demonstrated that total P is not a limiting factor considering the morphological, physical, chemical and other characteristics of the water body.

Fresh, non-tidal designated for natural biota, recreation, industrial, agricultural, and any other reasonable use.

0.7

All uses in central Pine Barrens

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
New Mexico ²⁸	Not specified	All
New York ²⁹	Concentration should be limited to the extent necessary to prevent nuisance growths of algae, weeds and slimes that are or may become injurious to any beneficial water use.	All uses of International boundary waters
North Carolina ³⁰	0.0001 (Elemental)	All
North Dakota ³¹	0.1 - 0.2 depending upon type of drinking water treatment process utilized 0.025 (goal)	All All lake uses
Ohio ³²	Total phosphorus as P shall be limited to the extent necessary to prevent nuisance growths of algae, weeds, and slimes that result in a violation of the water quality standards set forth in Chapter 3745-1 of the Ohio Administrative Code. In areas where such nuisance growths exist, phosphorus discharges from point sources determined significant by the Ohio Environmental Protection Agency shall not exceed a daily average of one milligram per liter as total P, or such stricter requirements as may be imposed by Ohio EPA in accordance with the International Joint Commission (US-Canada agreement)	Warmwater habitat, exceptional warm water habitat, seasonal warm water habitat, limited warm water habitat (with specific exceptions), cold water habitat, and Lake Erie.
Oklahoma ³³	Not specified	All
	The total phosphorus concentration and the nitrogen/phosphorous concentration ratio shall be limited to present eutrophication problems. Where historical data on nitrogen and phosphorus does not exist, sample points upstream of the point of discharge shall be used to calculate the natural nitrogen/phosphorus concentration ratio. The application of this standard shall be determined on a case by case basis. Compliance with this standard shall be determined at the end of the mixing zone.	All

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Oregon ³⁴	Not specified	All
Pennsylvania ³⁵	P ₁ 0.03 P ₂ 0.10 P ₃ 0.13	See Drainage Lists A through E of Pennsylvania Water Quality Standards for applicable uses and streams
Rhode Island ³⁶	None in such concentration that would impair any usages specifically assigned to said Class. New discharges of wastes containing phosphates will not be permitted into or immediately upstream of lakes or ponds. Phosphates shall be removed from existing discharges to the extent that such removal is or may become technically and reasonably feasible.	All
South Carolina ³⁷	Not specified	All
South Dakota ³⁸	Not specified	All
Tennessee ³⁹	Not specified	All
Texas ⁴⁰	Not specified	All
Utah ⁴¹	0.05	Recreation, aesthetics, aquatic life
	0.025	All uses in lakes and reservoirs
Vermont ⁴²	There shall be no discharge of wastes to Class A waters that do not meet or exceed the technical and other requirements for such waters nor shall there be any discharge of wastes containing any form of nutrients which would encourage eutrophication or growth of weeds or algae.	All

StateCriteria ValueDesignated Stream UseVermont
(con't)

There shall be no new or increased discharge of wastes after May 27, 1971 containing any form of nutrients which would encourage eutrophication or growth of weeds and algae in any lake, pond or reservoir. Any discharge of wastes existing prior to May 27, 1971 containing soluble or other nutrients which would encourage eutrophication or growth of weeds and algae in any lake, pond, or reservoir shall receive the highest practical degree of treatment currently available to remove such nutrients.

Virginia⁴³

In impounded waters, the total phosphate as phosphorus (P) should not exceed 50 ug/l in any stream where it enters a lake or reservoir nor 25/ug/l within the lake or reservoir.

Class I, II, III, IV, V, and VI waters

Washington⁴⁴

Not specified

All

West Virginia⁴⁵

Not specified

All

Wisconsin⁴⁶

Not specified

All

Wyoming⁴⁷

Not specified

All

American Samoa^E

Not specified

All

The naturally occurring atomic ratio of $\text{NO}_3\text{-N}$ to $\text{PO}_4\text{-P}$ in a body of water will be maintained. Similarly, the ratio of inorganic phosphorus (orthophosphate) to total phosphorus (the sum of inorganic phosphorus, dissolved organic phosphorus, and particulate (phosphorus) will be maintained in the ratio and amount as it occurs in the receiving waters naturally.

Recreation, aquatic life

District of
Columbia⁴⁸

Not specified

All

<u>State</u>	<u>Criteria Value</u>	<u>Designated Stream Use</u>
Guam ^F	Total phosphorus shall not exceed 0.025 mg/l	AA
	Total phosphorus shall not exceed 0.05 mg/l	A, 2b, I, 2b, II, C
	Total phosphorus shall not exceed 0.10 mg/l	2a-I, 2a-II
Puerto Rico ⁴⁹	0.025	All fresh water uses and preservation of coastal water natural phenomena
Trust Territories ^G	0.025	Drinking water supply
	The naturally occurring ratio of the con- centrations of nitrogen to phosphorus will be maintained in all waters.	All
Virgin Islands ^H	0.050	All except preservation of natural phenomena

NITROGEN - AMMONIA/NITRATE/NITRITE

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This digest is compiled to provide general information to the public as well as to Federal, State, and local officials. It contains excerpts from the individual Federal-State water quality standards establishing pollutant specific criteria for interstate surface waters. The water quality standards program is implemented by the U. S. Environmental Protection Agency where responsibility for providing water quality recommendations, approving State-adopted standards for interstate waters, evaluating adherence to the standards, and overseeing enforcement of standards compliance, has been mandated by Congress.

Standards, a nationwide strategy for surface water quality management, contain three major elements: the use (recreation, drinking water, fish and wildlife propagation, industrial, or agricultural) to be made of the navigable water; criteria to protect these uses; and an antidegradation statement to protect existing high quality waters, from degradation by the addition of pollutants.

Water quality criteria (numerical or narrative specifications) for physical, chemical, temperature, and biological constituents are stated in the July 1976 U. S. Environmental Protection Agency publication Quality Criteria for Water (QCW), available from the Government Printing Office, Washington, D. C. The 1976 QCW, commonly referred to as the "Red Book," is the most current compilation of scientific information used by the Agency as a basis for assessing water quality. This publication is subject to periodic updating and revisions in light of new scientific and technical information.

Criteria for ammonia, nitrate or nitrite nitrogen in State water quality standards are the subject of this digest. Ammonia in most waters is a biological degradation product of nitrogenous organic matter. When dissolved in water, ammonia will react with the water to form ammonium ions. Ammonium can also be released from proteinaceous organic matter and urea, or synthesized from nitrogen fixation. Nitrate is formed from the complete oxidation of ammonium by certain micro organisms in which nitrite is an intermediate product. In well oxygenated waters nitrite is readily oxidized to nitrate. The rationale for establishing water quality criteria for these three common molecular forms of nitrogen are:

- (1) ammonia toxicity to aquatic life is well documented and its toxicity is directly dependent on the pH of the water in which it is dissolved;
- (2) growing plants assimilate nitrate and ammonium ions into plant proteins; and
- (3) both nitrate and nitrite nitrogen are toxic to aquatic life where specific concentrations of either are reached in a waterbody.

To prevent the nuisance and toxic effects of any of the nitrogen forms, the 1976 Quality Criteria for Water recommends the following criteria:

0.02 mg/l (as un-ionized ammonia) for freshwater aquatic life.

Concentrations of total ammonia ($\text{NH}_3 + \text{NH}_4^+$) which contain an un-ionized ammonia concentration of 0.020 mg/l NH_3 (mg/l)

Temperature (°C)	pH Value								
	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
5...	160.	51.	16.	5.1	1.6	0.53	0.18	0.071	0.036
10...	110.	34.	11.	3.4	1.1	0.36	0.13	0.054	0.031
15...	73.	23.	7.3	2.3	0.75	0.25	0.093	0.043	0.027
20...	50.	16.	5.1	1.6	0.52	0.18	0.070	0.036	0.025
25...	35.	11.	3.5	1.1	0.37	0.13	0.055	0.031	0.024
30...	25.	7.9	2.5	0.81	0.27	0.099	0.045	0.028	0.022

10 mg/l nitrate nitrogen (N) for domestic water supply (health).

Since water quality standards experience revisions and upgrading from time to time, following procedures set forth in the Clean Water Act, individual entries in this digest may be superseded. As these revisions are accomplished and allowing for the States to revise their standards accordingly, this digest will be updated and reissued. Because this publication is not intended for use other than as a general information resource, to obtain the latest information and for special purposes and applications, the reader needs to refer to the current approved water quality standards. These can be obtained from the State water pollution control agencies or the EPA or Regional Offices.

Individual State-adopted criteria follow:

NITRATES/NITRITES/AMMONIA

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
Alabama ¹	Not specified	All
Alaska ²	Not specified	All
Arizona ³	<p>A. The mean annual total nitrate concentrations of the following waters shall not exceed the values given below nor shall the total nitrate concentrations of more than 10 percent of the samples in any year exceed the 90 percent values given below. Unless otherwise specified, indicated values also apply to tributaries to the named waters.</p> <p>Total nitrates as NO₃ mg/l</p> <p>4 Mean annual 7 90 pct-value</p> <p>5 Mean annual</p> <p>5 Mean annual 7 90 pct-value</p> <p>5 Mean annual 7 90 pct-value</p> <p>B. The above standards are intended to protect the beneficial uses of the named waters. Because regulation of nitrates and phosphates alone may not be adequate to protect waters from eutrophication, no substance shall be added to any surface water which produces aquatic growth to the extent that such growths create a public nuisance or interference with beneficial uses of the water defined and designated in Reg. 6-2-6.5.</p>	<p>Colorado River from Utah border to Willow Beach (main stem)</p> <p>Colorado River from Willow Beach to Parker Dam (main stem)</p> <p>Colorado River from Parker Dam to Imperial Dam (main stem)</p> <p>Colorado River from Imperial Dam to Morelos Dam (main stem)</p>

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
Connecticut ⁶	Not specified	All
Delaware ^B	Ammonia - N 0.4	Public water supply
	Total nitrogen 3.0	Public water supply
Florida ⁷	Nitrate - 10.0 as N or that concentration determined in Nutrients below	Public water supply
	Nitrite - Not specified	All
	Ammonia (un-ionized) 0.02	Public water supply, shellfish, recreation
	Nutrients - In no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora and fauna.	Public water supply, shellfish, recreation
Georgia ⁸	Not specified	
Hawaii ⁹	Total nitrogen, not greater than 0.10 mg/l	Class AA
	Total nitrogen, not greater than 0.15 mg/l	Class A
	Total nitrogen, not greater than 0.20 mg/l	Class B
Idaho ¹⁰	Not specified	All
Illinois ¹¹	Ammonia (as N) 1.5 mg/	All waters except secondary contact and indigenous aquatic life and Lake Michigan
	Ammonia Nitrogen as N. (Storet No. 00610). No effluent from any source which discharges to the Illinois River, The DesPlaines River downstream of its confluence with the Chicago River System, or the Calumet River System, and whose untreated waste load is 50,000 or more population equivalents shall contain more than 2.5 mg/l of ammonia nitrogen as N -	Secondary contact and indigenous aquatic life waters

State

Criteria Values in mg/l

Designated Stream Use

Illinois
(con't)

during the months of April through October, or 4 mg/l at other times, after December 31, 1977. Sources discharging to any of the above waters and whose untreated waste load cannot be computed on a population equivalent basis comparable to that used for municipal waste treatment plants and whose ammonia nitrogen discharge exceeds 100 pounds per day shall not discharge an effluent of more than 3.0 mg/l of ammonia nitrogen after December 31, 1974.

0.02 mg/l

All Lake Michigan Waters

10.0 mg/l Nitrate-Nitrogen

Public and Food Processing water supply

1.0 mg/l Nitrite-Nitrogen

Public and Food Processing water supply

Indiana¹²

The bioassay criterion for toxic substances of 1/10 x 96 hr TLM applies to ammonia in all waters except those listed in the specific standards as follows:

Unionized Ammonia

0.03 mg/l - Monthly Ave.

0.1 mg/l - Daily Max.

Inner Harbor, Gary Harbor, Burns Harbor

0.02 mg/l Monthly Ave.

0.05 mg/l - Daily Max.

Lake Michigan

1.5 mg/l total Ammonia Nitrogen

Grand Calumet River and Indiana Harbor Ship Canal

0.02 mg/l Unionized Ammonia

Wolf Lake and Wolf Lake Harbor

Ammonia

Toxic Substances: The concentration of toxic substances shall not exceed those values listed in the United States Environmental Protection Agency Administrator's Quality Criteria for Water 1976 for the protection of sensitive aquatic life.

(For Ammonia this value is 0.02 mg/l NH₃)

Natural Spawning and Rearing or Imprinting Areas for Salmonid Fishes

Toxic Substances: Not to exceed one-tenth of the 96-hour median tolerance limit of salmonid fishes or the natural

Migration Routes for Salmonid Fishes

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
Indiana (con't)	<p>biota obtained from continuous flow bioassays where the dilution water and toxicant are continuously renewed, except that other lower application factors may be used in specific cases when justified on the basis of available evidence.</p> <p>Nitrates and Nitrites: Plant Nutrients: Free from substances attributable to municipal, industrial, agricultural or other sources in concentrations or combinations which will cause or contribute to the growth of aquatic plants or algae in such degree as to create a nuisance, be unsightly or deleterious, or be harmful to salmonid fishes or the natural biota. (Stream Pollution Control Board of the State of Indiana; SPC 12R. Sec.B; filed May 26, 1978, 3:30 PM 1 IR 100)</p> <p>Plant Nutrients: Free from substances attributable to municipal, industrial, agricultural or other sources in concentrations or combinations which will cause or contribute to the growth of aquatic plants or algae in such degree as to create a nuisance, be unsightly or deleterious, or be harmful to salmonid fishes or the natural biota.</p>	<p>Natural Spawning and Rearing or Imprinting Areas for Salmonid Fishes</p> <p>Migration Routes for Salmonid Fishes</p>
Iowa ¹³	<p>Ammonia (N) 5 (Nov 1 - March 31) 2 (April 1 - Oct. 31)</p> <p>2.5 (Nov.1 - March 31) 1.0 (April 1 - Oct. 31)</p> <p>Nitrate (NO₃) 45</p> <p>Nitrite - Not specified</p>	<p>Warm water fish and aquatic life, secondary recreation</p> <p>Cold water fish and aquatic life, secondary recreation.</p> <p>Public water supply</p> <p>All</p>
Kansas ¹⁴	<p>Ammonia: Man-made sources shall not cause the undissociated ammonium hydroxide concentration of waters of the state to exceed 0.15 mg/l as N.</p>	<p>All</p>

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
Kansas (con't)	Nitrites - Not specified	All
Kentucky ¹⁵	Ammonia 0.05	All
Louisiana ¹⁶	Not specified	All
	Nutrients - the naturally occurring nitrogen phosphorous ratio shall be maintained.	
Maine ¹⁷	Not specified	All
Maryland ¹⁸	Not specified	All
	The state recognizes that certain waters of the State are eutrophic or are approaching eutrophic conditions. All discharges to waters which are eutrophic or potentially eutrophic, when so identified by the State, shall be treated as necessary to reduce eutrophic effects. The State shall require that wastewaters, containing nutrients which cause or may cause eutrophication be given advanced waste treatment prior to discharge, or be disposed of by spray irrigation on land, or by other practicable procedures which will avoid direct discharge to surface waters.	
Massachusetts ¹⁹	Nitrate: 10	Public water supply
	The discharge of nutrients, primarily phosphorus or nitrogen, to waters of the Commonwealth will be limited or prohibited by the Division as necessary to prevent excessive eutrophication of such waters. There shall be no new or increased discharges of nutrients into lakes and ponds, or tributaries thereto. Existing discharges containing nutrients which encourage eutrophication or growth of weeds or algae shall be treated. Activities which may result in non-point discharges of nutrients shall be conducted in	

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
Massachusetts (con't)	accordance with the best management practices reasonably determined by the Division to be necessary to preclude or minimize such discharges of nutrients.	
Michigan ²⁰	Not specified	All
	Nutrients originating from domestic, industrial, municipal or domestic animal sources shall be limited to the extent necessary to prevent stimulation of growths of aquatic rooted, attached and floating plants, fungi or bacteria which are or may become injurious to the designated uses of the waters of the state.	All
	(1) Toxicity of undefined toxic substances not specifically included in subrules (2) and (3) shall be determined by development of 96-hour TLM's or other appropriate effect and points obtained by continuous flow or <u>in situ</u> bioassays using suitable test organisms. Concentrations of undefined toxic substances in the waters of the State shall not exceed safe concentrations as determined by applying an application factor, based on knowledge of the behavior of the toxic substances and the organisms to be protected in the environment, to the TLM or other appropriate effect end point.	
	(2) For all waters of the State, unless on the basis of recent information, a more restrictive limitation is required to protect a designated use, concentrations of defined toxic substances, including heavy metals, shall be limited by application of the toxic substances, recommendations contained in the chapter on Freshwater Organisms, "Report of the National Technical Advisory Committee to the Secretary of the Interior, Water Quality Criteria, 1968," or by application of any toxic effluent standard, limitation or prohibition promulgated by the Administrator of the United States Environmental Protection Agency pursuant to section 307(a) of the United States Public Law 92-500, whichever is more restrictive.	

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
Michigan (con't)	(3) In addition to the standards prescribed in subrules (1) and (2), waters of the State used for public water supply shall, at the point of water intake, not exceed the permissible inorganic and organic chemicals criteria for raw public water supply in "Report of the National Technical Advisory Committee to the Secretary of the Interior, Water Quality Criteria, 1968," except that chlorides shall be limited to the same extent as prescribed by rule 1051(2).	
Minnesota ²¹	Nitrates (NO ₃) 45.0	Domestic water supply Classes A, B, and C
	0.2 Ammonia (N)	Fisheries and recreation (Class A)
	1.0	Fisheries and recreation (Class B)
	1.5	Fisheries and recreation (Class C)
	Unspecified toxic substances - none at levels harmful either directly or indirectly.	Agriculture and wildlife (Class B)
Mississippi ²²	Not specified	All
Missouri ^D	0.1 Ammonia nitrogen 0.02	Aquatic life Coldwater fishery
	10.0 Nitrate nitrogen	Drinking water supply
Montana ²³	Not specified	All
Nebraska ²⁴	Ammonia as N- Seasonal limits assigned to each designated stream segment with limits ranging from 1 to 6 mg/L.	All
Nevada ²⁵	Nitrates (NO ₃) 0.8 - 7.66 Single Value	Variable
	.07-5.0 Annual average	Variable

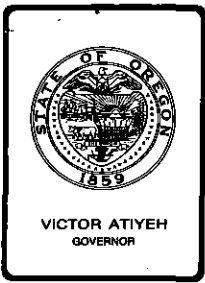
<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
Nevada (con't)	Nitrates (NO ₃) 1.0 - 5.0 Single Value	Variable
	.09 - 1.5 Annual Average	Variable
	Single value and annual average varies for each basin. See Water Pollution Rules, Table 1 thru 55 for specific rivers, lakes, and streams.	
New Hampshire ²⁶	Not specified	All
New Jersey ²⁷	Ammonia or ammonium compounds: None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota, produce undesirable aquatic life, or which would render the waters unsuitable for the designated uses. Where sources of public water supply is potential use, none which would cause standards for drinking water to be exceeded after appropriate treatment.	All
	Nitrate Nitrogen 2.0	All uses in FW-central Pine Barrens
	3.0	All uses in FW-lower Mullica and Wading Rivers Central Pine Barrens.
New Mexico ²⁸	Not specified	All
	Surface waters shall be free of nitrogen and other dissolved gasses at levels above 110% saturation when supersaturation is attributable to municipal, industrial or other discharges.	
New York ²⁹	Nitrates: Not specified	All
	Nitrites: Not specified	All
	Ammonia or ammonium compounds: 2.0 as NH ₃ at pH of 8.0 or above	Water supply source for drinking, culinary or food processing; fish life

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
North Carolina ³⁰	10.0 Nitrate nitrogen	Drinking water supply (treatment plus disinfection)
North Dakota ³¹	Nitrates: 1.0 - 1.5 (depending upon type of drinking water treatment process utilized)	All
	NO ₃ as N: 0.375 (goal)	All lake uses
Ohio ³²	Ammonia: 0.1 - 13.0 depending upon temperature and pH	All except Ohio River uses
	The concentration of un-ionized ammonia (NH ₃) shall not exceed 0.05 mg/l, un-ionized ammonia shall be determined for values for total ammonia N, pH and temperature and the following equation: Un-ionized ammonia = $1.3 \frac{\text{total ammonia-N}}{1 + 10^{(\text{pK}_a - \text{pH})}}$ where $\text{pK}_a = 0.0902 + 2730/273.2 + T$ and T = Temperature in degrees C	All Ohio River uses
	Nitrate-N plus Nitrite-N: 10.0	All Ohio River uses
	Nitrite-N: 1.0	All Ohio River uses
	Nitrate-N: 10.0	Public water supply
	Nitrates plus nitrites: 100.0	Agricultural water supply
	Ammonia as Nitrogen 0.2 - 13.0 mg/l depending on temperature and pH	Warm water habitat
	0.1 - 6.5 mg/l depending on temperature and pH	Lake Erie, exceptional warm water and cold water habitat
	1.5 - 12.8 mg/l depending on temperature and pH	Seasonal warm water habitat
	0.2 - 13.0 mg/l depending on temperature and pH except as indicated for specific streams	limited warm water habitat
	Nitrate - N; 10.0 mg/l	Lake Erie and public water supply
	Nitrates plus nitrites: 100.0 mg/l	Lake Erie and agricultural water supply

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
Ohio (con't)	Ammonia not greater than 12.0 mg/l from 12/1/74 to 6/30/76; nor greater than 8.0 mg/l from 7/1/76 to 1/1/79	Lower Cuyahoga River
	Toxic substances less than 1/10 x 96 hr TLM (Applies to Ammonia)	Mahoning River
Oklahoma ³³	Nitrates as N: 10.0	Drinking water supply
Oregon ³⁴	Not specified	All
Pennsylvania ³⁵	Nitrite plus Nitrate: 10.0 (as nitrogen)	All
	Ammonia nitrogen: 0.5 - 1.5 Note: See Drainage lists A through E of Pennsylvania Water Quality Standards for applicable uses and streams	
Rhode Island ³⁶	Not specified	All
	Chemical constituents narrative: bio-assays shall be performed as required.	Fisheries (fresh water)
	Chemical constituents narrative: the limit prescribed by the USEPA will be used where not superseded by more stringent state requirements.	Public drinking water supplies (fresh water)
South Carolina ³⁷	Not specified	All
South Dakota ³⁸	10.0 Nitrates	Domestic water supply
	50.0	Wildlife propagation
	0.02 un-ionized Ammonia (as N)	Domestic water supply, cold water fish
	0.04 un-ionized ammonia (as N)	Warm water fish (permanent and semi-permanent)
	0.05	Warm water fish (marginal)

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
South Dakota (con't)	Nitrites: Not specified	All
Tennessee ³⁹	Not specified	All
Texas ⁴⁰	Not specified	All
Utah ⁴¹	NH ₃ as N 0.02 (un-ionized)	Aquatic life
	NO ₃ as N 0.02	Aquatic life, recreation and aesthetics
Vermont ⁴²	There shall be no discharge of wastes to Class A waters that do not meet or exceed the technical and other requirements for such waters nor shall there be any discharge of wastes containing any form of nutrients which would encourage eutrophication or growth of weeds or algae.	All
	There shall be no new or increased discharge of wastes after May 27, 1971 containing any form of nutrients which would encourage eutrophication or growth of weeds and algae in any lake, pond or reservoir. Any discharge of wastes existing prior to May 27, 1971 containing soluble or other nutrients which would encourage eutrophication or growth of weeds and algae in any lake, pond, or reservoir shall receive the highest practical degree of treatment currently available to remove such nutrients.	
Virginia ⁴³	Nitrates plus nitrites: 10.0 (as N)	Public water supply
Washington ⁴⁴	Not specified	All
West Virginia ⁴⁵	45.0 Nitrates	All
Wisconsin ⁴⁶	NH ₃ - N	
	3.0 mg/l during warm temperature 6.0 mg/l during cold temperatures	Intermediate aquatic life waters

<u>State</u>	<u>Criteria Values in mg/l</u>	<u>Designated Stream Use</u>
Wyoming ⁴⁷	0.02 Ammonia as (N)	All cold water fisheries
American Samoa ^E	The naturally occurring atomic ratio of NO ₃ -N to PO ₄ -P in a body of water will be maintained. Similarly, the ratio of inorganic phosphorus (orthophosphate) to total phosphorus (the sum of inorganic phosphorus, dissolved organic phosphorus, and particulate (phosphorus) will be maintained in the ratio and amount as it occurs in the receiving waters naturally.	All
District of Columbia ⁴⁸	Ammonia - 0.02 mg/l as unionized ammonia	All waters
	Nitrates/Nitrites - 10 mg/l max. as nitrate (N)	Domestic water supply
Guam ^F	Total nitrogen shall not exceed 0.40 mg/l	AA
	Total nitrogen shall not exceed 0.75 mg/l	A, 2b-I, 2b-II, C
	Total nitrogen shall not exceed 1.5 mg/l	2a-I, 2a-II
Puerto Rico ⁴⁹	10.0 Ni rate plus Nitrite (as N)	All surface waters
	5.0 Nitrogen (NO ₂ , NO ₃ , NH ₃)	All coastal waters
Trust Territories ^G	0.01 Ammonia (N)	Drinking water supply
	The naturally occurring ratio of the concentrations of nitrogen to phosphorus will be maintained in all waters.	All
Virgin Islands ^H	Not specified	All



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: EQC Meeting January 31, 1986: Deletion of Agenda Item P

Background

Amendments to the Resource Conservation and Recovery Act, the Hazardous and Solid Waste Amendments of 1984, established a regulatory program for underground storage tanks used to store petroleum products and hazardous substances. This new federal act establishes the authority for a state underground storage tank delegation program. On April 30, 1985, Governor Victor Atiyeh designated the Oregon Department of Environmental Quality as Oregon's central coordinating agency for the federal underground storage tank program. In response, the 63rd Legislative Assembly considered and passed HB 2142 authorizing the development and implementation of a state-wide underground storage tank regulatory program. The first phase of this program is the notification process: the registration of all underground tanks in Oregon used to store regulated substances. Based on both federal and state laws and regulations, the DEQ developed proposed rules for underground storage tank management and for notification requirements.

Notice of Hearing

Public notice pertaining to a public hearing on proposed rules for underground storage tank management and notification requirements (OAR 340-120-005 and OAR 340-120-010) was published in the January 1, 1986 OAR Bulletin by the Office of the Secretary of State. Proposed rule OAR 340-120-005 included terms and definitions consistent with federal and state laws and regulations. Proposed rule OAR 340-120-010 contained timeframes and deadlines consistent with federal law and regulations for return of notification forms. Information to be contained within these forms was also specified. The information was to include both federally required information (as contained within EPA Form 7530-1 (11-85)), and additional state information.

Public Hearing

A public hearing was held on January 16, 1986. The public comment period remained open until 5:00 p.m., January 21, 1986. The majority of comments received pertained to the proposed notification requirements; OAR

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January 31, 1986 EQC Meeting
Page 2

340-120-010. The majority of individuals providing written and oral testimony requested that the EPA Form 7530-1 be used by the Department to meet federal notification requirements and that all additional state information be made optional or not collected at all.

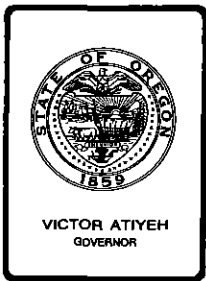
Discussion

The Department reviewed both public testimony and written comments, and determined that the primary objective sought in the proposed rules, the requirement of more comprehensive information, could be achieved by an alternative mechanism. The Department will issue two forms: the EPA Form 7530-1 required under federal law, and an optional state survey form requesting additional information. Although only a portion of the companies may choose to return the optional survey form, the information gathered will be valuable in determining the future direction of the state's regulatory program for underground storage tanks. Since this objective can be achieved without administrative rules, the Department withdraws proposed rules OAR 340-120-005 and OAR 340-120-010.



Fred Hansen

Katherine Futornick:b
229-5828
January 28, 1986
ZB5402



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission
From: Director
Subject: Agenda Item Q, January 31, 1986

Proposed Adoption of Hazardous Waste Management Fees
OAR 340-105-120

Background

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (also known as CERCLA or Superfund) established a national program for cleaning up uncontrolled hazardous waste sites. Funded by a combination of taxes on petroleum products, forty-two industrial chemicals, and federal tax dollars, CERCLA also requires state matching funds before a federally funded cleanup can begin. For a site located on private land, the state match is 10% of the construction costs and first year operating costs. For a site on publicly-owned land, the state match is 50%. After the first year, the operating and maintenance requirements must be fully funded by the state.

Over the last five years, five Oregon sites have been placed on the National Priorities list for possible detailed investigation and/or remedial action under the federal Superfund program. The five sites are:

Site/City	Principal Contaminant	Project Status	Probable Funding of Remedial Action
United Chrome, Corvallis	Hexavalent chrome	Remedial Investigation/feasibility study completed	Federal funds
Gould Battery, Portland	Lead	Remedial Investigation/feasibility study underway	Responsible party (Gould)
Martin Marietta, The Dalles	Cyanide	Remedial investigation/feasibility study underway	Responsible party (Martin Marietta)
Umatilla Army Depot, Hermiston	Nitrates	Preliminary Assessment completed	Responsible Party (Department of Defense)
Teledyne Wah Chang, Albany	Radio-activity	Preliminary Assessment completed	Responsible party (Teledyne Wah Chang)

Based on the Remedial Investigation/Feasibility study completed for United Chrome, the remedial action may cost two (2) million dollars to implement. The preferred alternative is yet to be selected, therefore, final plans and cost estimates have yet to be prepared. Since the City of Corvallis owns the land upon which the leased facility sits, the state's share is at least 50% or one (1) million dollars. The cost may be more since several of the alternatives include a 3-10 year program for treating groundwater which would require 100% state funding after the first year. Faced with a declining market for its services (United Chrome was heavily dependent on the wood products industry for business) and escalating cleanup liability costs, United Chrome recently dissolved voluntarily.

In anticipation of several federally funded cleanup projects being undertaken in Oregon, the Department approached the 1985 Legislature with a bill (HB 2146) to create a permanent financing mechanism for a State CERCLA matching account. Although originally patterned similar to the industry taxes in the federal CERCLA program (a tax on petroleum products and industrial chemicals), after extensive debate a fee on hazardous waste and polychlorinated biphenyl (PCB) disposal was adopted. Chapter 733, Oregon Laws 1985 became effective September 20, 1985 and imposes a \$10 per dry weight ton fee on operators of hazardous waste and PCB incineration and

disposal facilities. At this time only one facility in Oregon, the Arlington Hazardous Waste Disposal facility, will be subject to this fee requirement. The hazardous waste management fees collected will be deposited in Oregon's CERCLA matching account.

Section 19 of Chapter 733 further directs that the fees shall be calculated in the same manner as provided in Section 231 of CERCLA (see Attachment VI). Since Section 231 does not include any formula for calculating the fee, inquiries were made to the federal Internal Revenue Service (the agency designated to collect the fees) and the Environmental Protection Agency. Neither agency developed any guidance on how to determine "dry weight ton." The EPA representative indicated that they tried in 1983, but because of the heterogenous nature of hazardous waste could not develop a practical definition. The EPA representative further indicated that should Congress reauthorize this provision (it sunseted on September 30, 1985) Congress is prepared to change "dry weight ton" to "weight in tons." Weight in tons would be defined as the weight as measured at the time of delivery to a disposal site.

On December 10, 1985, the House of Representatives passed HB11619. This bill will shortly be the subject of a Senate-House conference committee. Sections 514 and 515 contain the revised Hazardous Waste Management Tax and uses the term "ton". Further, the definition of hazardous wastes infers that process water will be included in the weight when determining the amount of waste in tons by indicating that even rainwater, when mixed with hazardous waste, shall be considered hazardous waste for purposes of calculating the tax. No reference to dry weight ton occurs any place in these sections on the reauthorized waste management tax.

On November 22, 1985, the Environmental Quality Commission authorized a public hearing on the proposed rule for January 6, 1986. A notice of the public hearing was published in the Secretary of State's Bulletin of December 15, 1985. Additional notices for the public hearing were mailed out to interested parties on December 31, 1985.

On January 6, 1986, the Department held a public hearing on proposed rule OAR 340-105-120. Three issues were raised and are discussed in more depth in the Hearings Officer's report (see Attachment IV). As a result of the public hearing, two modifications were made to the proposed rule.

One modification clarifies that any wastes generated as a result of the treatment of wastes by the facility operator to reduce the volume or render the waste less hazardous would not be subject to a tax. The reason for this is that a fee would have been already collected on the hazardous waste at the time of receipt. The second modification clarifies that reusable containers or the transport vehicle do not have to be considered part of the weight of the waste for purposes of calculating the fee.

Discussion

The Department proposes to amend OAR 340 - Division 105 by adding a new rule OAR 340-105-120 relating to hazardous waste management fees. The rule would require operators of hazardous waste and PCB incineration and disposal facilities to pay to the Department, a fee of \$10 per ton of wastes received at the facility. The fee would be placed in a CERCLA matching account and used to provide the state match on federally funded Superfund projects.

Alternatives and Evaluation

The proposed amendment to OAR 340- Division 105 is a codification of statutory changes contained in Section 19(1) of Chapter 733, Oregon Laws 1985 and includes a definition of dry weight ton. In the absence of any federal guidance on calculating fees under CERCLA, and considering EPA's inability to define "dry weight ton" in 1983, the Department proposes that "dry weight ton" means weight in tons as measured at the time of delivery. This appears consistent with recently passed HB11619 which is the most current draft of a superfund reauthorization bill that the Department has been able to obtain. This is also consistent with information provided to the 1985 Legislature upon which revenue projections for the State CERCLA Matching Account were based. Since Chem-Security Systems, Inc. has previously installed a truck scale, they will be capable of implementing this proposed rule on January 1, 1986 without any capital expenditure being required.

Summary

1. The federal Superfund program (CERCLA) currently requires a state match in order for a federal funded hazardous waste cleanup project to be undertaken in a state.
2. Section 19(1) of Chapter 733, Oregon Laws 1985 established a State CERCLA matching account to be financed by a \$10 per dry weight ton fee on hazardous waste and PCB incinerated or disposed of.
3. Section 19(1) further directs that the fee shall be calculated in the same manner as provided in Section 231 of CERCLA. Section 231 sunseted on September 30, 1985 and has not been reauthorized as of this date.
4. Since neither EPA or federal IRS defined "dry weight ton" the Department must come up with its own definition. The Department proposes that dry weight ton means weight in tons as measured at time of delivery to the Arlington disposal site.
5. Recently passed HB11619 (December 10, 1985) contains only reference to ton. Further, the definition of hazardous wastes infers that process water, as well as rainwater, when mixed with hazardous waste, shall be

considered hazardous waste for purposes of calculating the federal hazardous waste management tax. Our proposed rule would appear consistent with this most recent draft federal legislation. Our proposed rule is also consistent with information provided to the 1985 Legislature upon which revenue projections for the proposed State CERCLA Matching Account were based.

6. A public hearing on the proposed rule was authorized by the Commission on November 22, 1985. Notice of the January 6, 1986 public hearing was published in the Secretary of State's Bulletin on December 15, 1985. Supplemental notices were mailed to interested parties by the Department on December 31, 1985.
7. The attached proposed rule, OAR 340-105-120 codifies Section 19(1) of Chapter 733, Oregon Laws 1985 and defines how to calculate the hazardous waste management fee.

Director's Recommendation

Based on the summation, it is recommended that the Commission adopt rule OAR 340-105-120 as proposed in Attachment III.



Fred Hansen

- Attachments I. Statement of Need for Rule
II. Statement of Land Use Consistency
III. Proposed Rule OAR 340-105-120
IV. Hearings Officer's Report
V. Chapter 733, 1985 Oregon Laws (HB 2146)
VI. Section 231 of CERCLA
VII. Sections 514 and 515 of HB11619 (December 10, 1985)

Richard P. Reiter:f
229-5774
January 8, 1986
ZF462

Before the Environmental Quality Commission of the State of Oregon

In the Matter of)	Statement of Need for
Proposed Rule)	Proposed Rule and Fiscal
OAR 340-105-120)	and Economic Impact

Statutory Authority

Section 19(1) of Chapter 733, Oregon Laws 1985 imposes a \$10 per dry weight ton fee on hazardous waste and PCB incinerated and disposed of.

Section 5(3) of Chapter 733, Oregon Laws 1985 directs the Environmental Quality Commission to adopt any rules necessary to carry out the provisions of Chapter 733.

Need for the Rule

Proposed rule OAR 340-105-120 codifies Section 19(1) of Chapter 733, Oregon Laws 1985 and defines dry weight ton. In the absence of any EPA or federal IRS guidance, dry weight ton is defined to be actual weight as measured at the time of delivery to a disposal facility.

Principal Documents Relied Upon

Chapter 733, Oregon Laws 1985
Comprehensive Environmental Response, Compensation and Liability Act of 1980
House Bill - H11665: December 10, 1985

Fiscal and Economic Impact

A \$10 a ton increase in disposal charges at the Arlington Disposal Site would raise the average per ton disposal costs from \$200 to \$210 or about 5%. In calendar year 1983, approximately 32,000 tons of wastes were disposed of at the Arlington Disposal site. Approximately 30% of that came from Oregon companies or about 9600 tons. At 9600 tons, Oregon companies would have payed \$96,000 into the Oregon CERCLA matching account. Out-of-state companies utilizing the Arlington Disposal site would have paid \$224,000 into the CERCLA matching Account.

With the exception of small quantity generators, the burden would fall evenly on all generators in proportion to the weight of hazardous waste or PCBs incinerated or disposed of. Small quantity generators disposing of exempted quantities at local landfills would not be affected since the fee is payable only by operators of facilities subject to the interim status or permitting requirements of the hazardous waste program.

ZF462.I

Attachment II
Agenda Item Q
1-31-86 EQC Meeting

Before the Environmental Quality Commission of the State of Oregon

In the Matter of Proposed) Land Use Consistency
Rule OAR 340-105-120

The proposed rule does not affect land use as defined in the Department's coordination program approved by the Land Conservation and Development Commission.

ZF462.II

Proposed Rule
OAR 340-105-120

Hazardous Waste Management Fee

340-105-120 1) Except as provided by subsection (2) of this section, beginning January 1, 1986, every person who operates a facility for the purpose of disposing of hazardous waste or polychlorinated biphenyl (PCB) that is subject to interim status or a license issued under ORS 459.410 to 459.450 and 459.460 to 459.690 shall pay a monthly hazardous waste management fee by the 45th day after the last day of each month in the amount of \$10 per dry weight ton of hazardous waste or PCB brought into the facility for treatment by incinerator or for disposal by landfill at the facility. For purposes of calculating the Hazardous Waste Management Fee required by this section, the facility operator does not need to include hazardous waste resulting from on-site treatment processes used to render a waste less hazardous or reduced in volume prior to land disposal.

2) When the balance in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund reaches \$500,000 minus any moneys approved for obligation under subsection 3 of Section 20 of Chapter 733, Oregon Laws 1985, payment of fees required by subsection (1) of this section shall be suspended upon written notice from the Department. Payment of fees shall resume upon written notice from the Department when approval of funds by the Legislative Assembly or the Emergency Board decrease the balance in the fund to \$150,000 or lower.

3) The term hazardous waste includes any hazardous waste as defined in OAR 340 - Division 101 or 40 CFR Part 261 handled under the authority of interim status or a management facility permit.

4) The term PCB shall have the meaning given to it in OAR 340 - Division 110.

5) The term "ton" means 2000 pounds.

6) The term "dry weight ton" as used in Chapter 733, Oregon Laws 1985 means weight of hazardous waste in tons determined at the time of receipt at a hazardous waste or PCB management facility. The term dry weight ton shall include the weight of any containers treated or disposed of along with the hazardous wastes being held by the container.

7) In the case of a fraction of a ton, the fee imposed by subsection (1) of this section shall be the same fraction of the amount of such fee imposed on a whole ton.

8) Every person subject to the fee requirement of subsection 1 of this section shall record actual weight of any hazardous waste and PCB received for treatment by incinerator or disposal by landfilling in tons at the time of receipt. Beginning January 1, 1986, the scale shall be licensed in accordance with ORS Chapter 618 by the Weights and Measures Division of the Department of Agriculture.

9) Accompanying each monthly payment shall be a detailed record identifying the basis for calculating the fee that is keyed to the monthly waste receipt information report required by OAR 340-104-075(2)(c) and (2)(d).

Attachment III
Agenda Item Q
1-31-86 EQC Meeting
Page 2

10) All fees shall be made payable to the Department of Environmental Quality. All fees received by the Department of Environmental Quality shall be paid into the State Treasury and credited to the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund.

ZF462.3

TO: Environmental Quality Commission

FROM: Richard Reiter, Analyst
Hazardous and Solid Waste Division

SUBJECT: Hearings Officer's Report and Responsiveness Summary
Proposed Hazardous Waste Management Fees
January 6, 1986

On January 6, 1986 at approximately 10:00 a.m. in Room 1400 of the Yeon Building, at 522 S.W. 5th Ave., Portland, Oregon a public hearing was held on Proposed Rule OAR 340-105-120 entitled "Proposed Hazardous Waste Management Fees." Nine persons were in attendance, two persons testified. One person called in his comments just prior to the hearing. Table 1 lists the participants in the public hearing.

TABLE 1

<u>Name</u> <u>Representing</u>	<u>Present</u> <u>at Hearing</u>	<u>Testified</u> <u>at Hearing</u>	<u>Telephoned</u> <u>Comments In</u>
1. John Harland, Intel	X	X	
2. Warren Westgarth, Cooper Consultants	X		
3. Irvin Hefford, Pennwalt	X		
4. Sara Laumann, OSPIRG	X		
5. David Fennell, Preston, Ellis, Holman	X		
6. Charles Farrell, Tillamook PUD	X		
7. Charles Allen, Pacific Power & Light	X		
8. Richard Zwieg, CSSI	X	X	
9. Bill Van Dyke, CSSI	X		
10. Jim Brown, Tektronix			X

Three issues were raised that are proposed to be dealt with as follows:

ISSUE 1

Comment (Brown, Harland):

The term "container" as used in rule OAR 340-105-120(6) could be interpreted to include the weight of the transport vehicle. If this was not intended some clarifying language should be included in the rule.

Department Response:

It was not the Department's intent to include the weight of any transport vehicle, nor for that matter, any reusable container. The rule has been modified to include the phrase "The term dry weight ton shall include the weight of any containers treated or disposed of along with the hazardous waste being held by the container."

ISSUE 2

Comments: (Zwieg):

While the Department's proposed rule is straightforward in terms of calculating the payment to the state (difference in weight between loaded and unloaded vehicle times \$10 per ton), concern was expressed as to how to allocate the cost back to multiple generators on mixed shipments of containers.

Mixed shipments may be made up of empty containers, partially filled containers, filled containers of different sizes, and containers filled with different materials (liquids, sludges, solids). It was suggested that in lieu of actual weight, the rule contain a formula for calculating the weight of container shipments based on predetermined assumed weights (i.e. 5 gallon container equals 40 pounds, 30 gallon container equals 240 pounds, etc. In some cases the calculated weight might exceed actual weight, in other cases the calculated weight might be less than actual weight.

Department Response:

The Department agrees that each facility operator will have to determine an equitable way to allocate costs to multiple generators for mixed shipments. In some cases the operator may choose to unload the transport vehicle one generator's waste at a time. Or the operator may choose to develop a formula to allocate costs based on a piece count, calculated weight or calculated volume. Since no two sites will necessarily be managed the same, it is the Department's opinion that the allocation formula is best an internal company procedure rather than be mandated by rule. If future problems develop between a site operator and generators over this issue, the Department could adopt amendments at that time. No change was made to the rules to address this issue.

ISSUE 3

Comments (Harland & Zwieg):

For wastes brought to the site and treated prior to land disposal (i.e. wastes reduced in volume/weight by solar evaporation in surface impoundments, the hazardous waste management fee should be assessed after treatment rather than at time of receipt.

Department Response

While the commentor has raised a clear alternative to the Department's proposal to handle water based wastes, the Department sees the following significant problems in administering the fee after the fact:

1. Surface impoundments may be in use for 2, 3 or more years before they become filled with solids and have to be dredged out.
2. Once mixed, it will be impossible to determine a generator's contribution to the overall solids buildup due to differences in waste composition, organic content, evaporation potential, depth of sludge, etc. Further, closure of a surface impoundment involves adding a solidifying agent to the sludge, removal of the double liners and any contaminated soils under or between the liners. It is the Department's opinion that any reduction in weight due to evaporation of water will be partially or fully offset due to the increase in weight due to the solidifying agents, weight of liners and contaminated soils.

Consequently, the Department believes assessment at the time of receipt is the most practical approach. On the other hand, a secondary issue is raised relative to double charging for the same wastes (once upon waste receipt and once when residues are moved from a closed surface impoundment to a landfill trench). In light of the Department's decision to assess the hazardous waste management fee at the time of receipt, the Department proposes to add clarifying language exempting any residues resulting from the treatment of wastes by a facility operator. The clarification will read as follows: For purposes of calculating the hazardous waste management fee required by this section, the facility operator does not need to include hazardous waste resulting from on-site treatment process used to render a waste less hazardous or reduced in volume prior to land disposal.

ZF462.4

amount contributed by that person or political committee.

(C) More than \$50 to a political committee supporting or opposing both a candidate for state-wide office or a state-wide measure and a candidate for other than state-wide office or a measure other than a state-wide measure, and the total amount contributed by that person or political committee.

The statement may list as a single item the total amount of other contributions, but shall specify how those contributions were obtained. [As used in this paragraph, "address" includes street number, and name or rural route number, city and state.]

(b) Under expenditures, all expenditures made, showing the amount and purpose of each. Each expenditure in an amount of more than \$50 shall be vouched for by a receipt or canceled check or an accurate copy of the receipt or check. A statement filed under ORS 260.058, 260.063, 260.068 or 260.073 shall list the name of any person to whom expenditures were made totaling \$100 or more, and the total amount of all expenditures.

(c) Separately, all contributions made by the candidate or political committee to any other candidate or political committee.

(d) All loans, whether repaid or not, made to the candidate or political committee. The statement shall list the name and address of each person shown as a cosigner or guarantor on a loan and the amount of the obligation undertaken by each cosigner or guarantor. The statement also shall list the name of the lender holding the loan.

(2) Anything of value paid for or contributed by any person shall be listed as both a contribution and an expenditure by the candidate or committee for whose benefit the payment or contribution was made.

(3) Expenditures made by an agent of a political committee on behalf of the committee shall be reported in the same manner as if the expenditures had been made by the committee itself.

(4) As used in this section, "address" includes street number and name or rural route number, city and state.

SECTION 6. ORS 260.993 is amended to read:

260.993. (1) Except as provided in subsections (2) to (6) of this section, violation of any provision of this chapter is a Class A misdemeanor.

(2) The penalty for violation of ORS 260.532 is limited to that provided in subsections (5) and (7) of that section.

(3) Violation of ORS 260.555, 260.575, 260.615, 260.645 or 260.715 is a Class C felony.

(4) Violation of ORS 260.705 is a Class B misdemeanor.

[(5) Violation of ORS 260.585 is a Class C misdemeanor.]

[(6)] (5) Violation of ORS 260.560 or 260.685 (1) is punishable by a fine of not more than \$250.

[(7)] (6) Violation of any provision of Oregon Revised Statutes relating to the conduct of any election or to nominations, petitions, filing or any other matter preliminary to or relating to an election, for which no penalty is otherwise provided, is punishable by a fine of not more than \$250.

SECTION 7. ORS 260.585 is repealed.

Approved by the Governor July 13, 1985

Filed in the office of Secretary of State July 15, 1985

CHAPTER 733

AN ACT

HB 2146

Relating to environment; creating new provisions; amending ORS 401.025 and 468.070; repealing ORS 468.810; and appropriating money.

Be It Enacted by the People of the State of Oregon:

SECTION 1. As used in sections 1 to 20 of this Act:

(1) "Barrel" means 42 U.S. gallons at 60 degrees Fahrenheit.

(2) "Cleanup" means the containment, collection, removal, treatment or disposal of oil or hazardous material; site restoration; and any investigations, monitoring, surveys, testing and other information gathering required or conducted by the department.

(3) "Cleanup costs" means all costs associated with the cleanup of a spill or release incurred by the state, its political subdivision or any person with written approval from the department when implementing ORS 459.685, 468.800 or sections 1 to 20 of this Act.

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

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

(6) "Director" means the Director of the Department of Environmental Quality.

(7) "Hazardous material" means one of the following:

(a) A material designated by the commission under section 6 of this Act.

(b) Hazardous waste as defined in ORS 459.410.

(c) Radioactive waste and material as defined in ORS 469.300 and 469.530 and radioactive substances as defined in ORS 453.005.

(d) Communicable disease agents as regulated by the Health Division under ORS chapters 431 and 433.

(e) Hazardous substances designated by the United States Environmental Protection Agency under section 311 of the Federal Water Pollution Control Act, P.L. 92-500, as amended.

(8) "Oils" or "oil" includes gasoline, crude oil, fuel oil, diesel oil, lubricating oil, sludge, oil refuse and any other petroleum related product.

(9) "Person" means an individual, trust, firm, joint stock company, corporation, partnership, association, municipal corporation, political subdivision, interstate body, the state and any agency or commission thereof and the Federal Government and any agency thereof.

(10) "Remedial action" means a permanent action taken to prevent or minimize the future spill or release of oil or hazardous material to prevent the oil or hazardous material from migrating and causing substantial danger to present or future public health, safety, welfare or the environment. "Remedial action" includes but is not limited to:

(a) Actions taken at the location of the spill or release such as storage, confinement, perimeter protection using dikes, trenches or ditches, clay cover, neutralization, cleanup of spilled or released oil or hazardous materials, recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavation, repair or replacement of leaking containers, collection of leachate and runoff, onsite treatment or incineration, provision of alternate water supplies, and any monitoring reasonably required to assure protection of the public health, safety, welfare or the environment.

(b) Offsite transport of oil or hazardous material.

(c) The storage, treatment, destruction or secure disposal offsite of oil or hazardous material under section 11 of this Act.

(11) "Reportable quantity" means one of the following:

(a) A quantity designated by the commission under section 5 of this Act.

(b) The lesser of:

(A) The quantity designated for hazardous substances by the United States Environmental Protection Agency pursuant to section 311 of the Federal Water Pollution Control Act, P.L. 92-500, as amended;

(B) The quantity designated for hazardous waste under ORS chapter 459;

(C) Any quantity of radioactive material, radioactive substance or radioactive waste;

(D) If spilled into waters of the state, or escape into waters of the state is likely, any quantity of oil that would produce a visible oily slick, oily solids, or coat aquatic life, habitat or property with oil, but excluding normal discharges from properly operating marine engines; or

(E) If spilled on land, any quantity of oil over one barrel.

(c) Ten pounds unless otherwise designated by the commission under section 5 of this Act.

(12) "Respond" or "response" means:

(a) Actions taken to monitor, assess and evaluate a spill or release or threatened spill or release of oil or hazardous material;

(b) First aid, rescue or medical services, and fire suppression; or

(c) Containment or other actions appropriate to prevent, minimize or mitigate damage to the public health,

safety, welfare or the environment which may result from a spill or release or threatened spill or release if action is not taken.

(13) "Spill or release" means the discharge, deposit, injection, dumping, spilling, emitting, releasing, leaking or placing of any oil or hazardous material into the air or into or on any land or waters of the state, as defined in ORS 468.700, except as authorized by a permit issued under ORS chapter 454, 459, 468 or 469 or federal law or while being stored or used for its intended purpose.

(14) "Threatened spill or release" means oil or hazardous material is likely to escape or be carried into the air or into or on any land or waters of the state.

SECTION 2. Subject to policy direction by the commission, the department may:

(1) Conduct and prepare independently or in cooperation with others, studies, investigations, research and programs pertaining to the containment, collection, removal or cleanup of oil and hazardous material.

(2) Advise, consult, participate and cooperate with other agencies of the state, political subdivisions, other states or the Federal Government, in respect to any proceedings and all matters pertaining to responses, remedial actions or cleanup of oil and hazardous material and financing of cleanup costs, including radioactive waste, materials and substances otherwise subject to ORS chapters 453 and 469.

(3) Employ personnel, including specialists, consultants and hearing officers, purchase materials and supplies and enter into contracts with public and private parties necessary to carry out the provisions of sections 1 to 20 of this Act.

(4) Conduct and supervise educational programs about oil and hazardous material, including the preparation and distribution of information regarding the containment, collection, removal or cleanup of oil and hazardous material.

(5) Provide advisory technical consultation and services to units of local government and to state agencies.

(6) Develop and conduct demonstration programs in cooperation with units of local government.

(7) Perform all other acts necessary to carry out the duties, powers and responsibilities of the department under sections 1 to 20 of this Act.

SECTION 3. Nothing in sections 1 to 20 of this Act is intended to grant the Environmental Quality Commission or the Department of Environmental Quality authority over any radioactive substance regulated by the Health Division under ORS chapter 453, or any radioactive material or waste regulated by the Department of Energy or Energy Facility Siting Council under ORS chapter 469.

SECTION 4. (1) In accordance with the applicable provisions of ORS 183.310 to 183.550, the Environmental Quality Commission shall adopt an oil and hazardous material emergency response master plan consistent with

the plan adopted by the Interagency Hazard Communications Council pursuant to the provisions of chapter 696, Oregon Laws 1985 (Enrolled House Bill 3005), and after consultation with the Interagency Hazard Communications Council, the Oregon State Police, the Oregon Fire Chiefs Association and any other appropriate agency or organization.

(2) The master plan adopted under subsection (1) of this section shall include but need not be limited to provisions for ongoing training programs for local government and state agency employes involved in response to spills or releases of oil and hazardous material. The department may coordinate its training programs with emergency response training programs offered by local, state and federal agencies, community colleges and institutes of higher education and private industry in order to reach the maximum number of employes, avoid unnecessary duplication and conserve limited training funds.

SECTION 5. In accordance with applicable provisions of ORS 183.310 to 183.550, the commission may adopt rules including but not limited to:

(1) Provisions to establish that quantity of oil or hazardous material spilled or released which shall be reported under section 7 of this Act. The commission may determine that one single quantity shall be the reportable quantity for any oil or hazardous material, regardless of the medium into which the oil or hazardous material is spilled or released.

(2) Establishing procedures for the issuance, modification and termination of permits, orders, collection of recoverable costs and filing of notifications.

(3) Any other provision consistent with the provisions of this Act that the commission considers necessary to carry out this Act.

SECTION 6. (1) By rule, the commission may designate as a hazardous material any element, compound, mixture, solution or substance which when spilled or released into the air or into or on any land or waters of the state may present a substantial danger to the public health, safety, welfare or the environment.

(2) Before designating a substance as hazardous material, the commission must find that the hazardous material, because of its quantity, concentration or physical or chemical characteristics may pose a present or future hazard to human health, safety, welfare or the environment when spilled or released.

SECTION 7. Any person owning or having control over any oil or hazardous material who has knowledge of a spill or release shall immediately notify the Emergency Management Division as soon as that person knows the spill or release is a reportable quantity.

SECTION 8. Any person owning or having control over any oil or hazardous material spilled or released or

threatening to spill or release shall be strictly liable without regard to fault for the spill or release or threatened spill or release. However, in any action to recover damages, the person shall be relieved from strict liability without regard to fault if the person can prove that the spill or release of oil or hazardous material was caused by:

(1) An act of war or sabotage or an act of God.

(2) Negligence on the part of the United States Government or the State of Oregon.

(3) An act or omission of a third party without regard to whether any such act or omission was or was not negligent.

SECTION 9. (1) Any person liable for a spill or release or threatened spill or release under section 8 of this Act shall immediately clean up the spill or release under the direction of the department. The department may require the responsible person to undertake such investigations, monitoring, surveys, testing and other information gathering as the department considers necessary or appropriate to:

(a) Identify the existence and extent of the spill or release;

(b) Identify the source and nature of oil or hazardous material involved; and

(c) Evaluate the extent of danger to the public health, safety, welfare or the environment.

(2) If any person liable under section 8 of this Act does not immediately commence and promptly and adequately complete the cleanup, the department may clean up, or contract for the cleanup of the spill or release or the threatened spill or release.

(3) Whenever the department is authorized to act under subsection (2) of this section, the department directly or by contract may undertake such investigations, monitoring, surveys, testing and other information gathering as it may deem appropriate to identify the existence and extent of the spill or release, the source and nature of oil or hazardous material involved and the extent of danger to the public health, safety, welfare or the environment. In addition, the department directly or by contract may undertake such planning, fiscal, economic, engineering and other studies and investigations it may deem appropriate to plan and direct clean up actions, to recover the costs thereof and legal costs and to enforce the provisions of this Act.

SECTION 10. (1) If the commission finds that a proposed remedial action cannot meet any of the requirements of ORS chapter 459 or 468 or any rule adopted under ORS chapter 459 or 468, the commission may issue a variance.

(2) The commission may issue a variance under subsection (1) of this section if:

(a) Special conditions exist that render strict compliance unreasonable, burdensome or impractical;

(b) Strict compliance would result in substantial delay or preventing a remedial action from being undertaken; or

(c) The public health, safety, welfare and the environment would be protected.

SECTION 11. The director may allow a person to store, treat, destroy or dispose of offsite oil or hazardous material in lieu of other remedial action if the director determines that:

(1) Such actions are more cost effective than other remedial actions; or

(2) Are necessary to protect the public health, safety, welfare or the environment from a present or potential risk which may be created by further exposure to the continued presence of oil or hazardous material.

SECTION 12. (1) In order to determine the need for response to a spill or release or threatened spill or release under this Act, or enforcing the provisions of this Act, any person who prepares, manufactures, processes, packages, stores, transports, handles, uses, applies, treats or disposes of oil or hazardous material shall, upon the request of the department:

(a) Furnish information relating to the oil or hazardous material; and

(b) Permit the department at all reasonable times to have access to and copy, records relating to the type, quantity, storage locations and hazards of the oil or hazardous material.

(2) In order to carry out subsection (1) of this section, the department may enter to inspect at reasonable times any establishment or other place where oil or hazardous material is present.

SECTION 13. (1) In order to determine the need for response to a spill or release or threatened spill or release under this Act, any person who prepares, manufactures, processes, packages, stores, transports, handles, uses, applies, treats or disposes of oil or hazardous material shall, upon the request of any authorized local government official, permit the official at all reasonable times to have access to and copy, records relating to the type, quantity, storage locations and hazards of the oil or hazardous material.

(2) In order to carry out subsection (1) of this section a local government official may enter to inspect at reasonable times any establishment or other place where oil or hazardous material is present.

(3) As used in this section, "local government official" includes but is not limited to an officer, employe or representative of a county, city, fire department, fire district or police agency.

SECTION 14. (1) The Oil and Hazardous Material Emergency Response and Remedial Action Fund is established separate and distinct from the General Fund in the State Treasury. As permitted by federal court decisions,

federal statutory requirements and administrative decisions, after payment of associated legal expenses, moneys not to exceed \$2.5 million received by the State of Oregon from the Petroleum Violation Escrow Fund of the United States Department of Energy that is not obligated by federal requirements to existing energy programs shall be paid into the State Treasury and credited to the fund.

(2) The State Treasurer shall invest and reinvest moneys in the Oil and Hazardous Material Emergency Response and Remedial Action Fund in the manner provided by law.

(3) The moneys in the Oil and Hazardous Material Emergency Response and Remedial Action Fund are appropriated continuously to the Department of Environmental Quality to be used in the manner described in section 15 of this Act.

SECTION 15. Moneys in the Oil and Hazardous Material Emergency Response and Remedial Action Fund may be used by the Department of Environmental Quality for the following purposes:

(1) Training local government employes involved in response to spills or releases of oil and hazardous material.

(2) Training of state agency employes involved in response to spills or releases of oil and hazardous material.

(3) Funding actions and activities authorized by section 9 of this Act, ORS 459.685, 468.800 and 468.805.

(4) Providing for the general administration of sections 1 to 20 of this Act including the purchase of equipment and payment of personnel costs of the department or any other state agency related to the enforcement of this Act.

SECTION 16. (1) If a person required to clean up oil or hazardous material under section 9 of this Act fails or refuses to do so, the person shall be responsible for the reasonable expenses incurred by the department in carrying out section 9 of this Act.

(2) The department shall keep a record of all expenses incurred in carrying out any cleanup projects or activities authorized under section 9 of this Act, including charges for services performed and the state's equipment and materials utilized.

(3) Any person who does not make a good faith effort to clean up oil or hazardous material when obligated to do so under section 9 of this Act shall be liable to the department for damages not to exceed three times the amount of all expenses incurred by the department.

(4) Based on the record compiled by the department under subsection (2) of this section, the commission shall make a finding and enter an order against the person described in subsection (1) or (3) of this section for the amount of damages, not to exceed treble damages, and the expenses incurred by the state in carrying out the action authorized by this section. The order may be appealed in the manner provided for appeal of a contested case order under ORS 183.310 to 183.550.

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(5) If the amount of state incurred expenses and damages under this section are not paid by the responsible person to the department within 15 days after receipt of notice that such expenses are due and owing, or, if an appeal is filed within 15 days after the court renders its decision if the decision affirms the order, the Attorney General, at the request of the director, shall bring an action in the name of the State of Oregon in a court of competent jurisdiction to recover the amount specified in the notice of the director.

SECTION 17. (1) In addition to any other penalty provided by law, any person who violates a provision of sections 1 to 20 of this Act, or any rule or order entered or adopted under sections 1 to 20 of this Act, may incur a civil penalty not to exceed \$10,000. Each day of violation shall be considered a separate offense.

(2) The civil penalty authorized by subsection (1) of this section shall be established, imposed, collected and appealed in the same manner as civil penalties are established, imposed, collected and appealed under ORS 468.090 to 468.125, except that a penalty collected under this section shall be deposited to the fund established in section 14 of this Act.

SECTION 18. Violation of a provision of this Act or of any rule or order entered or adopted under this Act is punishable, upon conviction, by a fine of not more than \$10,000 or by imprisonment in the county jail for not more than one year or both. Each day of violation shall be considered a separate offense.

SECTION 19. (1) Except as provided by subsection (2) of this section, beginning on January 1, 1986, every person who operates a facility for the purpose of disposing of hazardous waste or PCB that is subject to interim status or a license issued under ORS 459.410 to 459.450 and 459.460 to 459.690 shall pay a monthly hazardous waste management fee by the 45th day after the last day of each month in the amount of \$10 per dry-weight ton of hazardous waste or PCB brought into the facility for treatment by incinerator or for disposal by landfill at the facility. Fees under this section shall be calculated in the same manner as provided in section 231 of the federal Comprehensive Environmental Response, Compensation and Liability Act, P.L. 96-510, as amended.

(2) When the balance in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund established in section 20 of this Act reaches \$500,000 minus any moneys approved for obligation under subsection (3) of section 20 of this Act, payment of fees under subsection (1) of this section shall be suspended. Payment of fees shall resume upon approval of funds by the Legislative Assembly or the Emergency Board to the department sufficient to decrease the balance in the fund to \$150,000 or lower.

(3) If payment of fees is to be suspended or resumed under subsection (2) of this section, the department shall

give reasonable notice of the suspension or resumption to every person obligated to pay a fee under subsection (1) of this section.

SECTION 20. (1) The Comprehensive Environmental Response, Compensation and Liability Act Matching Fund is established separate and distinct from the General Fund in the State Treasury. All fees received by the Department of Environmental Quality under section 19 of this Act shall be paid into the State Treasury and credited to the fund.

(2) The State Treasurer may invest and reinvest moneys in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund in the manner provided by law.

(3) The moneys in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund are appropriated continuously to the department to be used as provided in subsection (4) of this section and for providing the required state match for planned remedial actions financed by the federal Comprehensive Environmental Response, Compensation and Liability Act, P.L. 96-510, as amended, subject to site by site approval by the Legislative Assembly or the Emergency Board.

(4) Up to 15 percent of the moneys appropriated under subsection (3) of this section may be used for investigating and monitoring potential and existing sites which are or could be subject to remedial action under the federal Comprehensive Environmental Response, Compensation and Liability Act, P.L. 96-510, as amended.

SECTION 21. ORS 401.025 is amended to read:

401.025. As used in ORS 401.015 to 401.105, 401.260 to 401.325 and 401.355 to 401.580, unless the context requires otherwise:

(1) "Administrator" means the Administrator of the Emergency Management Division.

(2) "Beneficiary" has the meaning given that term in ORS 656.005 (3).

(3) "Division" means the Emergency Management Division of the Executive Department.

(4) "Emergency" includes any man-made or natural event or circumstance causing or threatening loss of life, injury to person or property, human suffering or financial loss, and includes, but is not limited to, fire, explosion, flood, severe weather, drought, earthquake, volcanic activity, spills or releases of oil or [other substances] hazardous material as defined in section 1 of this 1985 Act, contamination, utility or transportation emergencies, disease, blight, infestation, civil disturbance, riot, sabotage and war.

(5) "Emergency management agency" means an organization created and authorized under ORS 401.015 to 401.105, 401.260 to 401.325 and 401.355 to 401.580 by the state, county or city to provide for and assure the conduct and coordination of functions for comprehensive emergency program management.

(6) "Emergency program management" includes all the tasks and activities necessary to coordinate and maintain an emergency services system including, but not limited to, program development, fiscal management, coordination with nongovernmental agencies and organizations, public information, personnel training and development and implementation of exercises to test the system.

(7) "Emergency program manager" means the person administering the emergency management agency of a county or city.

(8) "Emergency service agency" means an organization within a local government which performs essential services for the public's benefit prior to, during or following an emergency. This includes, but is not limited to, organizational units within local governments, such as law enforcement, fire control, health, medical and sanitation services, public works and engineering, public information and communications.

(9) "Emergency service worker" means an individual who, under the direction of an emergency service agency or emergency management agency, performs emergency services and:

(a) Is a registered volunteer or independently volunteers to serve without compensation and is accepted by the division or the emergency management agency of a county or city; or

(b) Is a member of the Oregon National Guard Reserve acting in support of the emergency services system.

(10) "Emergency services" includes those activities provided by state and local government agencies with emergency operational responsibilities to prepare for and carry out any activity to prevent, minimize, respond to or recover from an emergency. These activities include, without limitation, coordination, preplanning, training, interagency liaison, fire fighting, [hazardous substance management] oil or hazardous material spill or release clean up as defined in section 1 of this 1985 Act, law enforcement, medical, health and sanitation services, engineering and public works, search and rescue activities, warning and public information, damage assessment, administration and fiscal management, and those measures defined as "civil defense" in section 3 of the Act of January 12, 1951, P.L. 81-920 (50 U.S.C. 2252).

(11) "Emergency services system" means that system composed of all agencies and organizations involved in the coordinated delivery of emergency services.

(12) "Injury" means any personal injury sustained by an emergency service worker by accident, disease or infection arising out of and in the course of emergency services or death resulting proximately from the performance of emergency services.

(13) "Local government" means any governmental entity authorized by the laws of this state.

(14) "Major disaster" means any event defined as a "major disaster" by the Act of May 22, 1974, P.L. 93-288.

(15) "Search and rescue" means the acts of searching for, rescuing or recovering, by means of ground or marine activity, any person who is lost, injured or killed while out of doors. However, "search and rescue" does not include air activity in conflict with the activities carried out by the Aeronautics Division of the Department of Transportation.

(16) "Sheriff" means the chief law enforcement officer of a county.

SECTION 22. ORS 468.070 is amended to read:

468.070. (1) At any time, the department may refuse to issue, modify, suspend, revoke or refuse to renew any permit issued pursuant to ORS 468.065 if it finds:

(a) A material misrepresentation or false statement in the application for the permit.

(b) Failure to comply with the conditions of the permit.

(c) Violation of any applicable [provision] provisions of this chapter or sections 1 to 20 of this 1985 Act.

(d) Violation of any applicable rule, standard or order of the commission.

(2) The department may modify any permit issued pursuant to ORS 468.065 if it finds that modification is necessary for the proper administration, implementation or enforcement of the provisions of ORS 448.305, 454.010 to 454.040, 454.205 to 454.255, 454.405, 454.425, 454.505 to 454.535, 454.605 to 454.745, sections 1 to 20 of this 1985 Act and this chapter.

(3) The procedure for modification, suspension, revocation or refusal to issue or renew shall be the procedure for a contested case as provided in ORS 183.310 to 183.550.

SECTION 23. ORS 468.810 is repealed.

SECTION 24. (1) In addition to and not in lieu of any other appropriation or moneys made available by law or from other sources, there hereby is appropriated to the Department of Environmental Quality, for the biennium beginning July 1, 1985, out of the General Fund, the sum of \$200,000 for the purposes described in section 4, subsection (3) of section 9 of this Act and section 15 of this Act.

(2) In addition to the uses allowed under section 15 of this Act, when the commission determines that a sufficient amount of moneys is available from moneys in the Oil and Hazardous Material Emergency Response and Remedial Action Fund created in section 14 of this Act, but not later than six months after the receipt of such funds, the commission first shall reimburse the General Fund, without interest, in an amount equal to the amount from the General Fund appropriated under subsection (1) of this section.

Approved by the Governor July 13, 1985
Filed in the office of Secretary of State July 15, 1985

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costs are incurred incident to any spill the effects of which the Secretary determines to be catastrophic.

(C) **ADVANCES FOR OTHER COSTS.**—The maximum aggregate amount advanced to the Response Trust Fund which is outstanding at any one time for the purpose of paying costs other than costs described in section 111(a)(1), (2), or (4) shall not exceed one-third of the amount of the estimate made under subparagraph (A).

(D) **FINAL REPAYMENT.**—No advance shall be made to the Response Trust Fund after September 30, 1985, and all advances to such Fund shall be repaid on or before such date.

(3) **REPAYMENT OF ADVANCES.**—Advances made pursuant to this subsection shall be repaid, and interest on such advances shall be paid, to the general fund of the Treasury when the Secretary determines that moneys are available for such purposes in the Trust Fund to which the advance was made. Such interest shall be at rates computed in the same manner as provided in subsection (b) and shall be compounded annually.

Subtitle C—Post-Closure Tax and Trust Fund

SEC. 211. IMPOSITION OF TAX.

(a) **IN GENERAL.**—Chapter 38, as added by section 211, is amended by adding at the end thereof the following new subchapter:

“Subchapter C—Tax on Hazardous Wastes

“Sec. 4681. Imposition of tax.
“Sec. 4682. Definitions and special rules.

“SEC. 4681. IMPOSITION OF TAX.

“(a) **GENERAL RULE.**—There is hereby imposed a tax on the receipt of hazardous waste at a qualified hazardous waste disposal facility.

“(b) **AMOUNT OF TAX.**—The amount of the tax imposed by subsection (a) shall be equal to \$2.13 per dry weight ton of hazardous waste.

“SEC. 4682. DEFINITIONS AND SPECIAL RULES.

“(a) **DEFINITIONS.**—For purposes of this subchapter—

“(1) **HAZARDOUS WASTE.**—The term ‘hazardous waste’ means any waste—

“(A) having the characteristics identified under section 3001 of the Solid Waste Disposal Act, as in effect on the date of the enactment of this Act (other than waste the regulation of which under such Act has been suspended by Act of Congress on that date), or

“(B) subject to the reporting or recordkeeping requirements of sections 3002 and 3004 of such Act, as so in effect.

“(2) **QUALIFIED HAZARDOUS WASTE DISPOSAL FACILITY.**—The term ‘qualified hazardous waste disposal facility’ means any facility which has received a permit or is accorded interim status under section 3005 of the Solid Waste Disposal Act.

“(b) **TAX IMPOSED ON OWNER OR OPERATOR.**—The tax imposed by section 4681 shall be imposed on the owner or operator of the qualified hazardous waste disposal facility.

“(c) **TAX NOT TO APPLY TO CERTAIN WASTES.**—The tax imposed by section 4681 shall not apply to any hazardous waste which will not remain at the qualified hazardous waste disposal facility after the facility is closed.

“(d) **APPLICABILITY OF SECTION.**—The tax imposed by section 4681 shall apply to the receipt of hazardous waste after September 30, 1983, except that if, as of September 30 of any subsequent calendar year, the unobligated balance of the Post-closure Liability Trust Fund exceeds \$200,000,000, no tax shall be imposed under such section during the following calendar year.”

(b) **CONFORMING AMENDMENT.**—The table of subchapters for chapter 38 is amended by adding at the end thereof the following new item:

“Subchapter C—Tax on Hazardous Wastes.”

SEC. 232. POST-CLOSURE LIABILITY TRUST FUND.

(a) **CREATION OF TRUST FUND.**—There is established in the Treasury of the United States a trust fund to be known as the “Post-closure Liability Trust Fund”, consisting of such amounts as may be appropriated, credited, or transferred to such Trust Fund.

(b) **EXPENDITURES FROM POST-CLOSURE LIABILITY TRUST FUND.**—Amounts in the Post-closure Liability Trust Fund shall be available only for the purposes described in sections 107(k) and 111(j) of this Act (as in effect on the date of the enactment of this Act).

(c) **ADMINISTRATIVE PROVISIONS.**—The provisions of sections 222 and 223 of this Act shall apply with respect to the Trust Fund established under this section, except that the amount of any repayable advances outstanding at any one time shall not exceed \$200,000,000.

TITLE III—MISCELLANEOUS PROVISIONS

REPORTS AND STUDIES

Sec. 301. (a)(1) The President shall submit to the Congress, within four years after enactment of this Act, a comprehensive report on experience with the implementation of this Act, including, but not limited to—

...tive and reporting burdens on Government and industry, and the extent to which the tax burden falls on the substances and parties which create the problems addressed by this Act. In preparing the report, the President shall consult with appropriate Federal, State, and local agencies, affected industries and claimants, and such other interested parties as he may find useful. Based upon the analyses and consultation required by this subsection, the President shall also include in the report any recommendations for legislative changes he may deem necessary for the better effectuation of the purposes of this Act, including but not limited to recommendations concerning authorization levels, taxes, State participation, liability and liability limits, and financial responsibility provisions for the Response Trust Fund and the Post-closure Liability Trust Fund;

(H) an exemption from or an increase in the substances or the amount of taxes imposed by section 4661 of the Internal Revenue Code of 1954 for copper, lead, and zinc oxide, and for feedstocks when used in the manufacture and production of fertilizers, based upon the expenditure experience of the Response Trust Fund;

(I) the economic impact of taxing coal-derived substances and recycled metals.

(2) The Administrator of the Environmental Protection Agency (in consultation with the Secretary of the Treasury) shall submit to the Congress (i) within four years after enactment of this Act, a report identifying additional wastes designated by rule as hazardous after the effective date of this Act and pursuant to section 3001 of the Solid Waste Disposal Act and recommendations on appropriate tax rates for such wastes for the Post-closure Liability Trust Fund. The report shall, in addition, recommend a tax rate, considering the quantity and potential danger to human health and the environment posed by the disposal of any wastes which the Administrator, pursuant to subsection 3001(b)(2)(B) and subsection 3001(b)(3)(A) of the Solid Waste Disposal Act of 1980, has determined should be subject to regulation under subtitle C of such Act, (ii) within three years after enactment of this Act, a report on the necessity for and the adequacy of the revenue raised, in relation to estimated future requirements, of the Post-closure Liability Trust Fund.

(b) The President shall conduct a study to determine (1) whether adequate private insurance protection is available on reasonable terms and conditions to the owners and operators of vessels and facilities subject to liability under section 107 of this Act, and (2) whether the market for such insurance is sufficiently competitive to assure purchasers of features such as a reasonable range of deductibles, coinsurance provisions, and exclusions. The President shall submit the results of his study, together with his recommendations.

substances or other pollutants or contaminants. The provisions of this Act shall not be considered, interpreted, or construed in any way as reflecting a determination, in part or whole, of policy regarding the inapplicability of strict liability, or strict liability doctrines, to activities relating to hazardous substances, pollutants, or contaminants or other such activities.

EXPIRATION, SUNSET PROVISION

SEC. 303. Unless reauthorized by the Congress, the authority to collect taxes conferred by this Act shall terminate on September 30, 1985, or when the sum of the amounts received in the Treasury under section 4611 and under 4661 of the Internal Revenue Code of 1954 total \$1,380,000,000, whichever occurs first. The Secretary of the Treasury shall estimate when this level of \$1,380,000,000 will be reached and shall by regulation, provide procedures for the termination of the tax authorized by this Act and imposed under sections 4611 and 4661 of the Internal Revenue Code of 1954.

CONFORMING AMENDMENTS

SEC. 304. (a) Subsection (b) of section 504 of the Federal Water Pollution Control Act is hereby repealed.

(b) One-half of the unobligated balance remaining before the date of the enactment of this Act under subsection (k) of section 311 of the Federal Water Pollution Control Act and all sums appropriated under section 504(b) of the Federal Water Pollution Control Act shall be transferred to the Fund established under title II of this Act.

(c) In any case in which any provision of section 311 of the Federal Water Pollution Control Act is determined to be in conflict with any provisions of this Act, the provisions of this Act shall apply.

LEGISLATIVE VETO

SEC. 305. (a) Notwithstanding any other provision of law, simultaneously with promulgation or repromulgation of any rule or regulation under authority of title I of this Act, the head of the department, agency, or instrumentality promulgating such rule or regulation shall transmit a copy thereof to the Secretary of the Senate and the Clerk of the House of Representatives. Except as provided in subsection (b) of this section, the rule or regulation shall not become effective, if—

(1) within ninety calendar days of continuous session of Congress after the date of promulgation, both Houses of Congress adopt a concurrent resolution, the matter after the resolving clause of which is as follows: "That Congress disapproves the rule or regulation promulgated by _____ dealing with the matter of _____, which rule or regulation was transmitted to Congress on _____, the blank spaces therein being appropriately filled; or

(2) within sixty calendar days of continuous session of Congress after the date of promulgation, one House of Congress adopts such a concurrent resolution and transmits such resolution to the other House, and such resolution is not disapproved by such other House within thirty calendar days of continuous session of Congress after such transmittal.

(b) If, at the end of sixty calendar days of continuous session of Congress after the date of promulgation of a rule or regulation, no committee of either House of Congress has reported or been discharged from further consideration of a concurrent resolution disapproving the rule or regulation and neither House has adopted such a resolution, the rule or regulation may go into effect immediately. If, within such sixty calendar days, such a committee has reported or been discharged from further consideration of such a resolution, or either House has adopted such a resolution, the rule or regulation may go into effect not sooner than ninety calendar days of continuous session of Congress after such rule is prescribed unless disapproved as provided in subsection (a) of this section.

(c) For purposes of subsections (a) and (b) of this section—

(1) continuity of session is broken only by an adjournment of Congress sine die; and

(2) the days on which either House is not in session because of an adjournment of more than three days to a day certain are excluded in the computation of thirty, sixty, and ninety calendar days of continuous session of Congress.

(d) Congressional inaction on, or rejection of, a resolution of disapproval shall not be deemed an expression of approval of such rule or regulation.

TRANSPORTATION

SEC. 306. (a) Each hazardous substance which is listed or designated as provided in section 101(14) of this Act shall, within ninety days after the date of enactment of this Act or at the time of such listing or designation, whichever is later, be listed as a hazardous material under the Hazardous Materials Transportation Act.

(b) A common or contract carrier shall be liable under other law in lieu of section 107 of this Act for damages or remedial action resulting from the release of a hazardous substance during the course of transportation which commenced prior to the effective date of the listing of such substance as a hazardous material under the Hazardous Materials Transportation Act, or for substances listed pursuant to subsection (a) of this section, prior to the effective date of such listing: *Provided, however,* That this subsection shall not apply where such a carrier can demonstrate that he did not have actual knowledge of the identity or nature of the substance released.

(c) Section 11901 of title 49, United States Code, is amended by—

(1) redesignating subsection (h) as subsection (i);

(2) by inserting "and subsection (h)" after "subsection (g)" in subsection (i)(2) as so redesignated by paragraph (1) of this subsection; and

(3) by inserting the following new subsection (h):

"(h) A person subject to the jurisdiction of the Commission under subchapter II of chapter 105 of this title, or an officer, agent, or employee of that person, and who is required to comply with section 10921 of this title but does not so comply with respect to the transportation of hazardous wastes as defined by the Environmental Protection Agency pursuant to section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Congress) shall, in any action brought by the Commission, be liable to the United States for a civil penalty not to exceed \$20,000 for each violation."

ASSISTANT ADMINISTRATOR FOR SOLID WASTE

SEC. 307. (a) Section 2001 of the Solid Waste Disposal Act is amended by striking out "a Deputy Assistant" and inserting in lieu thereof "an Assistant".

(b) The Assistant Administrator of the Environmental Protection Agency appointed to head the Office of Solid Waste shall be in addition to the five Assistant Administrators of the Environmental Protection Agency provided for in section 1(d) of Reorganization Plan Numbered 3 of 1970 and the additional Assistant Administrator provided by the Toxic Substances Control Act, shall be appointed by the President by and with the advice and consent of the Senate.
[307 (b) amended by PL 98-80]

(c) The amendment made by subsection (a) shall become effective ninety days after the date of the enactment of this Act.

SEPARABILITY

SEC. 308. If any provision of this Act, or the application of any provision of this Act to any person or circumstance, is held invalid, the application of such provision to other persons or circumstances and the remainder of this Act shall not be affected thereby.

December 10, 1985

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"(iii) sold for resale by any purchaser for use, or resale for ultimate use, in a qualified animal feed use.

"(C) QUALIFIED ANIMAL FEED USE.—The term 'qualified animal feed use' means any use in the manufacture or production of animal feed or animal feed supplements, or of ingredients used in animal feed or animal feed supplements.

"(D) TAXATION OF NONQUALIFIED SALE OR USE.—For purposes of section 4661(a), if no tax was imposed by such section on the sale or use of any chemical by reason of subparagraph (A), the first person who sells or uses such chemical other than in a sale or use described in subparagraph (A) shall be treated as the manufacturer of such chemical."

(2) REFUND OR CREDIT FOR SUBSTANCES USED IN THE PRODUCTION OF ANIMAL FEED.—Subsection (d) of section 4662 of such Code (relating to refunds and credits with respect to the tax on certain chemicals) is amended by adding at the end thereof the following new paragraph:

"(4) USE IN THE PRODUCTION OF ANIMAL FEED.—Under regulations prescribed by the Secretary, if—

"(A) a tax under section 4661 was paid with respect to nitric acid, sulfuric acid, ammonia, or methane used to produce ammonia, without regard to subsection (b)(9), and

"(B) any person uses such substance as a qualified animal feed substance, then an amount equal to the excess of the tax so paid over the tax determined with regard to subsection (b)(9) shall be allowed as a credit or refund (without interest) to such person in the same manner as if it were an overpayment of tax imposed by this section."

(g) CERTAIN EXCHANGES BY TAXPAYERS NOT TREATED AS SALES.—Subsection (c) of section 4662 of such Code (relating to use by manufacturers) is amended to read as follows:

"(C) USE AND CERTAIN EXCHANGES BY MANUFACTURER, ETC.—

"(1) USE TREATED AS SALE.—Except as provided in subsections (b) and (e), if any person manufactures, produces, or imports any taxable chemical and uses such chemical, then such person shall be liable for tax under section 4661 in the same manner as if such chemical were sold by such person.

"(2) SPECIAL RULES FOR INVENTORY EXCHANGES.—

"(A) IN GENERAL.—Except as provided in this paragraph, in any case in which a manufacturer, producer, or importer of a taxable chemical exchanges such chemical as part of an inventory exchange with another person—

"(i) such exchange shall not be treated as a sale, and

"(ii) such other person shall, for purposes of section 4661, be treated as the manufacturer, producer, or importer of such chemical.

"(B) REGISTRATION REQUIREMENT.—Subparagraph (A) shall not apply to any inventory exchange unless—

"(4) both parties are registered with the Secretary as manufacturers, producers, or importers of taxable chemicals, and

"(ii) the person receiving the taxable chemical has, at such time as the Secretary may prescribe, notified the manufacturer, producer, or importer of such person's registration number and the internal revenue district in which such person is registered.

"(C) INVENTORY EXCHANGE.—For purposes of this paragraph, the term 'inventory exchange' means any exchange in which 2 persons exchange property which is, in the hands of each person, properly described in section 1221(1)."

made by this section shall take effect on November 1, 1985.

(2) REPEAL OF TAX ON XYLENE FOR PERIODS BEFORE OCTOBER 1, 1985.—

(A) REFUND OF TAX PREVIOUSLY IMPOSED.—In the case of any tax imposed by section 4661 of the Internal Revenue Code of 1954 on the sale or use of xylene before October 1, 1985, such tax (including interest, additions to tax, and additional amounts) shall not be assessed, and if assessed, the assessment shall be abated, and if collected shall be credited or refunded (with interest) as an overpayment.

(B) WAIVER OF STATUTE OF LIMITATIONS.—If one the date of the enactment of this Act (or at any time within 1 year after such date of enactment) refund or credit of any overpayment of tax resulting from the application of subparagraph (A) is barred by any law or rule of law, refund or credit of such overpayment shall, nevertheless, be made or allowed if claim therefor is filed before the date 1 year after the date of the enactment of this Act.

(C) XYLENE TO INCLUDE ISOMERS.—For purposes of this paragraph, the term "xylene" shall include any isomer of xylene whether or not separated.

(3) INVENTORY EXCHANGES.—

(A) IN GENERAL.—Except as otherwise provided in this paragraph, the amendment made by subsection (g) shall apply as if included in the amendments made by section 211 of the Hazardous Substance Response Revenue Act of 1980.

(B) RECIPIENT MUST AGREE TO TREATMENT AS MANUFACTURER.—In the case of any inventory exchange before January 1, 1986, the amendment made by subsection (g) shall apply only if the person receiving the chemical from the manufacturer, producer, or importer in the exchange agrees to be treated as the manufacturer, producer, or importer of such chemical for purposes of subchapter B of chapter 38 of the Internal Revenue Code of 1954.

(C) EXCEPTION WHERE MANUFACTURER PAID TAX.—In the case of any inventory exchange before January 1, 1986, the amendment made by subsection (g) shall not apply if the manufacturer, producer, or importer treated such exchange as a sale for purposes of section 4661 of such Code and paid the tax imposed by such section.

(D) REGISTRATION REQUIREMENTS.—Section 4662(c)(2)(B) of such Code (as added by subsection (g)) shall apply to exchanges made after December 31, 1985.

SEC. 514. REPEAL OF POST-CLOSURE TAX AND TRUST FUND.

(a) REPEAL OF TAX.—

(1) Subchapter C of chapter 38 of the Internal Revenue Code of 1954 (relating to tax on hazardous wastes) is hereby repealed.

(2) The table of subchapters for such chapter 38 is amended by striking out the item relating to subchapter C.

(b) REPEAL OF TRUST FUND.—Section 232 of the Hazardous Substance Response Revenue Act of 1980 is hereby repealed.

(c) EFFECTIVE DATE.—The amendments made by this section shall take effect on October 1, 1983.

SEC. 516. WASTE MANAGEMENT TAX.

(a) GENERAL RULE.—Chapter 38 of the Internal Revenue Code of 1954 (as amended by section 514 of this Act) is amended by adding after subchapter B the following new subchapter:

"Subchapter C—Hazardous Waste Management Tax

"Sec. 4671. Waste management tax.

"Sec. 4672. Exemptions; reduction of tax

"Sec. 4674. Backup tax on generator.

"Sec. 4675. Definitions and special rules.

"SEC. 4671. WASTE MANAGEMENT TAX.

"(a) IMPOSITION OF TAX.—There is hereby imposed a tax on—

"(1) the receipt of hazardous waste at a qualified hazardous waste management unit,

"(2) the receipt of hazardous waste for transport from the United States for the purpose of ocean disposal, and

"(3) the exportation of hazardous waste from the United States.

"(b) AMOUNT OF TAX.—

"(1) IN GENERAL.—The amount of the tax imposed by subsection (a) with respect to each ton of hazardous waste shall be determined in accordance with the following table:

If the taxable event is:

Land Disposal	Any Other Taxable Event
---------------	-------------------------

"For calendar year:

	The tax per ton is:	
1986.....	\$37.00	\$4.15
1987.....	39.00	4.15
1988.....	42.00	4.15
1989.....	44.00	4.15
1990.....	47.00	4.15

"(2) DEFINITIONS RELATING TO AMOUNT OF TAX.—For definition of—

"(A) hazardous waste, see section 4675(a)(1), and

"(B) land disposal and any other taxable event, see section 4675(a)(5).

"(c) LIABILITY FOR TAX.—

"(1) WASTE RECEIVED AT MANAGEMENT UNITS.—The tax imposed by subsection (a)(1) shall be paid by the owner or operator of the qualified hazardous waste management unit.

"(2) WASTE RECEIVED FOR TRANSPORT FROM THE UNITED STATES.—The tax imposed by subsection (a)(2) shall be paid by the person holding the permit issued for transport for ocean disposal under section 102 of the Marine Protection, Research, and Sanctuaries Act of 1972.

"(3) WASTE EXPORTED.—The tax imposed by subsection (a)(3) shall be paid by the exporter.

"(d) TERMINATION.—The taxes imposed by this section shall not apply after September 30, 1990.

"SEC. 4672. EXEMPTIONS; REDUCTION OF TAX WHERE PRIOR TAXABLE EVENT.

"(a) EXEMPTION FOR CERTAIN REMOVAL AND REMEDIAL ACTIONS, ETC.—The tax imposed by section 4671 shall not apply to the receipt or export of hazardous waste pursuant to—

"(1) a corrective action specified in—

"(A) an initial or final order, or

"(B) a proposed or final permit, issued by the Administrator under the Solid Waste Disposal Act or a State under a hazardous waste program authorized under section 3006 of such Act,

"(2) a proposed or final closure plan approved by the Administrator or such a State,

"(3) a removal or remedial action under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 which has been selected or approved by the Administrator, or

"(4) an action to correct an emergency situation arising from a product spill which is certified by the Administrator to the Secretary as carrying out the purposes of the Comprehensive Environmental Response

section 4671 shall not apply to any hazardous waste received at any facility owned by the United States.

"(c) REDUCTION IN TAX WHERE PRIOR TAXABLE EVENT.—

"(1) IN GENERAL.—If—

"(A) tax under section 4671 or 4674 was paid with respect to any hazardous waste, and

"(B) tax under section 4671 is subsequently imposed on such waste (hereinafter in this subsection referred to as the 'later taxable event'), then the tax under section 4671 on the later taxable event shall be reduced by the amount determined under paragraph (2).

"(2) AMOUNT OF REDUCTION.—The amount of the reduction determined under this paragraph is the product of—

(A) the weight of hazardous waste involved in the later taxable event, multiplied by

"(B) the lesser of—

"(i) the highest rate of tax paid under section 4671 or 4674 with respect to any prior taxable event involving such waste (determined without regard to this subsection), or

"(ii) the rate of tax imposed by section 4671 with respect to the later taxable event (as so determined).

"SEC. 4673. SPECIAL RULES FOR WASTE WATER TREATMENT, INCINERATION, ETC.

"(a) EXEMPTION FOR WASTE RECEIVED AT CERTAIN WASTE WATER TREATMENT UNITS.—The tax imposed by section 4671 shall not apply to hazardous waste received at any waste water treatment unit.

"(b) INCINERATION, ETC. WITHIN 90 DAYS OF RECEIPT.—

"(1) IN GENERAL.—Under regulations prescribed by the Secretary, if—

"(A) tax under section 4671 was paid with respect to the receipt of any hazardous waste at any qualified hazardous waste management unit or for transport described in section 4671(a)(2), and

"(B) such waste is incinerated on land (or the equivalent of incineration on land) by any person within 90 days after the date of the first receipt referred to in subparagraph (A),

then the tax so paid shall be allowed as a credit or refund (without interest) to such person in the same manner as if it were an overpayment of tax imposed by section 4671.

"(2) EQUIVALENT OF INCINERATION.—For purposes of subparagraph (A), a method, technique, or process shall be treated as the equivalent of incineration on land if—

"(A) such method, technique, or process meets detailed performance standards established by the Environmental Protection Agency, and

"(B) such standards require a destruction and removal efficiency for the hazardous waste involved at least equivalent to the destruction and removal efficiency applicable to incineration on land.

"(c) QUALIFIED CHEMICAL FUELS OR SOLVENTS.—

"(1) IN GENERAL.—Under regulations prescribed by the Secretary, if—

"(A) tax under section 4671 was paid with respect to any hazardous waste,

"(B) such waste is used by any person in the production of any qualified chemical fuel or solvent, and

"(C) such fuel or solvent is by such person sold for use or used in any industrial or commercial use,

then the tax so paid shall be allowed as a credit or refund (without interest) to such

the term 'qualified chemical fuel or solvent' means any chemical or solvent which is determined by the Administrator as not being a hazardous waste.

"(d) RECYCLING OF BATTERIES.—Under regulations prescribed by the Secretary, if—

"(1) tax under section 4671 was paid with respect to the receipt of any battery at a qualified hazardous waste management unit, and

"(2) the recycling of such battery begins at such a unit by any person within 90 days after the date of the first receipt of such battery at any qualified hazardous waste management unit,

then the tax so paid shall be allowed as a credit or refund (without interest) to such person in the same manner as if it were an overpayment of tax imposed by section 4671.

"(e) TAX TO APPLY WHILE CORRECTIVE ACTION NOT COMPLETED.—

"(1) IN GENERAL.—The exemption provided by subsection (a) shall not apply (and no credit or refund shall be allowed under this section) with respect to any activity conducted at a facility (or part thereof) during the period that required corrective action remains uncompleted with respect to such facility (or part).

"(2) REQUIRED CORRECTIVE ACTION.—For purposes of paragraph (1), required corrective action shall be treated as uncompleted during the period—

"(A) beginning on the date that the corrective action is required by the Administrator or an authorized State pursuant to a final permit under section 3005 of the Solid Waste Disposal Act or a final order under section 3004 or 3008 of such Act, and

"(B) ending on the date the Administrator or such State (as the case may be) certifies to the Secretary that such corrective action has been completed.

"(3) RATE OF TAX WITH RESPECT TO WASTE WATER TREATMENT.—The rate of tax imposed by section 4671 by reason of this subsection with respect to hazardous waste received at any waste water treatment unit shall be 15 cents per ton.

"SEC. 4674. BACKUP TAX ON GENERATOR.

"(a) IMPOSITION OF TAX.—There is hereby imposed a tax on each ton of hazardous waste which, as of the close of the 270-day period beginning on the day after the day on which such waste was generated, has not been—

"(1) received at a qualified hazardous waste management unit,

"(2) received for transport from the United States for the purpose of ocean disposal, or

"(3) exported from the United States.

"(b) RATE OF TAX.—The rate of the tax imposed by subsection (a) shall be the rate of tax applicable to land disposal under section 4671 at the end of the 270-day period described in subsection (a).

"(c) LIABILITY FOR TAX.—The tax imposed by subsection (a) shall be paid by the generator of the hazardous waste.

"(d) EXEMPTIONS.—

"(1) Small generators.—The tax imposed by subsection (a) shall not apply to hazardous waste generated during any month if the generator of such waste does not generate more than 100 kilograms of hazardous waste during such month.

"(2) WASTE LEGALLY DISPOSED OF IN PUBLICLY OWNED TREATMENT WORKS.—The tax imposed by subsection (a) shall not apply to hazardous waste disposed of in any publicly

(b) of section 4672 shall apply to the tax imposed by subsection (a).

"(4) EXEMPTIONS UNDER REGULATIONS, APPLICATION OF LOWER RATE.—The Secretary may prescribe regulations which provide exemptions from the tax imposed by subsection (a) (or the application of a lower rate) which are not inconsistent with the purposes of this section.

"(e) GENERATOR.—For purposes of this section, the term 'generator' means the person whose act or process produces the hazardous waste.

"(f) TERMINATION.—No tax shall be imposed by this section on waste generated after September 30, 1990.

"SEC. 4675. DEFINITIONS AND SPECIAL RULES.

"(a) DEFINITIONS.—For purposes of this subchapter—

"(1) HAZARDOUS WASTE.—The term 'hazardous waste' means any waste which is listed or identified under the date of the enactment of the Superfund Revenue Act of 1985 under section 3001 of the Solid Waste Disposal Act. Rainwater shall not be treated as hazardous waste unless mixed with hazardous waste (as defined in the preceding sentence).

"(2) QUALIFIED HAZARDOUS WASTE MANAGEMENT UNIT.—The term 'qualified hazardous waste management unit' means the specified area of land or structure—

"(A) which isolates the hazardous wastes within a qualified hazardous waste facility, and

"(B) which is subject to the requirements for obtaining interim status or a final permit under subtitle C of the Solid Waste Disposal Act.

"(3) QUALIFIED HAZARDOUS WASTE MANAGEMENT FACILITY.—The term 'qualified hazardous waste management facility' means any facility, as defined under subtitle C of the Solid Waste Disposal Act, which has received a permit or is accorded interim status under—

"(A) section 3005 of the Solid Waste Disposal Act, or

"(B) a State program authorized under section 3008 of such Act.

"(4) OCEAN DISPOSAL.—The term 'ocean disposal' means the incineration or dumping of hazardous waste over or into ocean waters or the waters described in section 101(b) of the Marine Protection, Research, and Sanctuaries Act of 1972, pursuant to section 102 of such Act.

"(5) DEFINITIONS RELATING TO AMOUNT OF TAX.—

"(A) LAND DISPOSAL.—The term 'land disposal' means a taxable event described in section 4671(a)(1) with respect to a qualified hazardous waste management unit which is a landfill, surface impoundment, waste pile, or land treatment unit.

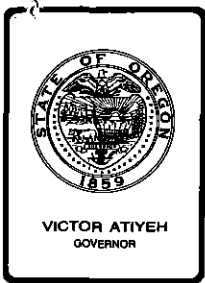
"(B) LANDFILL, ETC.—For purposes of subparagraph (A), the terms 'landfill', 'surface impoundment', 'waste pile' and 'land treatment unit' have the respective meanings given such terms in regulations prescribed by the administrator pursuant to sections 3004 and 3005 of the Solid Waste Disposal Act.

"(C) OTHER TAXABLE EVENT.—The term 'any other taxable event' means—

"(i) a taxable event described in section 4671(a)(1) which is not land disposal, and

"(ii) a taxable event described in paragraph (2) or (3) of section 4671(a).

"(6) WASTE WATER TREATMENT UNIT.—The term 'waste water treatment unit' means



Environmental Quality Commission

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522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item R, January 31, 1986, EQC Meeting

Proposed Rules: Open Burning of Solid Waste at Disposal Sites (OAR 340-61-015 and 340-61-040(2))

Background

At the time of passage of ORS 459 (Solid Waste Statutes) in 1971, approximately 70 percent of the 200 existing disposal sites were open burning dumps. As a result of a statewide planning effort in the 1973-75 period and subsequent cooperative effort between DEQ and local government, most of these open dumps have been closed, upgraded to landfill, or converted to a transfer station.

Since the passage of ORS 459, the Department has worked to eliminate open burning dumps. Emphasis has been placed on larger Western Oregon disposal sites. The coastal counties of Lincoln, Tillamook, and Clatsop were the last major areas to stop open burning. Only one Western Oregon city (Powers) is now allowed to open burn with a variance granted by the Commission.

Emphasis can now be directed to the more rural areas in Eastern Oregon. A current status of open burning dumps is attached (Attachment I).

As a result of an informational report, "Status of Open Burning Solid Waste Disposal Sites," presented to the Commission at the September 14, 1984 EQC meeting (Agenda Item K--Attachment II), a Department interdivisional task force was established. The task force examined the practice of open burning for impact on air and groundwater quality, and developed two sets of criteria. The first set of criteria would have to be met for an operator to be permitted to continue open burning. The second set was operational conditions for those sites allowed to continue open burning.

Based on the work of the task force, proposed rules were drafted. At the January 25, 1985 EQC meeting, the Commission granted authorization to conduct public hearings relating to these proposed rules (Agenda Item D--Attachment III).

The two sets of criteria which were established in the proposed rules follow:

1. Site operators must meet these criteria to open burn domestic solid waste:
 - A. Must have minimal air quality impact.
 - B. Located outside city or urban growth boundary with little impact on nearby residents.
 - C. Must have a dry climate with rainfall less than 25" annually.
 - D. Total population served less than 450 persons.
 - E. Shall not accept hazardous waste or burn industrial waste.
2. Minimum operational conditions:
 - A. Access must be controlled (site fenced with a gate).
 - B. Attendant must be on duty while site is open and while burning solid waste.
 - C. Burning must be limited to two times per week and only when the site is closed.
 - D. Must have a fire permit from local fire agency.
 - E. Ash must be buried at least twice per year.

The Statement of Need for Rulemaking, Land Use Consistency and Draft Rules are attached (Attachments IV, V and VI).

Six public hearings were held throughout the state in March 1985 as summarized below. Hearing Officer's reports are attached (Attachment VII).

	<u>Portland</u>	<u>Vale</u>	<u>Coquille</u>	<u>Baker</u>	<u>Canyon City</u>	<u>Lakeview</u>
Number Attending	5	5	11	20	4	6
Verbal Testimony	0	1	2	3	1	3
Written Testimony	17*	0	11	1	0	0

* All testimony regarded backyard burning in the burn ban area (see Hearing Officer's report)

At all public hearings but Portland, objection was voiced to the 450 population cutoff. Statements were that 450 was an arbitrary number and should be raised. Most persons giving testimony recommended a figure of 900-1000 persons.

At the Canyon City and Lakeview hearings an objection was also raised to the operational criteria. The criteria objected to were controlled access, attendant on site while open and while burning, and burial of ash twice a year.

A representative of Union County, where there is no open burning of solid waste, stated that a site operator should be required to demonstrate need in order for open burning of solid waste to be allowed. He indicated that the three transfer sites in Union County would most likely revert to open burning if the rules were adopted.

Considerable verbal and written testimony was received in support of burning at the city of Powers' disposal site. Major points raised were great distance to the nearest disposal site (transportation costs), poor economic climate in the Powers area and the rough area topography. An extensive discussion on Powers is included in the Hearing Officer's report for the Coquille public hearing.

The Department's response to public comment is attached (Attachment VIII).

Alternatives and Evaluation

The Department believes that open burning of solid waste in most cases is not an acceptable practice. Reasons for prohibition far outweigh advantages. The practice is in violation of Federal criteria which prohibits all burning of domestic, commercial, and industrial waste at disposal sites. Operators are subject to citizen suit for closure under RCRA. The 1984 RCRA Amendments, passed by Congress in late 1984, direct EPA to rewrite the criteria (with emphasis placed on groundwater and small quantities of hazardous waste) by March 1988. If states do not have a permit program which enforces the new criteria, EPA is given enforcement authority. Prior to the amendment, EPA had no solid waste enforcement authority.

Federal solid waste program grants to states were also authorized by the 1984 Amendments, however, to date this money has not been allocated. In all probability grants, if made, will not be available to states allowing open dumps in violation of the federal criteria. It is problematic whether the federal criteria will be changed to allow open burning.

While the Department is not at risk from a citizen's suit (citizens' suits are for closure of the disposal site only and would therefore be directed at the owner/operator), under RCRA there may be some liability involved by allowing open burning to continue. For example if a neighbor proves civil damages as a result of a site operator burning and an award is made, then the site operator may attempt to involve the Department for allowing the condition to occur.

There is very little control over what items are burned at open burning dumps. In addition to normal household wastes, most people dispose of

such items as empty or even partially full containers of pesticides, paints and other small quantities of hazardous wastes. Waste tires and plastics are also disposed. A large percentage of modern furniture, which is often disposed, contains upholstery which is composed of plastic foam material.

Polyvinyl chloride is an example of a plastic that emits toxic gases when burned. Phosgene, hydrogen chloride and carbon monoxide gases are among the products of combustion. Burning tires also emit highly toxic gases and large quantities of particulate. For comparison sake, the following table shows the relative emissions from burning tires and agricultural field burning:

	<u>Tires</u>	<u>Ag. Field Burning</u>
Particulate (lb/ton)	100	17
Carbon monoxide (lb/ton)	125	100
Hydrocarbons (lb/ton)	30	20
Nitrogen oxides (lb/ton)	4	2

Open burning dumps are also a safety hazard. Uncontrolled burning can cause range and forest fires. The most recent range fires started around the Dayville dump. Users are subject to burns if they enter the burning area. A fire can be smoldering under a relatively stable looking area and an incautious person may fall in.

The low cost of disposal at an open burning dump (usually free to the user) discourages the state's higher priorities for solid waste management. These priorities have been mandated by the Legislature. In order of priority they are reduction of waste at the source, reuse, recycle, energy recovery, and finally landfilling on those portions remaining. With low cost disposal, there is no incentive to attempt any of the higher priority methods.

The main reason which favors open burning is related to cost. For those small communities that have limited financial resources, open burning is an attractive, low-cost disposal alternative. Almost one-half of the disposal sites are operated in areas that are not incorporated cities. Many, if not all, of the cities involved are on a very limited budget. At the public hearing held at Vale, it was stated that to operate the disposal site at Jordan Valley without burning would cost more than the entire present city budget.

Most small rural sites have a relatively small impact on the environment. This is why the Department has given rural open burning sites a lower priority than large sites. The larger open burning disposal sites were located principally along the Oregon coast. With the EQC action at the September 14, 1984 meeting, which denied continuation of open burning variances for Seaside and Cannon Beach disposal sites, only one western Oregon city continues to open burn solid waste.

It should be noted that 13 of the 24 sites listed in Attachment I continue to open burn solid waste in violation of permit conditions. Because of the relatively small environmental impact, this has been allowed to continue. However, with the closure of the remaining western Oregon burning sites (except for Powers), attention can be focused on the smaller sites and enforcement proceedings could be initiated.

Following is a summary of the reasons for and against open burning:

- | <u>Why Stop Open Burning</u> | <u>Why Allow Open Burning</u> |
|--|---|
| 1. Practice is in violation of federal criteria. In March 1988, EPA may assume enforcement in those states not following criteria. (Federal solid waste money may become available.) | 1. Low cost. Small communities with limited disposal site areas can't afford better. |
| 2. No control over what is burned (hazardous waste, tires, explosives, etc.). | 2. Low environmental impact. Minimal population affected. |
| 3. Smoke may be harmful to attendants and those using the site. | 3. Low priority. Staff time is limited and should be used where more severe environmental problems occur. |
| 4. Site users are subject to safety hazards. Burning may cause range fires. | |
| 5. Low cost discourages other more acceptable forms of solid waste management (recycling, waste reduction, landfilling). | |

The Department believes that open burning, while not an accepted solid waste disposal practice, should be allowed in some form in a few rural areas. It should only be done by exception, with the permittee taking the burden of showing why a landfill is not practicable at their location.

There are two alternatives available to the EQC. First, the proposed rules may be adopted either in the present form or in a modified version. The second alternative is for the Commission to decline to adopt the proposed rule. This would continue the prohibition on open burning at disposal sites without the site operator obtaining a variance from the Commission.

By adopting the rules as proposed, or with slight modifications, the EQC would allow any site that could meet the acceptability criteria to continue, or begin, to open burn. Under these criteria as written, sixteen of the twenty-four sites that presently open burn would be allowed to continue (Attachment I). In addition, other disposal sites that have burned in the past but have been converted to landfills could request to again open burn.

There are presently 22 disposal sites being operated as landfills or transfer stations in rural Eastern Oregon that would be eligible to begin open burning if the rules are adopted as written (see Attachment IX). If the rules were modified as requested in the public hearings to increase the population figures from the proposed 450 to 1,000, nine additional sites would become eligible (see Attachment IX). The Commission could, however, limit the rules to address only those sites which presently open burn.

The Department feels that there is a matter of equity involved. If the rule is changed to allow open burning of solid waste, all sites that meet the criteria should be allowed to apply for such an exemption. To do otherwise would punish those site operators who have made the effort to meet the rules and reward those site operators who have continued the practice of open burning.

In response to the public testimony to an increase in the population served, the Department cannot agree that the 450 figure should be raised. The Open Dump Task Force established the 450 population figure as a point where there should be an economic base for a more responsible program. Sites serving populations from 500-1000 persons are presently being operated as landfills or transfer stations in Douglas, Gilliam, Grant, Klamath, Malheur, Union and Wallowa Counties. It is therefore recommended that, if the proposed rules are adopted, the figure remain at 450.

In response to the public comments regarding access control, an attendant on site while open and while burning, and coverage of ash at least twice a year, the Department again cannot agree with the testimony. Disposal sites in Baker, Malheur and Wallowa Counties presently operate with access control, are only open one to two days a week, and have an attendant on duty while the site is open. A small fee is charged to support the cost of the operator. Having an operator gives some control over what is dumped (tires, hazardous wastes, etc. can be excluded) and control over placement of the material for burning. The material can be burned at one time while the site is closed instead of burning at the discretion of the site users.

The Department also feels that some minimum form of maintenance must occur at the site and that ash disposal at least twice a year is a minimum program. Again, the Department recommends that if the proposed rules are adopted, they be adopted as written.

The second alternative is for the EQC to decline to adopt the proposed rules. This would make continued open burning illegal without the site operator obtaining a variance or a conditional permit under ORS 459.225 from the EQC. An important part of the variance procedure is that the EQC can require applicants to establish the need for the variance and can properly tailor the permit conditions to be site specific. Many of the operational criteria from the proposed rules could be included as conditions of the variance. Time limits could be imposed and the local jurisdiction might be required to submit periodic reports indicating their effort toward upgrading the disposal site. In this way, the status of open

burning disposal sites can be reviewed periodically as the variances expire. The variance procedure does require additional staff time, receiving and processing the variance requests.

The Department would like to maintain the most control possible over open burning of garbage at disposal sites. Only those remote rural sites that can demonstrate a need for the practice of open burning should be allowed to continue. In addition, a condition could be added to each permit giving the EQC the option of terminating the variance if federal regulations so dictate. At the time of application for a variance, any impact on possible recycling could be evaluated and taken into account in the conditions attached to the variance.

Members of the original Department task force were contacted regarding the alternatives. The members agree that the variance procedure is the most acceptable way to allow for continued open burning at a limited number of sites while maintaining control of the operation of these sites by permit conditions. This procedure would also limit the number of open burning disposal sites to the minimum.

For the above reasons the Department is recommending that the proposed rule not be adopted and staff be directed to contact the operators of all sites presently known to be open burning with instructions that a variance will be required for continuation of that practice and procedures for their requesting such a variance.

In the past, variance requests have been presented to the EQC in a group by county. This process could, for the most part, be continued. There are eight counties presently with open burning disposal sites. Four of these counties contain 19 of the 24 sites.

Summation

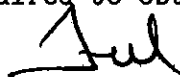
1. As a result of an interdivisional task force, criteria were developed relating to open burning of solid waste at disposal sites. Proposed rules were drafted which contained these criteria.
2. The proposed rules consist of two sets of criteria as follows:
 - A. Criteria that must be met for a disposal site operator to be allowed to open burn solid waste.
 - B. Minimum operational conditions if open burning is allowed.
3. On January 25, 1985, the EQC granted permission to hold public hearings on the proposed rules regarding open burning of solid waste at small rural disposal sites.
4. Six public hearings were held in March 1985. There was opposition to the 450 population cutoff and to the operational conditions relating

to site attendants and access control. One jurisdiction testified that the rule should require that need for open burning be established.

5. Site operators that open burn are subject to citizen suit in Federal Court for closure. While the Department is not subject to citizen suit, it is possible that it may be subject to suit if civil damages can be established.
6. The EQC can either adopt the proposed rule or a modification or decline to adopt.
7. If the Commission does not adopt the rules, all site operators presently open burning will be required to upgrade or obtain a variance or be subject to enforcement action.
8. The Department believes that open burning at small rural disposal sites should be allowed on an exemption basis, not a blanket approval by rule. It does not believe that sites presently operated as landfills or transfer stations should be allowed to revert to open burning without an exceptional justification.
9. Environmental impact at small, rural disposal sites is minimal.
10. The Department believes that the variance procedure maintains the most control over open burning at disposal sites since this requires the operators to show a need and allows the Commission to properly condition variances to ensure open burning doesn't continue longer than necessary.

Director's Recommendations

Based on the Summation, it is recommended that the Commission decline to adopt the proposed rules. It is also recommended that staff be instructed to pursue option two in the "Alternatives and Evaluation" section and contact the operators presently open burning at disposal sites and indicate the need for and the submissions required to obtain a variance.



Fred Hansen

- Attachments:
- I. Current Status of Open Burning Dumps
 - II. Agenda Item K, September 14, 1984 EQC Meeting
 - III. Agenda Item D, January 25, 1985 EQC Meeting
 - IV. Statement of Need for Rulemaking
 - V. Land Use Consistency Statement
 - VI. Proposed Rules
 - VII. Hearing Officer's Reports
 - VIII. Department's Response to Public Comments
 - IX. Sites Allowed to Open Burn Under Proposed Rules

Robert L. Brown:l
SL4790
229-6237
January 2, 1986

Status of Open Burning at Disposal Sites
 January 1, 1986

<u>County</u>	<u>Site</u>	<u>Has Variance</u>	<u>Comments</u>
Coos	* Powers	Yes	Expires May 1986.
Lake	Adel	No	Variances expired July 1985.
Lake	* Christmas Valley	"	Letter requests for variance extensions have been received from Lake County and the city of Paisley. Requests being held by Department pending action on rules.
Lake	Fort Rock	"	
Lake	* Paisley	"	
Lake	Plush	"	
Lake	Silver Lake	"	
Lake	Summer Lake	"	
Wheeler	Mitchell	Yes	Expires July 1986.
Wallowa	Imnaha	No	Variance request being held by Department pending action on rules.
Wallowa	Troy	No	
Baker	* Halfway	No	All site operators open burn solid waste in violation of permit conditions. Will be required to stop open burning or submit variance request with justification of need.
Baker	* Huntington	No	
Baker	Richland	No	
Baker	Unity	No	
Grant	Dayville	No	
Grant	Long Creek	No	
Grant	Monument	No	
Grant	Seneca	No	
Malheur	Harper	No	
Malheur	* Jordan Valley	No	
Malheur	* Juntura	No	
Malheur	McDermitt	No	
Wheeler	* Fossil	No	

* These sites would close or upgrade under the proposed criteria.



Environmental Quality Commission

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MEMORANDUM

To: Environmental Quality Commission
From: Director
Subject: Agenda Item No. K, September 14, 1984, EQC Meeting

Informational Report: Status of Open Burning Solid Waste Disposal Sites

Background

Open burning of solid waste materials is generally considered to be an unacceptable practice. It is allowed only in cases where no other alternative is available. Of the approximately 200 disposal sites receiving municipal waste in the state at the passage of ORS 459 by the 1971 Legislature, over 70% were open burning dumps. Through a statewide solid waste planning process conducted in the 1973-75 period, and subsequent implementation, most of these open dumps have been converted to landfills or transfer stations, or closed. The Department has continued to exert pressure on open burning dumps with additional closures or upgrades occurring each year.

OREGON REGULATION

ORS 459 does not specifically prohibit open burning, but policy statements indicate that more sanitary, efficient and economical methods of disposal should be developed. The EQC adopted a policy statement in 1971 which includes the following:

" . . . when acting on questions of solid waste disposal, [the Department] shall place primary emphasis on salvage, recycling and reconstitution of solid waste. Incineration of solid waste shall be permitted only where no other method of disposal is feasible . . . "

Division 61 of the Department's rules states:

"OAR 340-61-040(2) Open burning. No person shall conduct the open burning of solid waste at a landfill, except in accordance with plans approved and permits issued by the Department prior to such burning. The Department may authorize the open burning of tree stumps and limbs, brush, timbers, lumber and other wood waste, except that open burning of industrial wood waste is prohibited."

In spite of this negative attitude toward open burning garbage, the Department has supported variances to its rule to allow open burning in specific situations for cause. Two basic categories of open burning variance have been presented to and approved by the Commission: (1) temporary variances to allow local officials time to plan for and construct replacement facilities or to upgrade open burning dumps (such as Seaside and Cannon Beach) and (2) long-term variances on small sites that have no significant impact on the environment and have no concerted planning for replacement (such as Adel and Plush). Twelve disposal sites are presently operating under variances granted by the EQC. Half of these would be termed temporary. There are additional rural sites in eastern Oregon which are unattended and burn regularly or occasionally without variances in violation of Solid Waste Disposal Permits. The Department has held open burning at rural disposal sites a low priority item. Impact on the environment is typically minimal and the amount of waste involved is also minimal.

The Department now intends to put all open burning disposal sites on some type of formal status approved by the Commission. Permits with reasonable, meaningful and enforceable conditions will be issued. This effort will require that all open burning sites be divided into categories of short-term correctable sites and long-term sites with no reasonable alternative.

An internal interdivisional task force is proposed to examine the open burning problem and develop the following:

1. Air quality impacts of open burning.
2. Groundwater impacts from disposal at site.
3. Identification of those sites which need upgrading to sanitary landfill operating standards.
4. Identification of sites which should be closed.
5. Identification of sites where open burning is the most environmentally suitable solid waste disposal option.

For those sites where the task force believes open burning should continue, some recommendations on how to accomplish this within the confines of federal law will be sought. If a scheme where limited open burning at disposal sites is possible which is legal under federal law, but not under existing Oregon law, recommendations on the necessary changes in state statutes will be made.

FEDERAL REGULATION

In October 1976, the Resource Conservation and Recovery Act (RCRA) was enacted by Congress. The two major provisions were Subtitle C - Hazardous Waste and Subtitle D - Solid Waste. Under Subtitle D, the Environmental Protection Agency (EPA) was directed to develop "minimum criteria for determining what solid waste disposal facilities and practices pose no reasonable probability of adverse effects on health or the environment."

The criteria were also to provide the standard to be applied by the federal district courts in determining whether parties have engaged in acts that violate the prohibition of open dumping.

The sanitary landfill criteria were published in the Federal Register September 13, 1979. Although the Regulation Preamble indicated findings of "no reasonable probability of adverse effects," the criteria are inflexible on open burning. 40 CFR Part 257 Subsection 257.3-7 states "the facility or practice shall not engage in open burning of residential, commercial, institutional or industrial solid waste."

During the initial years of RCRA (1976-80), the Department received grant funds from EPA under Subtitle D to develop a state solid waste management plan and conduct an open dump inventory. The state plan was adopted by the EQC in January 1981 and the open dump inventory was substantially completed. There are 28 Oregon sites on that list. Most of these are listed for open burning. It should be pointed out that this "state plan" under RCRA was a necessary activity to funding the state solid waste program and was separate from earlier DEQ-sponsored solid waste management plans.

EPA has no direct enforcement powers in solid waste; however, the federal law does provide for citizen lawsuit. Section 7002 of the Act provides that any person (very broadly defined in the Act) may commence a civil action in federal district court against any person "who is alleged to be in violation of any permit, standard, regulation, condition, requirement or order which has become effective pursuant to this Act." Disposal sites under a compliance schedule established by a state plan are protected from citizen suit. Original wording in the law gave protection for 5 years from the date of publication of the open dump inventory. This wording was used in the state solid waste management plan which was approved by EPA. The first open dump inventory was published on May 29, 1981; thus, the date the Department had been working against is May 29, 1986.

The Department has recently learned that the May 29, 1986 date was affected by an amendment to RCRA on October 21, 1980. The wording "5 years from the date of publication of the inventory" was changed to "5 years from the date of publication of the criteria." As the criteria were published on September 13, 1979, the final date for protection against citizen suit is September 13, 1984. For unknown reasons, EPA overlooked the state's proposed enforcement program, which clearly extended beyond 1984, when it approved the Oregon state plan June 22, 1981.

Open burning of most solid waste is prohibited by the criteria. Thus, after September 13, 1984, all sites which open burn domestic solid waste (or otherwise violate federal sanitary landfill criteria) are subject to citizen suit. There is no general agreement among the states and EPA as to the significance of this. Initial contacts with Kenneth Schuster, EPA-Washington, indicate that only the site operator is subject to suit in federal court. Mr. Schuster has the only active program authority presently at EPA. His indication was that as long as the state is receiving no funding for solid waste activity, the Department is not

subject to suit. It may be that the only suable remedy under RCRA is halting "open dumping" and/or closure of the open dump. EPA has played no role in domestic solid waste matters since 1981.

In regard to the open dumps listed in the inventory, the introduction to the latest EPA-written update, published in 1984, states:

"In EPA's view, the open dumping prohibition is a provision of Federal law which stands on its own, separate from the State planning program. The inventory of open dumps is a publication of State findings from State planning efforts to satisfy the requirement of Section 4003 [state program funding] of the Act. The inclusion of a facility in the list of open dumps is not an administrative determination by EPA that any particular parties are engaging in the prohibited act of open dumping.

"A determination for purposes of the open dump inventory need not precede an open dumping suit. However, before the results of the inventory may be used to support a legal determination that open dumping has occurred, the court would have to determine that the classification was a correct application of the criteria and that the defendant was responsible for actions violating the criteria. The court would be obliged to review the sufficiency of the State's classification of a facility and not simply defer to the State's decision."

In fewer words, EPA does not intend the appearance of a disposal site on the inventory to constitute any conclusive finding usable in a citizen-initiated lawsuit.

EPA Region 10 (Seattle) is aware of two citizen suits in the region. Cedar Hills Landfill, Seattle, and Tillamook Landfill, Tillamook, Oregon, are both being sued for "open dumping." Both cases have been in federal court for approximately two years and neither have come to trial (Tillamook trial is scheduled for September 5-7, 1984).

The questions of who is subject to citizen suit and what remedies can be pleaded for have been referred to the Attorney General's Office for investigation and clarification.

CONCLUSION

The Department proposes that no action be taken at this time in regard to those sites with outstanding variances. However, with the current status of federal law, new variances contrary to EPA landfill criteria should not be granted and other actions should be suspended until the proposed task force has had time to examine open dumping in general and to explore alternatives. The variance request on behalf of Seaside and Cannon Beach (Clatsop County) is unique and is proposed to be acted on at this meeting (see Agenda Item No. L).

The Department is notifying all sites listed on the open dump inventory plus any others that may be violating federal sanitary landfill criteria, of the current applicability of federal law to their activities.

EQC Agenda Item No. K
September 14, 1984
Page 5

Director's Recommendation

It is the Director's recommendation that the Commission concur with the course of action outlined above by the Department.



Fred Hansen

Robert L. Brown:c
229-5157
August 22, 1984
SC1713



Environmental Quality Commission

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MEMORANDUM

To: Environmental Quality Commission
From: Director
Subject: Agenda Item No. D, January 25, 1985, EQC Meeting

Request for Authorization to Conduct a Public Hearing on Proposed Amendments to Solid Waste Rules Relating to Open Burning of Solid Waste at Disposal Sites (OAR 340-61-015 and 340-61-040(2))

Background

At the September 14, 1984, EQC meeting, an informational report on the "Status of Open Burning Disposal Sites" was presented (Agenda Item No. K, attached). The report proposed a course of action to examine the following open burning issues through a Department interdivisional task force:

1. Air quality impacts of open burning.
2. Groundwater impacts from disposal at site.
3. Identification of those sites which need upgrading to sanitary landfill operating standards.
4. Identification of sites which should be closed.
5. Identification of sites where open burning is the most environmentally suitable solid waste disposal option.

The EQC accepted the above course of action.

Since the beginning of the Solid Waste Program, it has been the EQC's position that open burning of solid waste is not an acceptable practice. Burning at disposal sites has been phased out at all but small rural disposal sites.

A task force of twelve Department staff identified and evaluated the above and wrote a detailed report. The report is attached (Attachment II).

One of the recommendations of the task force was that the solid waste rules relating to open burning at disposal sites be clarified and modified to clearly reflect whether open burning is to be allowed, and if so in what

situations and under what conditions. Proposed amendments to OAR 340, Division 61 have been prepared (Attachment VI).

Statement of Need and Fiscal Impact (Attachment III), Notice of Public Hearing (Attachment IV) and Land Use Consistency (Attachment V) are attached.

Alternatives and Evaluations

The task force members prepared environmental profiles for each of the landfills presently open burning solid waste and developed the following criteria to rate acceptability of open burning at a particular site:

1. Air quality impacts: As measured by potential health hazard and nuisance complaints.
2. Proximity to people: Open burning should not be allowed within city or urban growth boundary or where it would impact nearby residents.
3. Climate: Open burning should not be allowed in wet climate because garbage gets too wet to burn quickly and smolders. Wet/dry generally corresponds to east or west of the Cascades. Prevailing wind direction should be away from nearby residents and urban growth boundary.
4. Size: This criteria relates to economics of alternative disposal methods as measured by people and/or volumes of waste. The task force considered 450 persons within a dump service area to be necessary for adequate fee generation.
5. Composition of wastes: Hazardous or substantial industrial waste was considered unsuitable for an open burning dump.
6. Cost for upgrade: Task force believes costs in excess of \$10/month to the household would be excessive.
7. Poorly sited existing site: Sites should be relocated if they cause other problems such as groundwater contamination or complaint letters, or are subject to washout by surface water, etc.

The criteria 1 through 5 are proposed to be added to the rule to delineate those sites where open burning of domestic solid waste could continue (OAR 340-61-040(2)(b)(A-E)).

Operating conditions were also developed for those sites where open burning might be allowed. Operating conditions require:

1. Controlled access.
2. An attendant on duty during open hours and while burning.
3. Limit burning to two times per week when the site is closed.
4. Fire permit from local fire agency.
5. Burial of ash at least two times per year.

The operating conditions are included in the rule amendment (OAR 340-61-040(2)(c)(A-F)).

The task force did not make a final conclusion on whether open burning should be allowed, but developed two options with the condition that open burning of solid waste should not be allowed west of the Cascade Mountains.

If criteria developed to determine if sites should be allowed to continue open burning were applied, the two western Oregon sites now open burning solid waste would be forced to close (Powers and Butte Falls).

The first option is that open burning is an acceptable disposal practice in those rural areas that meet the criteria and under specified operating conditions. Justification for this option is as follows:

1. In certain areas and under specified operating conditions, it appears open burning does not create significant air quality impacts.
2. Open burning sites require smaller land area than do landfills and the lifespan of a given site can be longer.
3. Open burning operations require less equipment than landfills.
4. Open burning reduces long-term pollution liability at the site, as compared to a sanitary landfill. A significant amount of organics are removed by burning. (High concentrations of organics are found in landfill leachate.)
5. Open burning reduces closure costs to the extent that less land area and material are involved.
6. Open burning reduces potential for groundwater impacts.

7. Frozen ground does not impede disposal at an open burning site. It can at a landfill.

Federal law authorizes citizen suits to curtail violations of RCRA and its rules. In a citizen suit, closure appears to be the only available remedy in federal proceedings. Under RCRA, the state has exposure for citizen suit liability only if it receives federal funding for non-hazardous solid waste activities. Oregon does not receive such funding. RCRA does not affect other established bases of civil liability for damages.

RCRA reauthorization recently passed by Congress has authorization for solid waste funding for states. It is too early to determine what dollar level if any will actually be appropriated. It is also legal counsel's opinion that should the state apply for federal funding that the Department would be required to enforce federal criteria and stop all open burning. RCRA reauthorization also requires EPA to redraft criteria guidelines by March 31, 1988 for facilities that receive hazardous household waste. If a state lacks a program to implement the revised criteria, EPA is authorized to enforce the open dump ban. There is a slight possibility that western states may be successful in lobbying EPA to change the air criteria to allow for some open burning at disposal sites.

The other option is to stop open burning at all disposal sites. This would eliminate all air emissions, be safer and cause less fire hazard and in at least some cases lead to more acceptable environmental alternatives.

There is concern that if all open burning is stopped, some local governments may abandon their disposal operation. Presumably, this could greatly increase the amount of illegal dumping on federal, state and private lands.

Because of the negligible environmental impact that would be caused by allowing controlled open burning at small, rural disposal sites, the Department is supportive of allowing open burning to continue. Because of possible changes in federal criteria and law within three years, any site operator allowed to continue open burning should be notified that the rules may be subject to change. Although the task force recommendation was for long-term burning, it may only be a short-range option.

The rule as drafted would allow those sites that meet the criteria to continue to open burn. Of the twenty-five sites that presently burn, nine would be required to stop open burning. These sites are Butte Falls, Powers, Christmas Valley, Paisley, Silver Lake, Halfway, Huntington, Jordan Valley, and Fossil. They are all larger sites and include the two western Oregon sites. Even though open burning would be allowed at some sites, upgrading would occur because of the operating conditions that are also included in the rule. Burning would be reduced to a maximum of two times per week only when the site was closed to the public.

Summation

1. At the September 14, 1984 EQC meeting, the Commission approved a course of action to examine the problem and develop policy regarding open burning of solid waste at disposal sites.
 2. A task force composed of Department staff recommended that the rules regarding open burning be clarified and/or modified. Criteria were developed to evaluate whether sites should be closed, upgraded or allowed to continue to burn. The rule is designed to establish this criteria.
 3. Recommendation was made that the rule reflect whether open burning is to be allowed.
 4. The task force made the following recommendations regarding continuation of open burning.
 - o That no burning be allowed west of the Cascade Mountains.
 - o That in eastern Oregon:
 - Allow continued open burning at rural landfills subject to strict operating criteria.
- or-
- To phase out all open burning.
5. Legal opinion is that the state is not presently subject to legal remedy for allowing continued open burning. However, the site operator is subject to citizen suit in federal court for closure.
 6. RCRA reauthorization requires EPA to rewrite the landfill criteria by March 31, 1988 and allows EPA to enforce if states are not able.
 7. Because of the negligible environmental impact associated with open burning of solid waste at small rural landfills and the possibility that local governments would abandon any form of disposal, the Department is recommending that open burning is an acceptable disposal practice in certain situations.
 8. Under the proposed rule, nine of the twenty-five sites presently open burning solid waste would be required to upgrade to landfill or close.

EQC Agenda Item No. D
January 25, 1985
Page 6

Director's Recommendation

Based upon the Summation, it is recommended that the Commission authorize public hearings to take testimony on the proposed amendments to rules for open burning of solid waste at disposal sites (OAR 340-61-015 and OAR 340-61-040(2)).



Fred Hansen

Attachments: I Agenda Item K, 9-14-84 EQC Meeting
 II Task Force Report
 III Statement of Need for Rulemaking
 IV Notice of Public Hearing
 V Land Use Consistency
 VI Draft Rule

Robert L. Brown:b
229-5157
December 27, 1984
SB4117

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION
OF THE STATE OF OREGON

In the Matter of Modification of)	Statutory Authority,
Solid Waste in General Rules)	Statement of Need, Principal
Relating to Open Burning of Solid)	Documents Relied Upon, and
Waste at Disposal Sites (OAR)	Statement of Fiscal Impact
340-61-015 and OAR 340-61-040(2)))	

Statement of Need for Rulemaking

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

1. Legal Authority

Oregon Revised Statutes Chapter 459. Specifically ORS 459.045.

2. Need for Rule

Amendments to the existing rule are necessary to specify specific operating conditions and for clarification.

3. Principal Documents Relied Upon in this Rulemaking

- a. Agenda Item No. K, September 14, 1984, EQC Meeting.
- b. "Task Force Report on Open Dumps, Department of Environmental Quality, Portland, Oregon, October 25, 1984."
- c. Public Law 94-580 (Resource Conservation and Recovery Act, 1976) as amended.

Fiscal and Economic Impact

This action will have fiscal impact on operators of disposal sites which currently open burn solid waste. Increased cost of disposal site operation may secondarily impact customers of the disposal site including small business. There is no other direct impact on small business.

Attachment V
Agenda Item No. 5
1/31/86 EQC Meeting

Before the Environmental Quality Commission
of the State of Oregon

In the Matter of Modification of) Land Use Consistency
Solid Waste in General Rules Relating)
to Open Burning of Solid Waste at)
Disposal Sites (OAR 340-61-015 and)
OAR 340-61-040(2))

This proposed rule does not conflict with land use planning goals. The rule is consistent with Goal 6 in that it does not degrade air or water quality. The rule is also consistent with Goal 11 in that it provides for continued disposal of solid waste in rural areas.

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

It is requested that local, state, and federal agencies review the proposed action and comment on possible conflicts with their programs affecting land use and with Statewide Planning Goals within their expertise and jurisdiction.

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

After public hearing, the Commission may adopt the proposed modification identical to that proposed, adopt a modified rule or decline to take action. The Commission's deliberation should come in April 1985 as part of the agenda of a regularly scheduled Commission meeting.

RLB:b
SB4117.5

Department's Response to Public Comments

The following is a summary of comments received in response to proposed amendments to Administrative Rules for Solid Waste Management (OAR 340-61) and the Department's response to those comments:

Comment: The commenters felt that the population served figure of 450 as a cut off from open burning was too low and should be raised (OAR 340-61-040(2)(6)(b)(D)).

Response: The figure of 450 was established by a Department Task Force as a reasonable cut off point. There are only nine disposal sites above the 450 figure at which solid waste is presently burned. To give a blanket approval for open burning at sites over this figure would encourage other operators now properly landfilling to revert to open burning. Therefore this subsection has not been changed.

Comment: At two public hearings there was objection to the operational criteria requiring access control and an attendant on duty while the site is open. The sites must be open every day and an attendant is not economically feasible.

Response: At many rural disposal sites the operational criteria proposed in the rule are already in place. Sites are operated one or two days a week and a small fee is charged to defray the cost of the attendant. With access control an attendant can control the location of solid waste placement so when the solid waste is burned a greater percentage is consumed and the fire burns hotter and for a shorter period of time. The burning can also take place while the site is closed so there is no public exposure. The Department believes that some control should be exercised at a disposal site to keep objectional items from being burned (hazardous waste, etc.). Only nine of the twenty-five sites presently open burning garbage do not have some form of access control or attendants on duty while the site is open. Therefore the rule has not been changed.

Comment: Objection to the operational criteria requiring ash covering at least twice a year (OAR 340-61-040(2)(c)(E). (Only Lake County.)

Response: The Department believes that at least a minimum amount of maintenance is necessary at even the smallest disposal site. It is considered that routine ash burial and policing of the site is necessary at least twice a year. Cost for this maintenance is minimal and should be required. The rule has not been changed.

Comment: Operators of disposal sites which open burn solid waste should be required to demonstrate a need. Union County has an efficient disposal system and does not open burn at any site. Three transfer stations are in place and operation is not costly, but it is cheaper to burn if allowed. Under the rules as proposed, the three cities with transfer stations could revert to the practice of open burning of solid waste.

Response: The Department agrees with the statement. Open burning of solid waste should be allowed only at those disposal sites where the operators can demonstrate a need and that burning is the only alternative available for solid waste disposal. The Department is therefore recommending to the EQC that the proposed rules not be adopted and that evaluation of each site be made through use of the variance procedure.

Comment: The City of Powers disposal site is a unique case. The site is located a long distance from the next closest site; the city is in a depressed economy; excessive cost for disposal if long haul is required; upgrading of the Powers Disposal Site has improved the roadside dumping problem; the site is now properly maintained; and because of the location of the site there is little or no environmental impact.

Response: The Department agrees that the City of Powers may present a unique problem. However, the Department believes that unique problems associated with one facility are better handled by variance procedures and not by rule adoption.

Sites which could practice open burning of solid waste if proposed rules are adopted:

Population Under 450 (22)

<u>County</u>	<u>Site Name</u>
Harney	Andrews
Harney	Crane
Harney	Diamond
Harney	Drewsey
Harney	Fields
Harney	Frenchglen
Harney	Lawen
Harney	Riley
Harney	Sodhouse
Klamath	Beatty
Klamath	Bly
Klamath	Bonanza T.S.
Klamath	Chemult
Klamath	Crescent
Klamath	Langell Valley
Malheur	Adrian
Malheur	Brogan-Jamieson
Union	North Powder T.S.
Wallowa	Lostine Drop Box
Wasco	Antelope
Wasco	Shaniko
Wheeler	Spray

Population from 450 to 1,000 (9)

Gilliam	South Gilliam County (Condon)
Grant	Prairie City
Klamath	Chiloquin
Klamath	Malin
Klamath	Merrill
Klamath	Sprague River
Malheur	Willowcreek
Wallowa	Joseph Drop Box
Wallowa	Wallowa T.S.

POLICY

340-61-015 Whereas inadequate solid waste collection, storage, transportation, recycling and disposal practices cause nuisance conditions, potential hazards to public health and safety and pollution of the air, water and land environment, it is hereby declared to be the policy of the Department of Environmental Quality to require effective and efficient solid waste collection and disposal service to both rural and urban areas and to promote and support comprehensive county or regional solid waste management planning, utilizing progressive solid waste management techniques, emphasizing recovery and reuse of solid wastes and insuring highest and best practicable protection of the public health and welfare and air, water and land resources. Open burning of solid waste is generally an environmentally unacceptable method of solid waste disposal and will be allowed only if there is very low risk of adverse environmental impact and the criteria established in these rules have been met. In keeping with the Oregon policy to retain primary responsibility for management of adequate solid waste programs with local government units (ORS 459.015) and the Environmental Quality Commission's perception of Legislative intent under Chapter 773, Oregon Laws 1979, the Commission will look for, and expect, the maximum participation of local government in the planning, siting, development and operation of needed landfills. It is expected that local government will have carried out a good faith effort in landfill siting, including but not limited to public participation and Department assistance, before requesting the Department to site the

landfill. Local government will be expected to assume or provide for responsibility in the ownership and operation of any Department/Commission sited landfill under anything but an extraordinary circumstance.

SPECIAL RULES PERTAINING TO LANDFILLS

340-61-040 (1) Plan Design Requirements. Unless an exemption has been granted under section 340-61-025(4), in addition to the requirements of rule 340-61-025, detailed plans and specifications for landfills shall include but not be limited to:

(a) Topographic maps which show natural features of the site; the location and design of all pertinent existing and proposed structures, such as berms, dikes, surface drainage control devices, access and on-site roads, water and waste water facilities, gas control devices, monitoring wells, fences, utilities, maintenance facilities, shelter and buildings; legal boundaries and property lines, and existing contours and projected finish grades. Unless otherwise approved by the Department, the scale of the plan drawings shall be no greater than one inch equals 200 feet, with contour intervals not to exceed five feet. Horizontal and vertical controls shall be established and tied to an established bench mark located on or near the site. Where the Department deems it essential to ensure compliance with these rules, the bench mark shall be referenced to the Oregon State Plane Co-ordinate System, Lambert Projection.

(b) A minimum of two perpendicular cross section drawings through the landfill. Each cross section shall illustrate existing grade, excavation grade, proposed final grade, any additions for groundwater protection, water table profile and soil profile. Additional cross sections shall be provided as necessary to adequately depict underlying soils, geology and

landfill contours, and to display the design of environmental protection devices or structures.

(c) A description of the design assumptions and methods used to forecast flows and to determine the sizing of pumps, pipes, ditches, culverts and other hydraulic equipment used for the collection, treatment and disposal of leachate and for the control of surface drainage.

(d) A detailed operational plan and timetable which describes the proposed method of operation and progressive development of trenches and/or landfill lifts or cells. Said plan shall include a description of the types and quantities of waste materials that will be received (estimated maximum daily and average annual quantities); methods of waste unloading, placement, compaction and covering; areas and/or procedures to be used for disposal of waste materials during inclement weather; types and weights of equipment to be used for site operation; detailed description of any salvaging or resource recovery operations to take place at the facility; such measures for the collection, containment, treatment or disposal of leachate as may be required; provisions for managing surface drainage; and measures to be used for the control of fire, dust, decomposition gases, birds, disease vectors, scavenging, access, flooding, erosion, and blowing debris, as pertinent.

(2) Open Burning.

No person shall conduct the open burning of solid waste at a landfill, except [in accordance with plans approved and permits issued by the Department prior to such burning.] as provided for in this section.

(a) The Department may authorize the open burning of tree stumps and limbs, brush, timbers, lumber and other wood waste, except that open burning of industrial wood waste is prohibited.

(b) The Department may authorize only those disposal sites that meet the following criteria to open burn domestic solid waste:

(A) There is minimal air quality impact.

(B) The disposal site shall be located outside city or urban growth boundaries and in a location where there is little impact on nearby residents.

(C) The disposal site shall be located in a dry climate with average yearly rainfall of less than 25 inches.

(D) The total population served shall be less than 450 persons.

(E) The disposal site shall not accept hazardous wastes or burn industrial waste.

(c) At a minimum, any operator of a disposal site which meets the criteria listed in 340-61-040(2)(b) and desires to open burn domestic solid waste must meet the following conditions:

(A) Access must be controlled to restrict unauthorized entry.

(B) There must be an attendant on duty during open hours and during burning operation.

(C) Burning must take place no more than two times per week when the site is closed to public access and in some type of containment area such as a trench. Fire must be extinguished before dark.

(D) If there is a local fire protection agency, then the operator must have a valid permit from that agency.

(E) Disposal site must be maintained by burying ash at least two times per year unless as specified in the permit.

(3) Leachate. Any person designing, constructing, or operating a landfill shall ensure that leachate production is minimized. Where required by the Department, leachate shall be collected and treated or otherwise controlled in a manner approved by the Department.

(4) Groundwater:

(a) Each landfill permittee shall ensure that:

(A) The introduction of any substance from the landfill into an underground drinking water source does not result in a violation of any applicable federal or state drinking water rules or regulations beyond the solid waste boundary of the landfill or an alternative boundary specified by the Department.

(B) The introduction of any substance from the landfill into an aquifer does not impair the aquifer's recognized beneficial uses, beyond the solid waste boundary of the landfill or an alternative boundary specified by the Department, consistent with the Commission's adopted Groundwater Quality Protection Policy and any applicable federal or state rules or regulations.

(b) Where monitoring is required, monitoring wells shall be placed between the solid waste boundary and the property line if adequate room exists.

(c) The Department may specify an alternative boundary based on a consideration of all of the following factors:

(A) The hydrogeological characteristics of the facility and surrounding land;

(B) The volume and physical and chemical characteristics of the leachate;

(C) The quantity and directions of flow of groundwater;

- (D) The proximity and withdrawal rates of groundwater users;
- (E) The availability of alternative drinking water supplies;
- (F) The existing quality of the groundwater including other sources of contamination and their cumulative impacts on the groundwater; and
- (G) Public health, safety, and welfare effects.

(5) Surface Water:

(a) No person shall cause a discharge of pollutants from a landfill into public waters, including wetlands, in violation of any applicable state or federal water quality rules or regulations.

(b) Each landfill permittee shall ensure that surface runoff and leachate seeps are controlled so as to minimize discharges of pollutants into public waters.

(6) Monitoring:

(a) Where the Department finds that a landfill's location and geophysical conditions indicate that there is a reasonable probability of potential adverse effects on public health or the environment, the Department may require a permittee to provide monitoring wells to determine the effects of the landfill on groundwater and/or on the concentration of methane gas in the soil.

(b) If the Department determines that monitoring wells are required at a landfill, the permittee shall provide and maintain the wells at the locations specified by the Department and, at the Department's request, shall submit a copy of the well logs to the Department within thirty (30) days of completion of construction.

(c) Where the Department determines that self-monitoring is practicable, the Department may require that the permittee collect and analyze samples of surface water, groundwater and/or gas, at intervals

specified and in a manner approved by the Department, and submit the results within a time frame specified by the Department.

(d) The Department may require permittees who do self-monitoring to periodically split samples with the Department for the purpose of quality control.

(7) Endangered Species. No person shall establish, operate, expand or modify a landfill in a manner that will cause or contribute to the actual or attempted:

(a) Harassing, harming, pursuing, hunting, wounding, killing, trapping, capturing or collecting of any endangered or threatened species of plants, fish, or wildlife.

(b) Direct or indirect alteration of critical habitat which appreciably diminishes the likelihood of the survival and recovery of threatened or endangered species using that habitat.

(8) Gas Control. No person shall establish, operate, expand or modify a landfill such that:

(a) The concentration of methane (CH_4) gas at the landfill exceeds twenty-five (25) percent of its lower explosive limit in facility structures (excluding gas control or gas recovery system components) or its lower explosive limit at the property boundary.

(b) Malodorous decomposition gases become a public nuisance.

(9) Surface Drainage Control. Each permittee shall ensure that:

(a) The landfill is designed, constructed and maintained so that drainage will be diverted around or away from active and completed operational areas.

(b) The surface contours of the landfill are maintained such that ponding of surface water is minimized.

(10) Floodplains. No permittee of a landfill located in a floodplain shall allow the facility to restrict the flow of the base flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human life, wildlife or land or water resources.

(11) Cover Material. Each permittee shall provide adequate quantities of cover material of a type approved by the Department for the covering of deposited solid waste at a landfill in accordance with the approved operational plan, permit conditions and these rules.

(12) Cover Frequency. Each permittee shall place a compacted layer of at least six inches of approved cover material over the compacted wastes in a landfill at intervals specified in the permit. In setting a requirement for cover frequency, the Department may consider such factors as the volume and types of waste received, hydrogeologic setting of the facility, climate, proximity of residences or other occupied buildings, site screening, availability of equipment and cover material, any past operational problems and any other relevant factor.

(13) Access Roads. Each permittee shall ensure that roads from the landfill property line to the active operational area and roads within the operational area are constructed and maintained so as to minimize traffic hazards, dust and mud and to provide reasonable all-weather access for vehicles using the site.

(14) Access Control. Each permittee shall insure that the landfill has a perimeter barrier or topographic constraints adequate to restrict unauthorized entry.

(15) Site Screening. To the extent practicable, each permittee shall screen the active landfill area from public view by trees, shrubbery, fence, stockpiled cover material, earthen berm, or other appropriate means.

(16) Fire Protection:

(a) Each landfill permittee shall make arrangements with the local fire control agency to immediately acquire their services when needed and shall provide adequate on-site fire protection as determined by the local fire control agency.

(b) In case of accidental fires at the site, the operator shall be responsible for initiating and continuing appropriate fire-fighting methods until all smoldering, smoking and burning ceases.

(c) No operator shall permit the dumping of combustible materials within the immediate vicinity of any smoldering, smoking or burning conditions at a landfill, or allow dumping activities to interfere with fire-fighting efforts.

(17) Special Handling. Large dead animals, sewage sludges, septic tank pumpings, hospital wastes and other materials which may be hazardous or difficult to manage, shall not be deposited at a disposal site unless special provisions for such disposal are included in the operational plan or otherwise approved by the Department.

(18) Signs. Each permittee of a landfill open to the public shall post a clearly visible and legible sign or signs at the entrance to the disposal site specifying the name of the facility, the hours and days the site is open to the public, an emergency phone number and listing the general types of materials which either will be accepted or will not be accepted.

(19) Truck Washing Facilities. Each permittee shall ensure that any truck washing areas at a landfill are hard surfaced and that any on-site disposal of wash waters is accomplished in a manner approved by the Department.

(20) Sewage Disposal. Each landfill permittee shall ensure that any on-site disposal of sewage is accomplished in a manner approved by the Department.

(21) Salvage:

(a) A permittee may conduct or allow the recovery of materials such as metal, paper and glass from the landfill only when such recovery is conducted in a planned and controlled manner approved by the Department.

(b) No person may salvage food products, hazardous materials or furniture and bedding with concealed filling from a landfill.

(22) Litter:

(a) Each permittee shall ensure that effective measures such as compaction, the periodic application of cover material or the use of portable fencing or other devices are taken to minimize the blowing of litter from the active working area of the landfill.

(b) Each landfill operator shall collect windblown materials from the disposal site and adjacent property and properly dispose of same at sufficient frequency to prevent aesthetically objectionable accumulations.

(23) Vector and Bird Control:

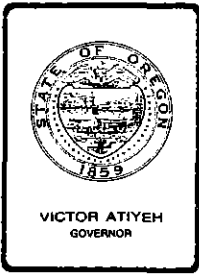
(a) Each permittee shall ensure that effective means such as the periodic application of earth cover material or other techniques as appropriate are taken at the landfill to control or prevent the

propagation, harborage, or attraction of flies, rodents, or other vectors and to minimize bird attraction.

(b) No permittee of a landfill disposing of putrescible wastes that may attract birds and which is located within 10,000 feet (3,048 meters) of any airport runway used by turbojet aircraft or within 5,000 feet (1,524 meters) of any airport used by only piston-type aircraft shall allow the operation of the landfill to increase the likelihood of bird/aircraft collisions.

(24) Weighing. The Department may require that landfill permittees provide scales and weigh incoming loads of solid waste, to facilitate solid waste management planning and decision making.

(25) Records. The Department may require records and reports it considers reasonably necessary to ensure compliance with conditions of a permit or these rules.



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: James L. Vilendre, Hearing Officer

Subject: Report on Public Hearing Held March 7, 1985, Concerning Amendments to Solid Waste Rules Requiring Specified Operating Conditions for Open Burning of Solid Waste

Summary of Procedure

Pursuant to public notice, a public hearing was convened in Room 1400, 522 S.W. Fifth, Portland, at 10:00 a.m., March 7, 1985. The purpose of the hearing was to receive testimony concerning proposed amendments to rules for open burning of solid waste. Five people attended the hearing and none testified.

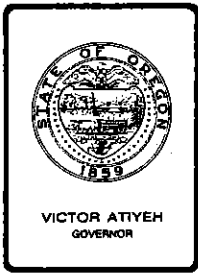
Summary of Verbal Testimony

No verbal testimony was presented.

Summary of Written Testimony

The press release published in the Portland area papers indicated that testimony would be taken regarding "open burning of solid waste." Seventeen letters were received, all asking to be allowed to open burn yard debris. A letter clarifying the reason for the hearing was sent to the authors, and they were also provided with hardship applications. No written testimony relating to the rules was received.

Robert L. Brown:b
229-6237
May 15, 1985
SB4679



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Robert L. Brown, Hearing Officer

Subject: Report on Public Hearing Held March 11, 1985, Concerning Amendments to Solid Waste Rules Requiring Specified Operating Conditions for Open Burning of Solid Waste

Summary of Procedures

Pursuant to public notice, a public hearing was convened in the Malheur County Courthouse, Attorneys' Lounge, at 3:00 p.m., March 11, 1985. The purpose of the hearing was to receive testimony concerning proposed amendments to rules for open burning of solid waste. Five people attended the hearing and one testified.

Summary of Verbal Testimony

J. Bruce Sarazin, representing Malheur County, submitted verbal testimony. The testimony related to the proposed OAR 340-61-040(2)(b)(D), "The total population served shall be less than 450 persons." He indicated that Jordan Valley had 460 persons and that cost to operate a landfill was prohibitive. No county equipment was available. To rent a piece of equipment costs \$100 per hour or approximately \$10,000 per year. The city of Jordan Valley's entire budget is about \$10,000 per year.

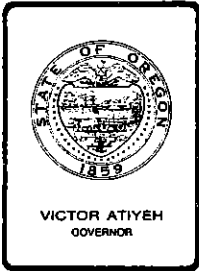
He recommended the number be increased from 450 to 600 to 700.

The county agrees with the proposed operational criteria in OAR 340-61-040(2)(c).

Written Testimony

No written testimony was received.

RLB:b
SB4595



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Robert L. Brown, Hearing Officer

Subject: Report on Public Hearing Held March 12, 1985, Concerning Amendments to Solid Waste Rules Requiring Specified Operating Conditions for Open Burning of Solid Waste

Summary of Procedures

Pursuant to public notice, a public hearing was convened in the Baker County Courthouse, Commissioners' Hearing Room at 10:00 a.m., March 12, 1985. The purpose of the hearing was to receive testimony concerning proposed amendments to rules for open burning of solid waste. Twenty people attended the hearing and three testified.

Summary of Verbal Testimony

Larry Smith, Baker County Judge, representing Baker County, submitted verbal testimony. Baker County does not need DEQ RULES. If residents can't meet the requirements, they will go their own route. Need a workable scheme that everyone can afford.

Four hundred fifty (450) population and 25" of rainfall are arbitrary. Huntington and Halfway are on the borderline of the 450 population. There is no environmental impact from these sites. County and cities' population is decreasing not increasing. County agrees with operational criteria in OAR 340-61-040(2)(c).

Ron Larvic, Union County Solid Waste Advisory Committee, gave verbal testimony. Union County has been served in the past by one landfill and three open burning dumps. Open burning dumps have been replaced with transfer stations. New rules would allow regression to open burning dumps. Suggested that no new site be allowed to open burn and that a site must prove there is no other practical or economical alternative available. He indicated that material from North Powder (city has a transfer station) was being hauled to Haines dump and open burned. This was jeopardizing continued operation of the North Powder transfer station.

Mike O'Rourke, Wallowa County Commissioner, gave verbal testimony. Two Wallowa County sites, Troy and Imnaha presently open burn. They would like to continue. Both sites have gates and are well maintained.

Written Testimony

Written testimony was received from LaRue Sanitary Service, Halfway, expressing opposition to the 450 population served figure in the criteria. They expressed the opinion that the figure should be increased to at least 900 to 1,000 people.

RLB:b
SB4596

LaRue Sanitary Service
Rt.1, Box 155
Halfway, Oregon 97834

March 25, 1985

Dept. of Environmental Quality
522 S.W. Fifth Ave.
Box 1760
Portland, Oregon 97207

RECEIVED
MARCH 25 1985
WATER QUALITY CONTROL

Dear Sirs,

After attending the hearing held in Baker on March 12, 1985, at which only one or two people were prepared to testify due to the fact that no one in this area had received the proposed plan until everyone was at the meeting. We felt this unfair to the people in this area.

As we are the Franchise holder with the City of Halfway to operate the Landfill in the area we feel it is unjust to this area to try to serve only 450 people. Our area is so scattered out that we think this figure should be increased to serve at least 900 to 1000 people. I think the City of Halfway has approximately 350 to 380 people.

The Landfill is located about 5/ 5 $\frac{1}{2}$ miles from the nearest residence or ranch and as near as we can find out our rainfall is somewhere near 20 to 22 inches per year.

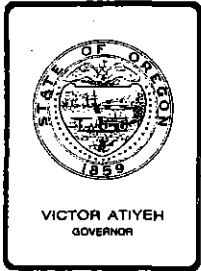
We also feel that burning at least twice a week will prolong the life of our Landfill.

We at this time request an exception to your open burning regulations.

Respectfully yours,

Lester E. LaRue
Mary B. LaRue

Lester E. & Mary B. LaRue
LaRue Sanitary Service
Rt.1, Box 155
Halfway, Oregon 97834



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Robert L. Brown, Hearing Officer

Subject: Report on Public Hearing Held March 13, 1985, Concerning Amendments to Solid Waste Rules Requiring Specified Operating Conditions for Open Burning of Solid Waste

Summary of Procedures

Pursuant to public notice, a public hearing was convened in the Grant County Courthouse, Courthouse Conference Room at 10:00 a.m., March 13, 1985. The purpose of the hearing was to receive testimony concerning proposed amendments to rules for open burning of solid waste. Four people attended the hearing, and one testified.

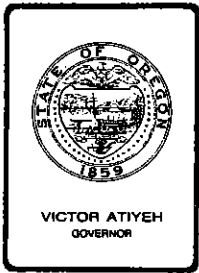
Summary of Verbal Testimony

Gayle Engle, Mayor of Monument, gave verbal testimony. City can close site to burn, other than that site must be open 24 hours a day seven days a week or illegal dumping will occur. The city cannot afford an attendant on-site while open.

Written Testimony

No written testimony was received.

RLB:b
SB4589



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

TO: Environmental Quality Commission

FROM: Robert L. Brown, Hearing Officer

SUBJECT: Report on Public Hearing Held March 14, 1985. Concerning Amendments to Solid Waste Rules Requiring Specified Operating Conditions for Open Burning of Solid Waste

Summary of Procedures

Pursuant to public notice, a public hearing was convened in the Lake County Courthouse, Commissioners' Courtroom at 10:00 a.m., March 14, 1985. The purpose of the hearing was to receive testimony concerning proposed amendments to rules for open burning of solid waste. Six people attended the hearing, and three testified.

Summary of Verbal Testimony

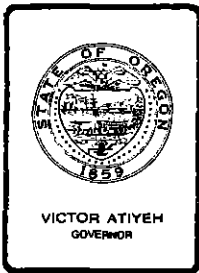
Louis (Bud) Lamb, Lake County Commissioner, gave verbal testimony. Objections were raised to OAR 340-61-040(2)(b)(D) in population served. He recommended that population served be raised from 450 to 550. Controlling access is not economical.

George Carlon, Lake County Commissioner, gave verbal testimony. Increase population served to 550 for a cut off. Objects to operational criteria A-B and E. (Controlled access, attendant on-site while open burning and burying ash at least twice per year.)

Arthur Sheer, Lake County Commissioner, gave verbal testimony. He agreed with above testimony.

Entire county commission went on record as opposing (c)(A)(B) and (E). Have track record of good operation. Controlled access has not been a problem at Lake County sites.

Robert L. Brown:b
229-6237
April 9, 1985
SB4515



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: James L. Vilendre, Hearing Officer

Subject: Report on Public Hearing Held March 12, 1985. Concerning Amendments to Solid Waste Rules Requiring Specified Operating Conditions for Open Burning of Solid Waste

Summary of Procedures

Pursuant to public notice, a public hearing was convened in the City of Coquille Commissioner's Chambers at 2:00 p.m., March 12, 1985. The purpose of the hearing was to receive testimony concerning proposed amendments to rules for open burning of solid waste. Eleven people attended the hearing and two of them testified.

Summary of Verbal Testimony

Leo Grandmontagne, representing the City of Powers, submitted verbal and written testimony. The written testimony is attached. Mr. Grandmontagne's verbal testimony was rather lengthy and expressed very strong support for not closing the Powers open burning solid waste site. Mr. Grandmontagne stressed an unreasonable financial burden on the already depressed economy if garbage had to be trucked in excess of 83 miles round trip to the Beaverhill disposal site. He stated that 44% of Powers' residents are retired senior citizens living on fixed incomes, 14.5% are at low income and 14.5% are unemployed -- only 27% are employed (or self-employed). The cost of garbage disposal would increase 175% from \$4.50 to \$8.00 - \$10.00 per month. He stated that the citizens of Powers cannot afford this. In closing, he said the City of Powers has proven they can do the job of maintaining a clean city garbage site and that he knows of no citizen complaints. Therefore, he asks that a five year variance be granted for continued operation.

Richard G. Lemery, representing the Coos County Solid Waste Committee, submitted verbal and written testimony. The written testimony is attached. Mr. Lemery's testimony also was in strong support of continued operation of the existing Powers solid waste site. He listed five reasons the site should remain open:

1. There has been no roadside dumping since mandatory garbage pickup was initiated.

2. An estimated 30-40% of the residents are senior citizens or unemployed. Economy in the community is depressed. A garbage rate increase would cause an unreasonable hardship.
3. Since City takeover of the dump, the site has been properly maintained in full cooperation with DEQ officials.
4. The location of the site away from town reduces any significant air pollution impact. The lack of complaints indicates good management with only about 40 cubic yards of garbage burned each month.
5. Lack of cover material at the site makes landfilling unfeasible. A transfer station would be expensive to construct and maintain, with added costs of transporting and sorting the waste.

Summary of Written Testimony

Written testimony from Mr. Grandmontagne and Mr. Lemery is summarized above and is attached. Mr. Grandmontagne also submitted photographs of promiscuous dumping problems that occurred in the Powers area before the City instituted mandatory garbage collection and took over operation of the disposal site. These photographs are on file in the Hazardous and Solid Waste Division.

In addition, Mr. Grandmontagne submitted letters of support (copies attached) from the following people:

1. Mable J. Shorb, Mayor of the City of Powers
2. Carole E. Smith, City Recorder of the City of Powers
3. B. E. Brown, District Maintenance Supervisor, State Highway Div.
4. John D. Berry, District Manager, Siskiyou National Forest
5. Walt Schroeder, State Representative
6. Forbes Fergus, President, Powers Chamber of Commerce
7. Sandra Diedrich, Director, Coos-Curry Council of Governments
8. Doc Stevenson, Jack L. Beebe, Sr., Robert A. Emmett, Coos County Board of Commissioners

Written testimony was also received from Senator Bill Bradbury and Howard Leatherman. Senator Bradbury expressed strong opposition to the proposed rules with specific concern for the Powers Disposal Site. The site would be closed for not meeting two of the proposed criteria (under 25" rainfall and over 450 population). Powers is a small isolated community over 50 miles from the nearest disposal site. If the site is closed, there would be a significant increase in illegal dumping.

Hearing Officer's Report
June 7, 1985
Page 3

Howard Leatherman indicated support for continued open burning at Powers Disposal Site. He owns 2400 acres on the northwest side of the site and is not bothered by the smoke.

Attachments

James Vilendre:c
SC2122
229-5549
May 15, 1985

On January 20th, 1984 the Common Council of the City of Powers decided that they could operate the City garbage dump at a fee people could afford. This decision came after several special Council Meetings and Public Hearings were held.

As we stated in our letter of February 20, 1984 (Ex. # 1), we have a problem of public dumping along our County, State and Forest Service roadways. We believed our plan could put a halt to this.

We have done everything that we stated we would do in our letter of January 20, 1984 (Ex. # 2) outlining operation and maintenance of the dump.

You have a copy of the letter that we have received from the State Highway Department (Ex. # 3) (read letter), also the letter from the United States Forest Service (Ex. #4. read letter). In the past not only household garbage was being dumped along the roadsides, but old refridgerators, electric stoves, hot water tanks, etc. were also being dumped (Ex. #5-picture of white goods) In the last 11 months alone, we have had 72 peices of white goods taken to our City dump site.

If our dump is closed, (Ex. # 6 - news paper picture) this picture will look like a picnic area compared to our roadsides. We have at least four well known dump areas in the vicinity that were used regularly, as well as random roadside dumping, prior to our taking over the garbage service (Ex. #7-picture). These pictures show no new noticable dumping since the City took over the garbage service.

Convicting a person of dumping trash is difficult, as quoted by Detective Sergeant Steve Dalton of the Coos County Sheriff's Office (Refer to Ex. #6-news paper article.)

Even if the City could afford to haul the household garbage to Beaverhill, there would need to be a place to dispose of white goods and metal goods. For the City to keep and maintain a garbage dump for these items at the existing rent, labor and maintenance is out of the question. If our dump is closed; State, County and U.S. Forest Service roads will again become unsightly garbage dumps that we do not have any control over.

Burning at the dump site is continuous on days the garbage is dumped. It is estimated that the City dump site burns approximately 480 cubic yards of trash per year, which equals 72 tons. This seems like an awfully small amount when compared to the U.S. Forest Service who burn in excess of 11,000. tons of slash a year and this doesn't include the amount of slash B.L.M. and other private timber company's burn.

(Ex. #8-recap houses) We made a recap of households of Powers on February 23,

1985. You will note that we have 248 individual houses on the tax lots. Of the 248; 96 are occupied by Senior Citizens, 55 are occupied by low income, and 40 are occupied by unemployed people. On a percentage basis we are looking at 39% Senior Citizens, 14% low income and 16% unemployed. This leaves 77 homes occupied by the employed, or 31% of the individual houses on the tax lots - and those employed include the self employed.

In addition to the 248 houses on the tax lots, we also have 15 households in trailer courts and apartments and 23 households in the Senior Citizen Housing, for a total of 286 households. 44% are Senior Citizens, 14.5% are low income and 14.5% are unemployed. This brings the total to 73%. The remaining 27% include employed and self employed. (Item D on Exhibit # 8)

Our labor force is 160 people. 49% employed, 25.5% low income and 26.5% unemployed. This isn't a very bright picture of the future and we know it, but we are trying to provide a good, well run garbage service for everyone. If the City were to consider hauling garbage to Beaverhill, the cost to our customers would increase 175% minimum, and this would be a real hardship to our citizens. This 175% does not include the disposing of the white goods and metals which we would have no control over (Refer to Ex. #5-white goods)

These would again be dumped along the roadsides.

Round trip mileage from the City limits to our City dump site is just over 2 miles. Round trip to Beaverhill is in excess of 83 miles.

The City operates on a \$77,187. tax base. The rate per \$1 000. valuation which includes City County, School District and College is \$28.58.

According to the Coos County Tax Assessor, facts published in the Myrtle Point Herald news paper dated February 15, 1955 state there is \$100,247.13 in unpaid taxes within the City limits of Powers.

Our few businesses are like businesses everywhere, they can not stand any-more expenses, or some of them will be closing their doors.

In closing, we feel we have proven that we have done the job of taking care of our roadsides and maintaining a clean City garbage site.

The City Council has promised the people that the City will not be in the garbage business if the existing garbage site is closed because of the anticipated high cost to the individual.

We therefore ask that a five year variance be granted.

City of Powers

P. O. Box 250
Powers, Oregon 97466

February 20, 1984

Ernest Schmidt
Administrator
Dept. of Environmental Quality
Box 1760
Portland, Oregon 97207

Re: Powers Dump
SW Permit No. 160
Coos County

Dear Sir:

We have the following problems:

1. Our variance is expiring June 1984
2. We have random dumping on the Forest Service and County Roads, also the State Highway.

We realize that in the past our City Franchise holder has not done the best job at keeping our open burning site properly managed. We have had him at the City Council meetings over this many times, and he would promise to take care of it, but all they turned out to be were promises. The City's franchise with Mr. Thornsberry expires on April 3, 1984, and the City proposes to take over their own operation of the site.

The City on January 6th 1984 hired equipment at the site to clean it up. We hired 500 yds of fill materials hauled in, and a cat for about 12 hours. This was done at the City's expense. We also had a gate going into the site installed, including locks. We added two large signs stating that any unauthorized dumping would be prosecuted by City Ordinance. We have our City Policemen partoling the area every few hours with orders to site anyone not obeying our sighs.

We have given several news releases to our two County Newspapers of our meetings with our intent and our actions. These news releases have solved quite a few of our problems at the site, but not along the road and highways.

We have been working closely with our DEQ Representative, Bruce Hammon of our local area. We have tried for years to find property for a land fill, but due to our terrain, there isn't any place except farm land that would have to be condemned.

We are asking you to consider an indefinite period of time, but at least a 5 year extension of our variance so that we may try our proposed plan. Our plan is that the City will mandate that all residence of the City have their garbage hauled. We feel that by doing this, no one will take their garbage out and dump it over the banks if they are paying for it to be hauled anyhow.

The City will extend for dumping privileges, our area to Gaylord, which is 8 miles to the North of us, and to the Forest Boundary which borders us only 4 miles to the South. This should minimize the dumping along the roadways also.

We are a small City with over 50% of the households being Senior Citizens, and about 10% of the others being low income. If the garbage has to be hauled to the County site at Beaver Hill, the cost will be prohibitive for these people do to the distance (see operating cost sheet). Using the Counties Beaver Hill site would not take care of disposing of white goods, burning as yard trash and shrub trimmings, old building materials etc. This would still cause unsightly roadside dumping.

This is a large undertaking for the City. If we do nothing, and an outside hauler comes in, we won't have 25% of the people taking their services, then all of our roadways will be filled with garbage.

We plan to explore the possibility of a recycling program, and with the help of your Field Representative, we feel this can become a reality. Also, if we can set up a recycling program, this will help relieve random burning.

The City on January 23, 1984 adopted a resolution which is enclosed, also on January 30, 1984 we held a public meeting with the people to explain our plan. We have had several Special Council Meetings just pertaining to the garbage.

The people in Powers do not have the money for the City to operate in a fashionable manner, but we do believe we can give them good service and operate with good management at a cost that so many Senior Citizens low income and others can afford.

We therefore request a variance, for the reasons of our problems and solutions as we have stated, be granted.

Respectfully,

Mable J. Shorb

Mable J. Shorb

Mayor

City of Powers

P.O. Box 250

Powers, Oregon 97466

City of Powers

P. O. Box 250
Powers, Oregon 97466

January 20, 1984

POWERS OPEN BURNING DUMP

The Powers open burning dump is scheduled to be closed by order of the DEQ in June 1984. Because the City of Powers is in a remote location far from the central disposal site at Beaver Hill, and the city's residents are mostly retired people on fixed incomes we cannot afford alternative methods of garbage disposal. Therefore, we propose an alternative to closing the existing site.

We will completely restructure our garbage collection and methods of operating and maintaining the open burning dump. We will manage the collection and disposal of garbage in such a manner as to minimize air pollution, odors, and unsanitary conditions. We will promote recycling of all wastes where possible. We will achieve this in the following manner.

OPERATION AND MAINTENANCE OF THE EXISTING DUMP

1. Operate and maintain the dump according to county and state requirements.
 - A. Properly manage burning at the dump
 - B. Not allow garbage to stand, unburned, for extended periods
 - C. Keep the area where garbage is dumped to a minimum
 - D. Properly maintain the fence, gate, and access road
 - E. Strictly enforce unauthorized dumping
 - F. Periodically inspect for leachate and correct if necessary
 - G. Properly manage white goods, recycle all white goods and larger metal objects (These objects to be separated on the disposal site)
 - H. The Council will promote recycling by investigating source separation and a satellite recycling center for recyclable goods.

COLLECTION

We will implement a mandatory pickup service that will distribute the cost of pickup and disposal over all users. This measure will pay for the cost of maintaining the disposal site plus distribute the expense over all users, including those persons who are now dumping on County roads etc. at no charge.

Carol E. Smith
City Recorder
P.O. Box 250
Powers, Oregon 97466



Department of Transportation
HIGHWAY DIVISION District 7

P. O. Box 1265 Coos Bay, OR 97420 269-9121

In Reply Refer to
File No

February 26, 1985

Honorable Mable Shorb, Mayor
City of Powers
P. O. Box 250
Powers, Oregon 97466

Dear Mayor Shorb:

We would like to take this opportunity to express our appreciation of the Powers dump facility since the dump has been in place at Powers. We have certainly not had the roadside litter and dumping of white goods along the highway that was prevalent prior to the moving of the existing dump.

Anything that you can do to keep the dump located where it is would certainly be of benefit to the Oregon State Highway Division in regard to roadside litter.

Sincerely,

B. E. Brown
District Maintenance Supervisor

BEB/dc

cc: Robert L. Brown
Environmental Quality Council
P. O. Box 1760
Portland, Oregon 97207



United States
Department of
Agriculture

Forest
Service

Siskiyou
National
Forest

Powers Ranger District
Powers, Oregon 97466

Reply to 1500

Date February 22, 1985

Leo Grandmotagne
Powers City Council
P.O. Box 250
Powers, OR. 97466

Since the City of Powers has been handling the garbage service, there appears to be no additional garbage dumping on Forest Service lands.

The Powers Ranger District appreciates the efficient service they have been receiving for the garbage pickup.

Hopefully the City will be able to continue with the present services and costs.

JOHN D. BERRY
District Ranger



WALT SCHROEDER
COOS AND CURRY COUNTIES
DISTRICT 48

REPLY TO ADDRESS INDICATED
 House of Representatives
Salem, Oregon 97310-1347
25102 Rogue River Heights
Gold Beach, Oregon 97444



Office: 378-8050
Toll Free: 1-800-982-1211

HOUSE OF REPRESENTATIVES
SALEM, OREGON
97310-1347

March 4, 1985

Mr. Fred Hansen, Director
Dept. of Environmental Quality
522 S. W. Fifth
Portland, Oregon 97204

Dear Fred:

When we had breakfast at Carrows a few weeks ago, as a part of our get-acquainted session, you urged us to get in touch with you if we had any questions or concerns in your area of expertise.

I was contacted a few days ago by citizens of the City of Powers, located about 22 miles southeast of Myrtle Point in Coos County.

According to the Powers people, DEQ is strongly considering closure of the solid waste disposal site in their vicinity because it does not meet two of the several criteria proposed in your notice of public hearing dated January 25, 1984 (?) for hearings in March, 1985.

The criteria that no Western Oregon area can possibly meet is the requirement that the site must be in an area of less than 25 inches of rain per year.

Powers also cannot meet the population requirement because they have about 740 people and the DEQ proposal limits population to 450.

Powers is a long way from the Beaver Hill disposal site. Because of the Powers disposal site, illegal garbage dumping along the roads and U. S. Forest Service land has decreased markedly.

Given the distance to the dump, it is almost a foregone conclusion that if the Powers site is closed, garbage will be increased considerably along roads and in the forested areas.

Powers is not only distant from the Beaver Hill site, it is also the home of many senior citizens, low income residents, and unemployed. Figures provided at my request from the Powers City Recorder show the following. In the table each person was counted only once. i.e. Each person is listed either as low income, senior, or unemployed, but not in two or all three categories.

Fred Hansen - 2
March 4, 1985

Individual Houses on Tax Lots

	<u>No. of Houses</u>	<u>% of Total</u>
Senior citizens	96	39
Low income citizens	35	14
Unemployed	40	16
Employed (including self employed)	<u>77</u>	<u>31</u>
	248	100%

Households in Powers

Individual houses	248
Trailer Courts & Apartments	15
Senior housing	<u>23</u>
	286

Households in Powers

	<u>No. of People Living in Houses</u>	<u>% of Total*</u>
Senior Citizens	126	44.0
Low income	41	14.5
Unemployed	42	14.5
Employed	<u>77</u>	<u>27.0</u>
	286	100%

*Does not include infants, pre-schoolers or children in school.

Labor Force In Powers

	<u>No. of Employables</u>	<u>% of Total</u>
Employed	77	48.0
Low income	41	25.5
Unemployed	<u>42</u>	<u>26.5</u>
	160	100%

I asked for and submit these figures to you, Fred, to indicate that it is more than distance that causes a problem for these people. They are good people and most want to abide by the law. Closing the dump site could make it very tempting to subvert the law, even for those who are naturally law abiding.

Fred Hansen - 3
March 4, 1985

I would ask that your department reconsider the discontinuation of the Powers site.

The dump has a high level of maintenance, metal is salvaged, and only one complaint has been registered regarding smoke from the dump. The one complaintant has already moved from the community.

If, for some reason, burning cannot be continued, I urge you to work with the Coos County Commissioners to provide some other method of collecting solid waste other than requiring individuals to haul it to the Beaver Hill site.

Curry County, for example, has large dumpsters located in strategic places throughout the county. Agness is a site that has a situation quite similar to Powers.

Enclosed is a clipping from the Myrtle Point Herald on February 27, 1985 showing an illegal dump site near the junction of the Powers road with Highway 42. If people from the Myrtle Point-Broadbent area are not willing to take their solid waste to Beaver Hill, you can see how much more of a problem it is for the Powers people who are an additional 22 miles from the site.

I hope you can help us in this matter.

Sincerely yours,



Walt Schroeder
State Representative

WS:vf

Enclosure

cc: Coos Co. Commissioners

bcc: ✓ Carole Smith, Recorder, Powers

February 26, 1935

Oregon Dept. of Environmental Quality
P.O. BOX 1760
Portland, Oregon 97207

Dear Sirs:

The Powers Chamber of Commerce would like to express their views on the closing of the Powers Solid waste site, here in Powers.

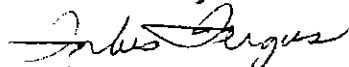
The Population (735) is so small that the pollution from this site is nil, as far as the City of Powers is concerned or even the surrounding areas. We realize that Laws cannot be made for each and every City, but this is one exception that should be given special consideration.

The City is made up of Sr. Citizens and unemployed people, as it is a lumber town, and the lumber industry is at the rock bottom, as you well know. The income of all these people is extremely low and are just existing. Should we be forced to haul the refuse to the County Site at Beaver Hill, the cost of transporting is out of the question for them to bear, therefore they could not be forced to use the service and they would be right back to disposing it along roads and highways, and this we cannot blame them for.

Please give this town your Special consideration when you make your ruling. We wish each and everyone of you who make the final decision could view this situation in person, and you would be welcome to do so.

Thank you for your past and future consideration.

Yours truly



Forbes Fergus-President
P.O. Box 92
Powers, Oregon 97466

COOS-CURRY COUNCIL OF GOVERNMENTS

P.O. BOX 647
NORTH BEND, OREGON 97459
756-2563

RAY KELLEY, Chairman
TIMM SLATER, Vice-Chairman
JOE JAKOVAC, Treasurer
SANDRA DIEDRICH, Director

March 11, 1985

Fred Hansen, Director
Department of Environmental Quality
P. O. Box 1760
Portland, OR 97207

Re: Powers City Refuse Disposal Site

Dear Fred:

The Coos-Curry Council of Governments is seriously concerned about the situation facing the City of Powers and the DEQ regarding continued use of the Powers City Refuse Disposal Site.

As you know, Powers is a remote community with a high incidence of low and moderate income people, as well as a high incidence of retired persons. The Powers area has experienced significant economic problems; therefore has significant limitations in revenue generating capabilities for public services.

Given the number of special situations involved with this issue, we encourage you to provide all possible assistance to the City of Powers, and to consider the appropriate use of variances in addressing the special problems of Powers.

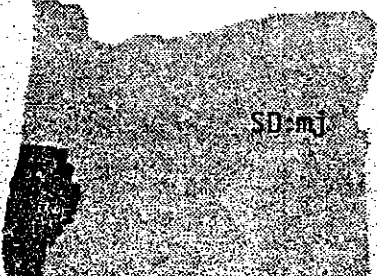
We know your Department recognizes the efforts of the City of Powers in providing improved management of the disposal site. Given the City's meritorious efforts, we anticipate that you will find appropriate means to affirm or extend a variance until such time that feasible, affordable, and practical alternatives can be developed which will respect the needs of Powers and achieve the objectives of the State's Solid Waste Management Program.

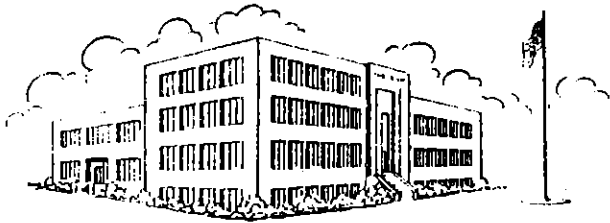
We are forwarding this letter to the City of Powers for inclusion in their presentation to you. Thank you for the opportunity to make our concerns known, and to urge your support of the City of Powers' needs.

Sincerely,



Sandra Diedrich
Director





COOS COUNTY COURTHOUSE
Coquille, Oregon 97423
Phone: (503) 396-3121
Ext. 224, 225

County of Coos

BOARD OF COMMISSIONERS

Doc Stevenson
Jack L. Beebe, Sr.
Robert A. Emmett

March 13, 1985

Mr. James L. Vilendre'
Solid Waste Division
Department of Environmental Quality
P.O. Box 1760
Portland, OR 97207

Re: Garbage Dump at Powers, Oregon

Dear Mr. Vilendre':

The Coos County Board of Commissioners supports the City of Powers in its efforts to keep its garbage dump open.

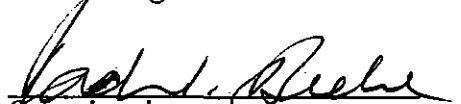
Due to the fact that a round trip from Powers to the Solid Waste Disposal Site at Beaver Hill is over eighty miles, we feel it would cause a hardship on the Powers residents if their garbage dump were closed. The closure might also cause littering along the county roads.


We feel the request by the City of Powers should be granted.

Thank you for your cooperation in this matter.

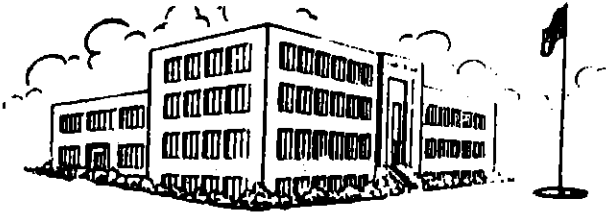
BOARD OF COMMISSIONERS


Chairman


Commissioner


Commissioner

jm



County of Coos

HIGHWAY DEPARTMENT
COOS COUNTY COURTHOUSE
COQUILLE, OREGON 97423

March 6, 1985


M E M O

TO : COOS COUNTY BOARD OF COMMISSIONERS
FROM : COOS COUNTY SOLID WASTE ADVISORY COMMITTEE
RE : CLOSURE OF POWERS DUMP SITE

At their meeting of March 6, 1985, the following motion was entered, seconded and passed unanimously, to wit:

The Coos County Solid Waste Advisory Committee supports the continuation of the Powers dump site based on the attached scenario.

COOS COUNTY SOLID WASTE ADVISORY COMMITTEE


Dick Lemery, Chairman

de

attchm. 1

MAR 7 - 1985

February 27, 1985

The Coos County Solid Waste Advisory Committee recommends that the Powers dump remain in operation for the following reasons:

1. Roadside dumping.

Since Powers has instituted mandatory garbage pickup at \$4.50 per can per month, roadside dumping has ceased to be a major problem.

2. Unemployment.

It is estimated that between 30-40% of Powers Citizens are unemployed or senior citizens on small fixed incomes. Raising the garbage rate from \$4.50 to \$8-10.00 will be a hardship on these people if the dump is closed and the 90 mile round trip haul to Beaver Hill is initiated.

3. Proper management.

Since City takeover of the dump, the site has been properly maintained with regular bulldozing of the burned refuse and rapid elimination of rodent and bird problems. Full cooperation with D.E.Q. officials has been implemented.

4. Lack of Complaints.

Burning at the dump site which is located away from the townsite has not created a significant air pollution problem. Approximately 40 cubic yards per month are burned.

5. Lack of Suitable Alternative.

Converting the dump to a sanitary landfill is not feasible because of a lack of cover material, and the high probability of leachate formation in the wet coastal climate.

Installation of a transfer site would be expensive and would undoubtedly require an attendant and maintenance, besides the added costs of transporting and sorting.

MAR 7 - 1985

BILL BRADBURY
COOS, CURRY, DOUGLAS COUNTIES
DISTRICT 24

REPLY TO ADDRESS INDICATED:

- Senate Chamber
Salem, Oregon 97310-1347
- P.O. Box 1499
Bandon, Oregon 97411



COMMITTEES
Chairman:
Energy and Natural Resources
Vice-Chairman:
Joint Water Policy
Member:
Revenue
Agriculture and Forestry

OREGON STATE SENATE
SALEM, OREGON
97310-1347

March 20, 1985

Robert L. Brown
Solid Waste Division
Box 1760
Portland, OR 97207

RE: Agenda Item D from 1-25-85 EQC meeting (proposed rules
regulating rural solid waste disposal sites)

Dear Commissioners:

I am writing in strong opposition to your proposed rules
regulating small rural solid waste disposal sites which are
presently conducting the practice of open burning of solid waste.
My specific concern is the continued operations of the Powers
Landfill near Powers, Oregon.

Several of the criteria your are proposing to apply to landfill
sites would automatically eliminate continued open burning at
Powers. It is my understanding that you are proposing to require
that any continued open burning be conducted in an area with a
dry climate with average rainfall of less than 25 inches per
year. The other proposed regulation is that the total population
served by the landfill is less than 450. Both of these criteria
would automatically eliminate continued open burning at the
Powers landfill site. I don't know what the average rainfall is
in Powers, but given the fact that it is in the Coast Range, I'm
sure that it is substantially more than 25 inches a year. As far
as population goes, the current size of Powers is almost double
your proposed size of 450. The net effect of these proposed
rules would be closure of the Powers open burning landfill site.

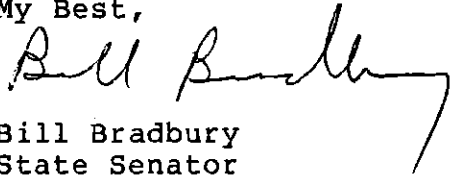
As I have written before, Powers is a very small isolated
community at the end of a long and windy road that follows the
South Fork of the Coquille River. The nearest disposal site for
Powers residents if their landfill site is closed is over 50
miles away at Beaver Hill (the Coos County solid waste
incinerator).

It is very clear that if the Powers landfill is closed, very few
of the residents will drive the torturous route from Powers to
Beaver Hill. Instead there will be a dramatic increase in
promiscuous dumping in every ravine and gully surrounding the
Powers area.

I would strongly suggest that you amend the proposed rules to insure the continued operation of the Powers landfill. The environment will be well served if you do.

Thanks so much for your attention to my request.

My Best,

A handwritten signature in cursive script that reads "Bill Bradbury". The signature is written in dark ink and is positioned to the right of the typed name.

Bill Bradbury
State Senator

March 13, 1985

Oregon Dept. of Environmental Agency
P. O. Box 1760
Portland,

Re: Powers Solid Waste Site

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
MAR 19 1985

OFFICE OF THE DIRECTOR

Dear Sirs:

As an adjoining landowner, I would like to express my views on the matter of closing above mentioned site.

I own all the land on the Northwest side of the site, my ranch consisting of twenty four hundred (2400) acres, and the smoke doesn't bother me. It dissipates before I notice it.

There is no question that closure would increase roadside and over the fence dumping.

Sincerely,
Howard Johnson

Recap of Households in Powers

A. 248 Individual houses on tax lots:

Senior Citizens	96	39 %
Low Income	35	14 %
Unemployed	40	16 %
	<hr/>	
	171	69 %
Employed, includes self employed	77	31 %
	<hr/>	
	248	100 %

C.

	Households:		Households:
B. Individual houses	248	Senior Citizens	126 44 %
Trailer Courts & Apt's	15	Low Income	41 14.5 %
Senior Housing	23	Unemployed	42 14.5 %
	<hr/>		
	286		209 73 %
		Employed, includes	
		self employed	77 27 %
			<hr/>
			286 100 %

Labor Force,

D. employed includes SELF employed	77	48 %
Low Income	41	25.5 %
Unemployed	42	26.5 %
	<hr/>	
	160	100 %

Low Income Citizens, Classification was determined by Coos-Curry Council of Governments records.

Recap / Towers Residence

	1	2	3	4	5	6
	Senior Citizens	Low Income	Unemployed Person	Employed Person	Single Women in Household	Single Men in Household
1	Allen, Dean	/		x		x
2	Allen, Neil	x				
3	Aubin, Vera	x			x	
4	Adamek, Noble		x			
5	Adamek, Noble		x			
6	Adamek, Harry	x				
7	Allard, Gus			x		
8	Anderson, Eddie			x		
9	Anderson, Ralph	x				
10	Anderson, Percy	x				
11	Abbott, John		x	/		
12	Atenbach, Bernie			x		
13	Agnew, Sherry			x		
14	Brutton, Bud			x		
15	Bennis, John			x		
16	Bennett, Don	x				
17	Benedict, Marshal		x			
18	Batten, Rob			x		
19	Ballard, Nonie		x			
20	Byrd, Pat			x		
21	Blanton, James			x		
22	Brown, Myrtle	x				
23	Berra, Jessie		x		x	
24	Baldwin, Richard	x				
25	Bedwell, Ed	x				
26	Biel, Grace	x			x	
27	Boutin, Cecil	x			x	
28	Blecziński, Linda			x	x	
29	Bushnell, Jack			x		
30	Bushnell, John			x		
31	Black, James	x				x
32	Clausen, James Jr.			x		x
33	Clausen, John			x		
34	Clausen, Roger			x		
35	Collier, Nina	x			x	
36	Case, Wm. Sr.		x			
37	Case, Wm. Jr.		x			x
38	Crabill, Ben	x				
39	Christisen, Richard		x			
40	Courts, Herb	x				x
	Totals	15	4	5	15	6

	1	2	3	4	5	6	
	Senior Citizens	Low Income	Unemployed	Employed	Single Women in Household	Single Men in Household	
1	Balance Forward	15	4	5	15	6	5
2	Colfin, Steve		/	x			
3	Click, James				x		
4	Clark, Ken	x					
5	Cover, Bonnie	x				x	
6	Clark, Juanita	x				x	
7	Cowan, Bernice		x				
8	Costello, Carol	x					
9	Caughell, Jack	x					
10	Clayton, James Sr.		x				
11	Clark, Geo.			x			
12	Chard, Claston			x			
13	Carney, M.		x				
14	Derrison, Don				x		
15	Devoe, James			x			
16	Duncan, Dora	x				x	
17	Davis, Cliff	x					
18	DeCarlo, Ed				x		
19	Divine, George	x					
20	Donnelly, Mark				x		
21	Ellis, Rita		x			x	
22	Ellis, Gary				x		
23	Elam, Joe			x			
24	Ellis, Selby	x					
25	Ellis, Danny				x		x
26	Erwert, John			x			x
27	Elam, Lavene				x	x	
28	Fandt, John				x		
29	Fisher, Shanna			x			
30	Frye, Marion				x		
31	Frye, Leona			x		x	
32	Foster, Marshall				x		x
33	Frye, Elmo				x		
34	Feuerborn, Don				x		
35	Fawcett, Merial	x				x	
36	Fronk, Mary				x	x	
37	Fulton, Pat	x				x	
38	Fergus, Stephen		x				
39	Fergus, Forbes	x					
40	Foster, Steven		x				
	Totals	29	10	13	28	15	8

		1	2	3	4	5	6	
		Senior Citizens	Low Income	Unemployed	Employed	Single Women in Household	Single Men in Household	
1	Balance forward	27	10	13	28	15	8	1
2	Farrier, Jerry				x			2
3	Fry, Isabelle	x						3
4	Grant, Glenn	x				x		4
5	Grandmontagne, Leo			x			x	5
6	Grubl, Albert	x						6
7	Griffith, Mitchell				x			7
8	Gubizon, R.C.	x						8
9	Grove, Bertie	x				x	/	9
10	Horton, Francis	x					x	10
11	Penderson, Dennis			x				11
12	Hanloft, Ed		x					12
13	Hurtley, Anna		x			x		13
14	Holland, Darrell		x					14
15	Hayes, George				x			15
16	House, Florence		x			x		16
17	Hofness, Ron			x	x			17
18	Hofness, Jackie		x			x		18
19	Hackett, Dolly	x				x		19
20	Hoffman, Aleta	x				x		20
21	Homedew, Stan				x			21
22	Huggett, Ellen	x						22
23	Hughes, Dan	x						23
24	Hegarty, Frank	x					x	24
25	Hubbard, Emory	x						25
26	Hedrich, Norma	x				x		26
27	Hallett, Joe				x		x	27
28	Inselman, Charlene		x			x		28
29	Johnson, Roger				x			29
30	Jahn, Paul	x						30
31	Kalb, Merle Jr.				x			31
32	Kalb, Merle Sr.				x			32
33	Kemp, Beth		x	x		x		33
34	King, Joel				x			34
35	Klepac, Frank				x			35
36	Kemmerer, Gordon		x					36
37	Knoder, John	x						37
38	Kuehl, Richard	x						38
39	Lane, Archie	x					x	39
40	Lee, Albert	x						40
	Totals	45	18	16	38	25	14	

	1	2	3	4	5	6	
	Senior Citizens	Low Income	Unemployed	Employed	Single Women in Household	Single Men in Household	
1	Balance forward	45	18			25	17
2	Leggett, Dollie	x				x	
3	Lambert, Fina		x			x	
4	Louren, Edith		x			x	
5	Lourey, Calvin			x			
6	Low, Dennis				x		
7	Lutchworth, Tom			x			x
8	Luttberr, Jack			x			
9	Lucas, Keith				x		
10	Lopez, Rich				x		
11	McAllister, Larry				x		
12	McDaniel, Merel Sr.	x					
13	McDaniel, Merel Jr.				x		
14	McLary, C.H.	x					
15	McAul, Dan				x		
16	McCulloch, Leona	x				x	
17	McKenzie, Kenneth	x					
18	McNeil, Milly	x					
19	McAdams, Oliver	x					
20	McCulloch, Lyle	x					
21	McDonald, Robert				x		
22	McCurry, Joe	x					x
23	McCleod, Bob				x		
24	Millard, Homer			x			x
25	Moore, Jill		x			x	
26	Moore, Lonnie				x		
27	Merrill, James				x		
28	Morgan, Elton				x		
29	Mahan, James			x			
30	Martin, Russell				x		
31	Magill, Joe				x		
32	Milojeulich, George	x					
33	Mullens, Linda				x	x	
34	Merchen, Wilbur	x					
35	Magnuson, Leo	x					
36	Meyer, Vickie				x	x	
37	Montensen, Phyllis				x	x	
38	Meyer, Elinor	x				x	
39	Murford, Norman				x		
40	Nightingale, Pete				x		
	Totals	58	21	24	56	34	17

	1	2	3	4	5	6				
	Senior Citizens	Low Income	Unemployed	Employed	Single Women in Household	Single Men in Household				
1	Balance forward	58	21	31	32	56	35	31	17	
2	Nicklaus, B.R.	x							x	
3	Nealy, Shirley				x					
4	O'Connors, Frank	x								
5	Parkhurst, Jack			x						
6	Perry, Dale			x						
7	Post, Ethel	x						x		
8	Pierson, Liz		x					x		
9	Pearce, Rocky			x						
10	Post, Lynn					x				
11	Perks, Vickie		x					x		
12	Possee, Charles					x				
13	Porter, Dean			x						
14	Peeb, Crawford	x								
15	Pierson, Ruth	x						x		
16	Peterson, Medina		x					x		
17	Peterson, Pete					x				
18	Qualls, Roy	x							x	
19	Quilhaugh Dick	x								
20	Quilhaugh, Kerry					x				
21	Quilhaugh, Bob	x								
22	Quilhaugh, Carol Kay		x					x		
23	Ringle, Janet		x					x		
24	Reed, Loy			x						
25	Roland, Don					x				
26	Reeves, Don					x				
27	Rector, Graig					x				
28	Rolfe, Margaret	x						x		
29	Rolfe, Rachel	x						x		
30	Rolfe, Harry	x								
31	Rauch, Lynn					x				
32	Ross, Harold	x								
33	Ranta, Debe	x								
34	Robinette, Carl	x								
35	Rollofson, John					x				
36	Rose, Jim			x						
37	Shorb, Betty		x					x		
38	Shorb, Joe			x						
38	Shorb, Scott			x						
40	Shorb, Bill	x								
	Totals	73	27	39	32	66		44	19	

	1	2	3	4	5	6	
	Senior Citizens	Low Income	Unemployed	Employed	Single Women in Households	Single Men in Households	
1	Balance forward	73	27	29	64	44	19
2	Shorb, Lowell	x					
3	Shorb, Paul				x		
4	Shepherd, Don			x			
5	Stevens, Sam				x		
6	Stevens, Kenneth				x		
7	Smith, Robert			x			
8	Smith, Nev		x				
9	Smith, Bill				x		
10	Smith, Lena	x				x	
11	Stump, Madine		x			x	
12	Stone, James			x			x
13	Shovan, G.R.			x			x
14	Sherrill, Glenn		x				x
15	Stallard, Ted				x		
16	Stallard, Nick				x		
17	Sanderlin, Richard		x				
18	Simpson, Maudie	x				x	
19	Spitznass, Clarence	x					x
20	Shallar, Dale				x		
21	Stewart, Carl	x					
22	Soterion, Tom	x					x
23	Sheedy, Ana	x				x	
24	Stock, Fred		x				x
25	Seuell, Fred	x					
26	Stallard, Charles	x					
27	Richardson, Helma	x				x	
28	Thonnsberry, Berrie	x				x	
29	Thonnsberry, Richard				x		
30	Thonnsberry, Raymond			x			
31	Thornton, Charlie			x			
32	Townsend, Curt	x					
33	Tarbox, Mary Anne		x			x	
34	Thorp, Mabel	x				x	
35	Thornton, Walter				x		
36	Tweed, R.W.			x			
37	Taylor, Norma	x				x	
38	Utterback, Carl	x					
39	Wiwatowski, Willma	x				x	
40	Tomas, Bob	x					x
	Totals	90	33	36	75	54	26

	1	2	3	4	5	6
	Senior Citizens	Low Income	Unemployed	Employed	Single Women in Household	Single Men in Household
1	Balance forward	90	33	367	75	54 26
2	Wilson, Robert	x				
3	Wallace, Richard Sr.		x	✓		
4	Wallace, Richard Jr.			x		
5	Bright, Isabelle	x			x	
6	Barick, Poppo				x	
7	Halber, Marcelle	x			x	
8	Wilson, Paul	x				
9	Wilson, Alfred	x				
10	Verner, Robert		x			
11	Valson, Michael			x		
12	Summerville, Willie	x			x	
13	Fyler, Steve			x		
14	Shelton, Tom				x	
15	Multi-Housing:					
16	Shorb's Trailer Court:					
17	Haves, Ed				x	
18	Smith, Thelma	x			x	
19	Smith, Elbert	x				
20	Domico, Dianna		x		x	
21	McCray, Bob		x			
22	Shorb, Mark				x	x
23	Looney, Bill				x	x
24						
25	Kalb's Apt's &					
26	Trailer Court:					
27	Barton, Julia	x			x	
28	Martin, Judy		x		x	
29	Clark, Glenda		x		x	
30	Walkins, Darlene		x		x	
31	Faye, Donnie		x			x
32	Ayers, Gene			x		
33						
34	Myrtle Tree's					
35	Trailer Court:					
36	Speaks, Jonny			x		
37		3	6			7
38	Senior Citizens					
39	Housing:					
40	Aber, Mahalah	x			x	

Department's Response to Public Comments

The following is a summary of comments received in response to proposed amendments to Administrative Rules for Solid Waste Management (OAR 340-61) and the Department's response to those comments:

Comment: The commenters felt that the population served figure of 450 as a cut off from open burning was too low and should be raised (OAR 340-61-040(2)(6)(b)(D)).

Response: The figure of 450 was established by a Department Task Force as a reasonable cut off point. There are only nine disposal sites above the 450 figure at which solid waste is presently burned. To give a blanket approval for open burning at sites over this figure would encourage other operators now properly landfilling to revert to open burning. Therefore this subsection has not been changed.

Comment: At two public hearings there was objection to the operational criteria requiring access control and an attendant on duty while the site is open. The sites must be open every day and an attendant is not economically feasible.

Response: At many rural disposal sites the operational criteria proposed in the rule are already in place. Sites are operated one or two days a week and a small fee is charged to defray the cost of the attendant. With access control an attendant can control the location of solid waste placement so when the solid waste is burned a greater percentage is consumed and the fire burns hotter and for a shorter period of time. The burning can also take place while the site is closed so there is no public exposure. The Department believes that some control should be exercised at a disposal site to keep objectional items from being burned (hazardous waste, etc.). Only nine of the twenty-five sites presently open burning garbage do not have some form of access control or attendants on duty while the site is open. Therefore the rule has not been changed.

Comment: Objection to the operational criteria requiring ash covering at least twice a year (OAR 340-61-040(2)(c)(E)). (Only Lake County.)

Response: The Department believes that at least a minimum amount of maintenance is necessary at even the smallest disposal site. It is considered that routine ash burial and policing of the site is necessary at least twice a year. Cost for this maintenance is minimal and should be required. The rule has not been changed.

Comment: Operators of disposal sites which open burn solid waste should be required to demonstrate a need. Union County has an efficient disposal system and does not open burn at any site. Three transfer stations are in place and operation is not costly, but it is cheaper to burn if allowed. Under the rules as proposed, the three cities with transfer stations could revert to the practice of open burning of solid waste.

Response: The Department agrees with the statement. Open burning of solid waste should be allowed only at those disposal sites where the operators can demonstrate a need and that burning is the only alternative available for solid waste disposal. The Department is therefore recommending to the EQC that the proposed rules not be adopted and that evaluation of each site be made through use of the variance procedure.

Comment: The City of Powers disposal site is a unique case. The site is located a long distance from the next closest site; the city is in a depressed economy; excessive cost for disposal if long haul is required; upgrading of the Powers Disposal Site has improved the roadside dumping problem; the site is now properly maintained; and because of the location of the site there is little or no environmental impact.

Response: The Department agrees that the City of Powers may present a unique problem. However, the Department believes that unique problems associated with one facility are better handled by variance procedures and not by rule adoption.

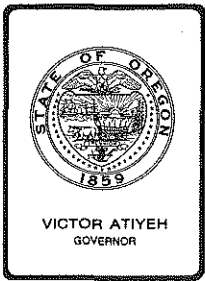
Sites which could practice open burning of solid waste if proposed rules are adopted:

Population Under 450 (22)

<u>County</u>	<u>Site Name</u>
Harney	Andrews
Harney	Crane
Harney	Diamond
Harney	Drewsey
Harney	Fields
Harney	Frenchglen
Harney	Lawen
Harney	Riley
Harney	Sodhouse
Klamath	Beatty
Klamath	Bly
Klamath	Bonanza T.S.
Klamath	Chemult
Klamath	Crescent
Klamath	Langell Valley
Malheur	Adrian
Malheur	Brogan-Jamieson
Union	North Powder T.S.
Wallowa	Lostine Drop Box
Wasco	Antelope
Wasco	Shaniko
Wheeler	Spray

Population from 450 to 1,000 (9)

Gilliam	South Gilliam County (Condon)
Grant	Prairie City
Klamath	Chiloquin
Klamath	Malin
Klamath	Merrill
Klamath	Sprague River
Malheur	Willowcreek
Wallowa	Joseph Drop Box
Wallowa	Wallowa T.S.



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item S, January 31, 1986, EQC Meeting

Proposed Adoption of Revisions to Rules Relating to the
"Opportunity to Recycle" (OAR 340-60-025 and OAR
340-60-030), Creating a West Linn Wasteshed.

Background

On December 14, 1984, the Environmental Quality Commission adopted rules relating to implementation of the Oregon Recycling Opportunity Act. One of those rules, OAR 340-60-025, identified areas of the state which were to be recognized as wastesheds. One of these, the Clackamas Wasteshed, is all of the area within Clackamas County and all of the area within the cities of Lake Oswego, Wilsonville and Rivergrove excluding the area within the City of Portland and the City of Tualatin. The City of West Linn is included within the Clackamas Wasteshed.

ORS 459.175(2)(a) provides that "Any affected person may appeal to the Commission for the inclusion of all or part of a city, county or local government unit in a wasteshed." The City of West Linn has appealed its inclusion in the Clackamas Wasteshed and has requested to be identified as a separate wasteshed (see Attachment I).

Wasteshed status is formalized in rules under the provisions of ORS 459.170. Wasteshed, as defined in ORS 459.005, means an area of the state having a common solid waste disposal system or designated by the Commission as an appropriate area of the state within which to develop a common recycling program. The City of West Linn can be identified as a separate wasteshed through a change in the rules to exclude West Linn from the Clackamas Wasteshed and identify it as a separate wasteshed. The list of principal recyclable materials must also be changed to identify the principal recyclable materials for the West Linn Wasteshed.

The Environmental Quality Commission authorized a public hearing at its September 27, 1985 meeting. Public notice on the proposed rules (Attachment II) was published in the Secretary of State's Bulletin on October 15, 1985 and mailed to all affected persons in the Clackamas Wasteshed and other interested persons on October 17, 1985. A public hearing was held in West Linn on November 19, 1985. Four persons submitted

testimony, all in favor of the proposed rule change. All were proud of the city's program and wanted it to be documented as an individual wasteshed so that other cities could see what could be accomplished in an individual community. The city has achieved 40-50% participation in recycling and is making progress toward achieving its solid waste reduction goal. No testimony was received against the proposal. The hearings officer's report is included as Attachment III.

Alternatives and Evaluation

The City of West Linn is requesting a change in status which will require a formal action from the Commission. The proposed rule change (Attachment IV) will accomplish what West Linn is requesting. No other method of providing West Linn with separate wasteshed status is available to the Commission.

The city feels it has a comprehensive program for the implementation of the opportunity to recycle, and wants its program to be recognized and evaluated independently. Its program meets the requirement of the opportunity to recycle and includes: weekly on-route collection, drop-off depots, recycling from multi-family housing, yard-debris collection and recycling, school and community education, recycling promotion, and a franchise rate structure which encourages recycling.

A change in the wasteshed status of West Linn would not appear to have a significant effect on the other cities within the Clackamas Wasteshed, on the wasteshed as a whole, or on other wastesheds. Allowing the city of West Linn to be its own wasteshed should not be viewed as a precedent to allow other small cities to become their own wasteshed. West Linn is unique in that it has an already operating weekly recycling program and an education/promotion program which is entirely run and staffed by the city. Furthermore, the request has been made because the city wants its program to be recognized and wants to set an example for other cities in the state.


Summation

1. The city of West Linn is presently a part of the Clackamas Wasteshed.
2. The city has appealed under ORS 459.175(2)(A) to be identified as a separate wasteshed.
3. The city meets the statutory definition of a wasteshed as "an area of the state within which to develop a common recycling program" and is eligible for status as a separate wasteshed.
4. A public hearing was held on the proposal and all comments were in favor of the proposed rule change. The city wants the separate wasteshed status so that its program can stand apart as a model for other communities to look at to see how a successful recycling program can be accomplished.

5. The proposed rule change would not appear to have a significant effect on the Clackamas Wasteshed, or on other wastesheds.

Director's Recommendation

Based on the Summation, the Director recommends that the Commission adopt the proposed rule changes for OAR 340, Division 60, Sections 025 and 030, which would designate the city of West Linn as an independent wasteshed and identify the principal recyclable materials in the West Linn Wasteshed.



Fred Hansen

- Attachments
- I. Resolution No. 85-18, city of West Linn, petitioning the Environmental Quality Commission for recognition of the city of West Linn as an independent wasteshed and reporting district under ORS 459.175(2)(a), dated July 10, 1985.
 - II. Public Notice and Rulemaking Statements
 - III. Hearing Officer's Report
 - IV. Proposed Changes to OAR 340-60-025 and 340-60-030

Marianne Fitzgerald:b
229-5060
January 15, 1986
YB5011.M



City of West Linn

Attachment I
Agenda Item S
1/31/86, EQC Meeting
4900 PORTLAND AVENUE
WEST LINN, OREGON 97068
PHONE (503) 656-4211

July 30, 1985

Environmental Quality Commission
P.O. Box 1760
Portland, Oregon 97207

Attn: Chairman, James Petersen

Dear Mr. Petersen,

The West Linn City Council recently discussed Senate Bill 405 on recycling, where the City can be recognized as an independent reporting district. The City of West Linn's Solid Waste and Recycling Committee recently voted unanimously to recommend to the City Council that they petition the Environmental Quality Commission for recognition as an independent reporting district. The Council, at a recent meeting adopted the enclosed resolution requesting that the City become an independent watershed and reporting district for the provisions of the opportunity to recycle under Oregon Revised Statutes Chapter 459, as interpreted by Oregon Administrative Rules 340-60-10 through 304-60-85.

If you have any further questions please feel free to give us a call.

Sincerely,

JOHN A. BUOL
City Administrator

Enclosure

/djn

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY

RECEIVED

AUG 01 1985

OFFICE OF THE DIRECTOR

RESOLUTION NO. 85-18

A RESOLUTION PETITIONING THE ENVIRONMENTAL QUALITY COMMISSION FOR RECOGNITION OF THE CITY OF WEST LINN AS AN INDEPENDENT WASTESHED AND REPORTING DISTRICT UNDER ORS 459.175(2)(a).

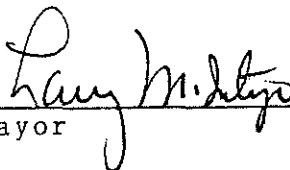
WHEREAS, the City of West Linn has been designated as part of the Clackamas wasteshed by OAR 340-60-025 (1)(c); and

WHEREAS, the City of West Linn has a comprehensive recycling program, together with an active education and promotion program that in many areas is unique in the State of Oregon; and

WHEREAS, the City of West Linn desires to stimulate cooperative discussion between cities, and other local jurisdictions on the matter of recycling and various promotional and educational techniques.

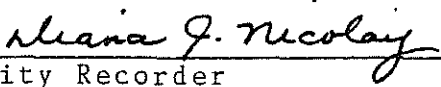
NOW, THEREFORE, BE IT RESOLVED BY THE COMMON COUNCIL OF THE CITY OF WEST LINN that petition is hereby made to the Department of Environmental Quality, Environmental Quality Commission, for inclusion of the City of West Linn as an independent wasteshed and reporting district for provision of the opportunity to recycle under ORS chapter 459, as interpreted by OAR 340-60-010 to 340-60-085.

This resolution adopted this 10th day of July, 1985.



Mayor

ATTEST:



City Recorder

Oregon Department of Environmental Quality

A CHANCE TO COMMENT ON...

**Proposed Rules to Identify the City of West Linn as a Wasteshed
NOTICE OF PUBLIC HEARING**

Date Prepared: 10/2/85
Hearing Date: 11/19/85
Comments Due: 11/20/85

**WHO IS
AFFECTED:**

Owners and operators of solid waste or recycling businesses in Clackamas County, the City of West Linn, and other cities within Clackamas County. Individuals involved in the implementation of the Oregon Recycling Opportunity Act (Oregon Revised Statutes 459.005 to 459.285).

**WHAT IS
PROPOSED:**

The Department proposes to revise OAR 340-60-025 to exclude the City of West Linn from the Clackamas Wasteshed and identify West Linn as a separate wasteshed, and revise OAR 340-60-030 to identify the principal recyclable materials in the West Linn Wasteshed.

**WHAT ARE THE
HIGHLIGHTS:**

The City of West Linn has requested this change. There should be no significant impact on other affected persons in the Clackamas Wasteshed or other wastesheds in the state. The City of West Linn will provide a separate Recycling Report to the Department by July 1, 1986 as required by the Recycling Opportunity Act.

**HOW TO
COMMENT:**

A public hearing will be held before a hearings officer at:

7:00 p.m.
Tuesday, November 19, 1985
Council Chambers
West Linn City Hall
4900 Portland Avenue
West Linn, Oregon

Written or oral comments can be presented at the hearing. Written comments can also be sent to the Department of Environmental Quality, Hazardous and Solid Waste Division, P.O. Box 1760, Portland, OR 97207, by Wednesday, November 20, 1985, 5:00 p.m.

Copies of the complete proposed rule package may be obtained from the DEQ Hazardous and Solid Waste Division in Portland (522 S.W. Fifth Avenue). For further information contact William R. Bree at 229-6975.

(over)



P.O. Box 1760
Portland, OR 97207

8/16/84

FOR FURTHER INFORMATION:

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

**WHAT IS THE
NEXT STEP:**

The Environmental Quality Commission may adopt rule amendments identical to the ones proposed, adopt modified amendments as a result of testimony received, or may decline to amend the rules. The Commission's deliberation should come in January, 1986, as part of the agenda of a regularly scheduled Commission meeting.

A Statement of Need, Fiscal and Economic Impact Statement, and Land Use Consistency Statement are attached to this notice.

YB5011.3

RULEMAKING STATEMENTS

for

Amendments to the Rules Pertaining to the Opportunity to Recycle
OAR Chapter 340, Division 60, Sections 025 and 030

Pursuant to ORS 183.335, these statements provide information on the intended action to amend a rule.

STATEMENT OF NEED:

Legal Authority

ORS 459.170 requires the Commission to adopt rules and guidelines necessary to carry out the provisions of ORS 459.165 to 459.200. ORS 459.175 allows a local government to appeal inclusion. Wastesheds are established by rule under these provisions. ORS 459.175 allows a local government to appeal inclusion in a wasteshed.

Need for the Rule

The City of West Linn has appealed its inclusion in the Clackamas Wasteshed. For the City of West Linn to be identified as a separate wasteshed, the Commission must amend the present rules which identify wasteshed areas and identify the principal recyclable materials for the West Linn Wasteshed.

Principal Documents Relied Upon

- a. Oregon Revised Statutes Chapter 459.
- b. Oregon Administrative Rules, Chapter 340, Division 60
- c. Resolution No. 85-18 from the City of West Linn, petitioning the Environmental Quality Commission for recognition as an independent wasteshed and reporting district, dated July 10, 1985.

FISCAL AND ECONOMIC IMPACT STATEMENT

This action should have no significant fiscal impact. The affected persons in the City of West Linn need to prepare their own recycling report rather than participate in the preparation of a recycling report for the Clackamas Wasteshed. Small businesses are unaffected.

LAND USE CONSISTENCY STATEMENT

The proposed rules appear to affect land use and appear to be consistent with statewide planning goals.

With regard to Goal 6 (air, water and land resources quality), the rules provide for recycling of solid waste in a manner that encourages the reduction, recovery and recycling of material which would otherwise be solid waste, and thereby provide protection for air, water and land resource quality.

With regard to Goal 11 (public facilities and services), the rules provide for solid waste disposal needs by promoting waste reduction at the point of generation, through beneficial use and recycling. The rules also intend to assure that current and long-range waste disposal needs will be reduced by the provision of the opportunity to recycle.

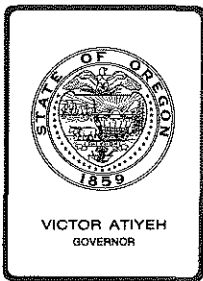
The rules do not appear to conflict with other goals.

Public comment on any land use issue involved is invited and may be submitted in the manner described in the accompanying NOTICE OF PUBLIC HEARING.

It is requested that local, state and federal agencies review the proposed action and comment on possible conflicts with their programs affecting land use and with Statewide Planning Goals within their expertise and jurisdiction.

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

WRB:b
YB5011.1
8/26/85



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

Attachment III
Agenda Item S
1/31/86, EQC Meeting

MEMORANDUM

To: Environmental Quality Commission

From: Marianne E. Fitzgerald, Hearings Officer *Marianne E. Fitzgerald*

Subject: Hearing Report for the Public Hearing Held on November 19, 1985 Regarding the Proposed Identification of the City of West Linn as a Wasteshed

Summary of Proceedings

Approximately 8 persons attended the hearing. Marianne Fitzgerald, Recycling Specialist in the DEQ Hazardous and Solid Waste Division, presided. Four persons presented oral testimony. No written testimony was received.

Summary of Testimony

Marianne Fitzgerald opened the hearing with a description of the rulemaking process for West Linn's proposal and a brief summary of the recycling program currently operating in the city.

Bob Mountain, a member of the West Linn Recycling Committee, said he is proud of West Linn's program and wants to share information about what can be done with other cities in a similar position. He felt the success of the program, with approximately 40-50% participation, was due to the people's willingness to cooperate. He wants to see less refuse going to the landfill, especially yard debris. No taxpayers' money has been used in the program, and it works.

Ed Druback, Recycling Coordinator for the city of West Linn, also worked on the grant program from Metro last year to develop the city's promotion and education programs. He said that from the beginning the city plagiarized from other successful programs around the state and around the nation. They recognized the importance of documenting specific information about one area's program, including contact persons on the local level. The City Council Resolution to request a separate wasteshed was meant to set up their program for others to look at and open the line of communication to other communities.

Larry Bollinger, an original member of the recycling committee, said he agreed with Mr. Mountain and Mr. Druback, that he was proud of the city's program and wanted it to be a model for other cities to follow.

Jerry Herrmann, a member of the West Linn recycling committee, also agreed with the previous witnesses. He said the Metro grant helped to support and evaluate the program. The city's goal of solid waste reduction was instrumental in the success of the recycling program, including recycling of 4,000 cubic yards of yard debris to date. He wants the city's program to be evaluated in a separate watershed report, rather than subsumed in an overall county report.

MEF:b
YB5011.4

OAR 340-60-025 and 340-60-030 are proposed to be amended as follows:

340-60-025

(1) The following areas are designated wastesheds within the state of Oregon:

(a) Baker wasteshed is all of the area within Baker County

(b) Benton & Linn wasteshed is all of the area within Linn and Benton Counties excluding the area within:

(A) the city of Gates

(B) the city of Idanha

(C) the city of Mill City

(c) Clackamas wasteshed is all of the area within Clackamas County and all of the area within the cities of Lake Oswego, Wilsonville, and Rivergrove excluding the area within:

(A) the city of Portland

(B) the city of Tualatin

(C) the city of West Linn

(d) Clatsop wasteshed is all of the area within Clatsop County

(e) Columbia wasteshed is all of the area within Columbia

County

- (f) Coos wasteshed is all of the area within Coos County
- (g) Crook wasteshed is all of the area within Crook County
- (h) Curry wasteshed is all of the area within Curry County
- (i) Deschutes wasteshed is all of the area within Deschutes
County
- (j) Douglas wasteshed is all of the area within Douglas County
- (k) Gilliam wasteshed is all of the area within Gilliam County
- (l) Grant wasteshed is all of the area within Grant County
- (m) Harney wasteshed is all of the area within Harney County
- (n) Hood River wasteshed is all of the area within Hood River
County
- (o) Jackson wasteshed is all of the area within Jackson County
- (p) Jefferson wasteshed is all of the area within Jefferson
County
- (q) Josephine wasteshed is all of the area within Josephine
County
- (r) Klamath wasteshed is all of the area within Klamath County
- (s) Lake wasteshed is all of the area within Lake County
- (t) Lane wasteshed is all of the area within Lane County
- (u) Lincoln wasteshed is all of the area within Lincoln County
- (v) Malheur wasteshed is all of the area within Malheur
County
- (w) Marion wasteshed is all of the area within Marion County and
all of the area within the cities of Gates, Idanha, Mill
City and the urban growth boundary of the city of Salem
- (x) Milton-Freewater wasteshed is all the area within the urban
growth boundary of the city of Milton-Freewater

- (y) Morrow wasteshed is all of the area within Morrow County
- (z) Multnomah wasteshed is all the area within Multnomah County excluding the area within:
 - (A) the city of Maywood Park
 - (B) the city of Portland and that area within the city of Portland's urban service boundary
 - (C) the city of Lake Oswego
- (aa) Polk wasteshed is all the area within Polk County excluding the area within:
 - (A) the urban growth boundary of the city of Salem
 - (B) the city of Willamina
- (bb) Portland wasteshed is all of the area within the city of Maywood Park, the city of Portland, and that area within the city of Portland's urban service boundary
- (cc) Sherman wasteshed is all of the area within Sherman County
- (dd) Tillamook wasteshed is all of the area within Tillamook County
- (ee) Umatilla wasteshed is all of the area within Umatilla County excluding the area within:
 - (A) the urban growth boundary of the city of Milton-Freewater
- (ff) Union wasteshed is all of the area within Union County
- (gg) Wallowa wasteshed is all of the area within Wallowa County
- (hh) Wasco wasteshed is all of the area within Wasco County
- (ii) Washington wasteshed is all of the area in Washington County and all of the area in the city of Tualatin excluding the area within:
 - (A) the city of Portland

- (B) the city of Lake Oswego
- (C) the city of Wilsonville
- (D) the city of Rivergrove

(jj) West Linn wasteshed is all of the area within the city of
West Linn

[(jj)] (kk) Wheeler wasteshed is all of the area within Wheeler County

[(kk)] (ll) Yamhill wasteshed is all of the area within Yamhill County
and all of the area within the city of Willamina.

- (2) Any affected person may appeal to the Commission for the
inclusion of all or part of a city, county, or local government
unit in a wasteshed.

340-60-030

- (1) The following are identified as the principal recyclable
materials in the wastesheds as described in Sections (4) through

(8):

- (a) newspaper
- (b) ferrous scrap metal
- (c) non-ferrous scrap metal
- (d) used motor oil
- (e) corrugated cardboard and kraft paper
- (f) container glass
- (g) aluminum
- (h) hi-grade office paper
- (i) tin cans

- (2) In addition to the principal recyclable materials listed in (1)
above, other materials may be recyclable material at specific

locations where the opportunity to recycle is required.

(3) The statutory definition of "recyclable material" (ORS 459.005(15)) determines whether a material is a recyclable material at a specific location where the opportunity to recycle is required.

(4) In the following wastesheds, the principal recyclable materials are those listed in Section 1 (a) through (i):

- (a) Benton and Linn wasteshed
- (b) Clackamas wasteshed
- (c) Clatsop wasteshed
- (d) Columbia wasteshed
- (e) Hood River wasteshed
- (f) Lane wasteshed
- (g) Lincoln wasteshed
- (h) Marion wasteshed
- (i) Milton-Freewater wasteshed
- (j) Multnomah wasteshed
- (k) Polk wasteshed
- (l) Portland wasteshed
- (m) Umatilla wasteshed
- (n) Union wasteshed
- (o) Wasco wasteshed
- (p) Washington wasteshed
- (q) West Linn wasteshed

[(q)] (r) Yamhill wasteshed

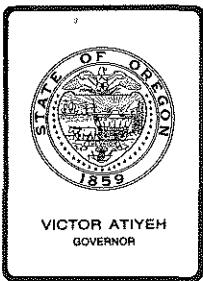
(5) In the following wastesheds, the principal recyclable materials are those listed in Section 1 (a) through (g):

- (a) Baker wasteshed

- (b) Crook wasteshed
 - (c) Jefferson wasteshed
 - (d) Klamath wasteshed
 - (e) Tillamook wasteshed
- (6) In the following wastesheds, the principal recyclable materials are those listed in Section 1 (a) through (h):
- (a) Coos wasteshed
 - (b) Deschutes wasteshed
 - (c) Douglas wasteshed
 - (d) Jackson wasteshed
 - (e) Josephine wasteshed
- (7) In the following wastesheds, the principal recyclable materials are those listed in Section 1 (a) through (e):
- (a) Curry wasteshed
 - (b) Grant wasteshed
 - (c) Harney wasteshed
 - (d) Lake wasteshed
 - (e) Malheur wasteshed
 - (f) Morrow wasteshed
 - (g) Wallowa wasteshed
- (8) In the following wastesheds, the principal recyclable materials are those listed in Section 1 (a) through (d):
- (a) Gilliam wasteshed
 - (b) Sherman wasteshed
 - (c) Wheeler wasteshed
- (9) (a) The opportunity to recycle shall be provided for each of the principal recyclable materials listed in (4) through (8) above and for other materials which meet the statutory

definition of recyclable material at specific locations where the opportunity to recycle is required.

- (b) The opportunity to recycle is not required for any material which a recycling report, approved by the Department, demonstrates does not meet the definition of recyclable material for the specific location where the opportunity to recycle is required.
- (10) Between the time of the identification of the principal recyclable materials in these rules and the submittal of the recycling reports, the Department will work with affected persons in every watershed to assist in identifying materials contained on the principal recyclable material list which do not meet the statutory definition of recyclable material at some locations in the watershed where the opportunity to recycle is required.
- (11) Any affected person may request the Commission modify the list of principal recyclable material identified by the Commission or may request a variance under ORS 459.185.
- (12) The Department will at least annually review the principal recyclable material lists and will submit any proposed changes to the Commission.



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item T, January 31, 1986, EQC Meeting

Request for an Extension of a Variance From OAR 340-25-315(1)(b), Veneer Dryer Emission Limits, for Leading Plywood Corporation, Corvallis

Background and Problem Statement

Leading Plywood Corporation owns and operates a plywood mill near Corvallis. Emission control equipment installed on the company's two veneer dryers in 1979 have not been adequate to maintain compliance with visible emission standards. Poor economic conditions and limited availability of viable replacement emission controls prevented the company from aggressively taking corrective measures until recent months.

On November 2, 1984, the Commission granted a variance to Leading Plywood Corporation with the stipulation that emission controls be installed and operating by January 1, 1986 (Attachment I). The company has completed the installation of emission control equipment on one veneer dryer but has failed to meet the time schedule for achieving compliance for the second dryer.

By letter dated November 25, 1985, Leading Plywood Corporation requested an extension of the variance to allow continued operation of the Prentice veneer dryer in violation of state emission standards (Attachment II). Subsequent correspondence was received on January 16, 1985 which indicated the inability of the corporation to purchase and install the necessary additional pollution control system at this time for financial reasons (Attachment III).

The delays in proceeding with emission controls for the second veneer dryer have been caused primarily by problems with vendor supplied components used on the prototype control device (GeoEnergy Aerosol Recovery System) on their first dryer. Equipment modifications and premature failure of the vendor supplied components have been outside the company's control.

The Commission is authorized by ORS 468.345 to grant variances if it finds that strict compliance with the rule or standard is inappropriate because:

- a) conditions exist that are beyond the control of persons granted such variance; or
- b) special circumstances render compliance unreasonable, burdensome or impractical due to special physical conditions or cause, or
- c) strict compliance would result in substantial curtailment or closing down of a business, plant or operation, or
- d) no other alternative facility or method of handling is yet available.

Evaluations and Alternatives

Leading Plywood Corporation has proceeded in a reasonable manner and timeframe to comply with the veneer dryer emission standards in accordance with the variance granted by the Commission on November 2, 1984. One of their two veneer dryers has been fitted with an approved emission control device. Necessary equipment design modifications and premature failure of vendor supplied electrical components resulted in delays for operation and performance evaluation of the prototype GeoEnergy aerosol recovery system (ARS) installed on veneer dryer number 1. The company has kept the Department informed of progress made by GeoEnergy Company to correct the difficulties. However, the lack of funds to purchase the second emission control system was not known by the Department until January 1986.

The Department staff has made preliminary observations of the ability of the GeoEnergy ARS to achieve visible emission compliance. The results have been favorable. Unit 1 has been on-line with a transformer/rectifier (a troublesome electrical component) supplied by another manufacturer since early December 1985. The Department expects to certify emission performance of this unit by June 1, 1986.

The Department has been reluctant to approve the second GeoEnergy ARS until satisfactory performance is shown by the prototype unit. Likewise, Leading Plywood Corporation did not feel that they could proceed with the second emission control unit without reasonable assurance that it could meet the required emission standards.

The company has now stated that their bank will not give clearance for additional capital expenditures at this time. The company claims higher

winter operating costs, seasonal depressed prices, and greater inventories have adversely affected their cash flow. They expect to be in a position to order the second GeoEnergy ARS by July 1, 1986.

Based on the Department's expectation to certify the number 1 GeoEnergy ARS by June 1, 1986, and the anticipated availability of funds for the needed emission control device, the proposed schedule for compliance would be as follows:

By no later than July 1, 1986, issue purchase orders for the second GeoEnergy ARS unit;

By no later than July 1, 1986, submit a Notice of Intent to Construct, including plans and updated specifications;

By no later than October 1, 1986, initiate the installation of emission control equipment;

By no later than November 1, 1986, complete the installation of emission control equipment and/or on-site construction;

By no later than December 1, 1986, complete and submit the data and results of a particulate source test from the Prentice veneer dryer emission stack (subject to waiver by the Department upon evaluation of test results from Moore dryer).

Three alternatives identified for consideration by the Commission are as follows:

1. Grant the variance extension for the Prentice veneer dryer with new increments of progress and a final compliance deadline of December 1, 1986. The emissions of one veneer dryer are now controlled by a GeoEnergy ARS. The company is not in a financial position to purchase the second unit at this time. Based on preliminary evaluations the prototype control system will comply with the emission standards and may prove to be one of the most effective control systems available for direct wood heated veneer dryers. There remains some risk that further physical problems would occur with the GeoEnergy ARS equipment and its acceptability could be delayed beyond July 1. Also, there is the possibility that the financial position of the corporation will not improve to the degree which allows acquisition of funds for the emission control system by July 1, 1986.
2. Switch from plytrim fuel to natural gas or other wood fuels containing no resins or salts. This alternative would require the company to change from low cost fuel, produced from excess materials trimmed from the final products, to a high cost fuel in the case of natural gas; or purchase pelletized wood fuel to be found and burned in the existing burners. In either case, the added cost of buying outside fuel and

provided for storage and disposal of the plytrim currently burned would add to the cost of doing business and result in further delays in completing the long-term solution. Additionally, the extent of emissions reduction is not known. Even with the change in fuel, emissions may not be in compliance.

3. Deny the variance extension request and require strict compliance with the emissions standards. Such action would be expected to result in severe production curtailments and possible plant closure to achieve compliance immediately.

The Department supports alternative 1, the variance extension for the Prentice veneer dryer emission control deadline. At this time, the GeoEnergy ARS unit appears to be one of the most effective control systems for direct wood heated veneer dryers.

Summation

1. Leading Plywood Corporation operates a sheathing grade plywood mill at Corvallis. Veneer dryer emissions from the Prentice dryer are out of compliance with the 20 percent maximum opacity limitation.
2. The Commission granted a variance to Leading Plywood Corporation on November 2, 1984 with conditions requiring compliance by January 1, 1986.
3. Partial compliance has been achieved in that emission control equipment has been installed on one of the two veneer dryers and is currently in operation. Necessary in-field changes and electrical component failures delayed start-up and DEQ emission compliance certification of the GeoEnergy ARS type of control device.
4. Leading Plywood Corporation has requested that a variance from veneer dryer emission standards be extended. They claim that funds are not currently available for purchase and installation of an emission control system on the Prentice veneer dryer at this time, but expect to be in a position to place purchase orders by July 1, 1986.
5. The Commission is authorized by ORS 468.345 to grant variances from emission standards if it finds that conditions exist that are beyond the control of persons granted such variance.
6. The Commission should find that meeting the schedule of the November 1984 EQC variance for installing emission control equipment on the Prentice veneer dryer has been beyond the control of Leading Plywood Corporation. They should also find that funds to purchase and install emission control equipment will not be available until July 1, 1986 because of low cash flow attributed to wood products market conditions.

Director's Recommendation

Based on the findings in the Summation, it is recommended that the Commission grant a variance to Leading Plywood Corporation for OAR 340-25-315(1)(b), Veneer Dryer Emission Limits, for the Prentice veneer dryer with increments of progress and a final compliance date as follows:

1. By no later than July 1, 1986, issue purchase orders for a second GeoEnergy ARS to be installed on the Prentice veneer dryer;
2. By no later than July 1, 1986, submit to the DEQ a Notice of Intent to Construct Application with plans and updated modifications to the GeoEnergy ARS to be installed on the Prentice veneer dryer.
3. By no later than October 1, 1986, initiate the installation of emission control equipment.
4. By no later than November 1, 1986, complete the installation of emission control equipment and/or on-site construction.
5. By no later than December 1, 1986, conduct and submit the data and results of a particulate source test on the Prentice veneer dryer emission stack (subject to waiver by the Department upon evaluation of test results from Moore dryer).



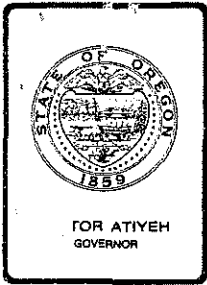
Fred Hansen

Attachments:

- I. Variance Extension Memorandum to EQC, November 2, 1984.
- II. Variance Request from Leading Plywood Corporation, November 25, 1985.
- III. Modified Variance Request from Leading Plywood Corporation, January 16, 1986.

Donald K. Neff:s
229-6480
January 16, 1986

AS2249



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission
From: Director
Subject: Agenda Item No. M, November 2, 1984, EQC Meeting

Request For An Extension of a Variance From OAR 340-25-315(1)(b),
Veneer Dryer Emission Limits, For Brand-S Corporation, Leading
Plywood Division, Corvallis.

Background and Problem Statement

Brand-S Corporation, Leading Plywood Division, owns and operates a plywood mill at Corvallis, Oregon. Past violations of the Department's 10% average and 20% maximum opacity limits for veneer dryer emissions resulted in issuance of a Notice of Violation and Intent to Assess Civil Penalty in April, 1983. Subsequent modifications in veneer dryer operation; dryer scrubber operation and maintenance; and dryer seal improvements failed to result in compliance. The Department notified Leading that violations were continuing and further work would be needed.

Due to severe economic conditions and poor profitability, the Company was unable to purchase commercially available veneer dryer control equipment. Leading Plywood requested and was granted a variance (Attachment A) from the Department's veneer dryer opacity limits by the Commission on October 7, 1983, subject to the following conditions:

1. The Company would complete modifications, already underway, on one of the existing dryer gravel bed scrubbers by adding a sand bed filtering section by October 10, 1983.
2. The Company was to review existing commercially available "off the shelf" veneer dryer control systems from three vendors; submit documentation on the suitability, expected performance and cost of installation of these systems for Department review; and select the most suitable system for installation by March 1, 1984.
3. By October 1, 1984, they were to purchase and install the selected control system and demonstrate compliance with the permit opacity limits.

4. Beginning April 1, 1984, the Company was to submit monthly reports, detailing progress in meeting the above requirements.

Leading Plywood has completed the requirements of Conditions 1, 2, and 4. (Progress reports were generally in the form of frequent telephone conversations and meetings with Department staff. Attachment B is a status report summarizing the Company's activities and investigations and has been accepted as satisfying the variance reporting requirements). However, the critical step of purchase and installation of adequate control equipment has not been met due to the following:

1. The Company's efforts to upgrade the existing gravel bed scrubber by installing a sand/fabric section were not successful. A large, "home-built" sand filter section was then added. In the Company's opinion, the new sand filter section was "equal to or better than" commercially available sand filters. The improved sand filter, however, failed to achieve compliance despite several months of fine tuning and modifications.
2. Price quotes and proposals were received on two commercial scrubber systems, the Radar Sand Filter and the Ceilcote Ionizing Wet Scrubber. Two other systems were considered but no proposals solicited because of compliance problems documented by the Department.

The Radar sand filter was rejected by Leading due to the inability of their own sand filter unit to achieve compliance. Since the Department has no other experience with sand filter scrubbers controlling wood fired dryers, we agreed with this conclusion. The Ceilcote proposal was rejected because of the high initial cost and the variability of performance on different wood fired dryer installations around the State. High maintenance and operating costs were also drawbacks for this small Company.

3. Concurrent with these investigations, Leading Plywood commissioned, with Department approval, two experimental pilot-scale control system tests (one on each dryer). Only one of the systems, the GeoEnergy Aerosol Recovery System (ARS), an electrostatic precipitator system used successfully for control of cooking oil smoke in the potato industry, appeared to hold promise in controlling wood fired emissions. Low projected operation and maintenance costs also made this control system appealing.
4. Leading Plywood represents possibly the "worst case" situation for control of wood fired dryer emissions:
 - a. Poorest quality resinous veneer is processed into sheathing grade plywood. Roughly 70% of the veneer dried is Douglas

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4. Leading Plywood represents possibly the "worst case" situation for control of wood fired dryer emissions:
 - a. Poorest quality resinous veneer is processed into sheathing grade plywood. Roughly 70% of the veneer dried is Douglas

fir "white spec", which historically produces the greatest amount of smoke or blue haze.

- b. The fuel used to heat the dryers is ground up trim from the plywood sheets and contains salts (from the resin glue) which aggravates opacity levels in the emissions.
 - c. When the dryers were converted from natural gas firing to wood firing in the mid-1970's, suspension burners were added to the superheater sections of the dryers. This configuration did not allow for efficient recirculation of exhaust gases for incineration of hydrocarbons and, therefore, no additional treatment occurs within the burner system.
 - d. High exhaust flows from each dryer increase the difficulty of successfully controlling emissions using conventional control devices.
5. In mid-1983, the Air Quality Division conducted a study of veneer dryer performance/compliance statewide. After preliminary review of the study, the Department found that there were compliance problems with all types of control systems serving wood fired veneer dryers and that none of the current technology was able to achieve continuous compliance with the 10% average opacity limit.
6. Leading Plywood has been suffering from the general downturn in the wood products industry for the past several years. At the request of their lending institution, the Company has taken measures to increase profitability. Steps include reducing work force, salaries, benefits, and hours of operation. The Company is limited by their bankers to amount of capital expenditures which can be made. Only recently have they been able to negotiate for purchase of emission control equipment due to the special considerations GeoEnergy is giving Leading Plywood on this system. However, if they are required to purchase other add-on equipment without accompanying accommodations in price and financing, funding would not be possible at this time.

Given the circumstances, Leading Plywood was reluctant to purchase any currently available commercial control equipment. However, the test results for the pilot GeoEnergy ARS show better opacity and particulate control than currently available commercial systems. Therefore, Leading Plywood chose to further pursue this option. After review of the test data, the Department agreed with this decision. Since funding was a major stumbling block for Leading and the technology was new to veneer dryer control, Department staff investigated EPA Research and Development

funding. EPA advised this project would compete nationwide for funds and appeared to have little chance for approval.

In early September, 1984, Leading Plywood reached a verbal agreement with GeoEnergy for purchase and installation of a prototype full-scale control unit at a reduced price. GeoEnergy agreed to this arrangement in an effort to establish the viability of their system for control of veneer dryer emissions in Oregon. Regional and Air Quality Division staff met with Leading and contacted GeoEnergy and verified that they were working on final contract language (anticipated contract signing by October 15, 1984). However, the October 1, 1984, deadline for achieving compliance cannot be met. The Department has issued a Notice of Violation and Intent to Assess Civil Penalties for failure to meet the deadline as outlined in the October, 1983, variance. Further enforcement is contingent upon continued progress toward achieving compliance and the Company's requesting an extension of the above variance.

By letter of September 27, 1984, Leading Plywood has requested an extension of their temporary variance, from the Department's 10% average, 20% maximum opacity rule for veneer dryer emissions (Attachment C). They propose to achieve compliance according to the following time table:

1. By October 15, 1984, sign final agreements and contracts.
2. By February 1, 1985, take delivery of the initial prototype control unit.
3. By February 15, 1985, complete installation of the prototype control unit.
4. By March 15, 1985, complete troubleshooting and tuning and notify the Department so certification observations can begin.

A second control unit would be ordered within 90 days of certification by the Department that the control system is meeting the limitations of the permit. By January 1, 1986, the second unit would be installed and in full operation.

The Commission is authorized by ORS 468.345 to grant variances from Department rules if it finds that strict compliance would result in substantial curtailment or closing down of a business, plant or operation; and/or special circumstances render strict compliance unreasonable, burdensome or impractical due to special physical conditions or cause.

Alternatives and Evaluations

The Department has reviewed several alternatives available to the Company as detailed in the Status Report (Attachment B). Four will be discussed here:

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4. By March 15, 1985, complete troubleshooting and tuning and notify the Department so certification observations can begin.

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Alternatives and Evaluations

The Department has reviewed several alternatives available to the Company as detailed in the Status Report (Attachment B). Four will be discussed here:

1. Request an extension of the October, 1983, variance to allow for design, construction, installation and DEQ certification of the prototype GeoEnergy ARS control system for both dryers.

This alternative would allow the Company to proceed with work already begun to control emissions. It would also provide an opportunity for the development of a new control technology for wood fired dryers. The Department feels this system will provide more reliable emission control for this difficult emission category. Because of the prototype nature of this control system, Leading Plywood would be able to purchase the necessary control equipment over the next 14 months at a price and terms acceptable to their lending institution and board of directors.

2. Purchase available new or used "off the shelf" control equipment with possible shorter installation time.

This alternative may or may not result in compliance. Final results are not easily predictable due to the nature of the Company's emissions and Department experience with currently available equipment in achieving continuous compliance. A variance extension would also be necessary to allow time for purchase and installation of equipment. Due to the high cost of this equipment, Leading Plywood may not be able to obtain financing for this alternative.

3. Change product mix to eliminate processing of resinous veneers which produce heavy smoke.

This alternative may allow the Company to reduce emissions using existing controls if non-resinous whitewoods were processed exclusively. There are currently several mills which operate dryers in compliance strictly on these veneers. It is doubtful, however, if Leading could achieve compliance unless a switch to non-resinous wood fuels occurred concurrently.

This alternative would require a complete change in veneer suppliers, marketing procedures, and possible modifications to the production lines. It is also questionable if room exists in this highly competitive plywood market for another supplier.

4. Switch from ply trim fuel to natural gas or other wood fuels containing no resins or salts.

This alternative would require the Company to change from low cost fuel, produced from excess materials trimmed from the final products, to a high cost fuel in the case of natural gas; or purchase pelletized wood fuel to be ground and burned in the existing burners. In either case, the added cost of buying outside fuel and providing

for storage and disposal of the ply trim currently burned would add significantly to the cost of doing business.

Additionally, the extent of emissions reduction is not known. Even with the change in fuel, emissions may not be in compliance.

After reviewing the above alternatives, Department staff concurs that installation of an add-on emission control device is the most practical alternative. Further, the development of the GeoEnergy ARS control system appears to hold promise of providing more reliable control of wood fired veneer dryers than is now available. Therefore, staff supports Leading Plywood's selection of alternative #1.

The Department staff has identified three alternatives available to the Commission:

1. Grant the variance extension with new increments of progress and a final compliance deadline of January 1, 1986. Contrary to the original variance, Leading Plywood is currently in the process of negotiating a purchase contract with final signing anticipated before November 2, 1984, for a prototype control unit. The Company has committed to purchase a second unit upon DEQ certification that this system complies with the Department's opacity limitations.

There is risk that this prototype control system will not comply with the Department limits and other measures would have to be taken.

2. Grant a shorter extension and require installation of commercially available control equipment on both dryers at the same time. The extension deadline would have to be determined based on delivery and installation times of the chosen equipment and presented to the Commission at a later meeting.

There is risk that the commercial control equipment will not bring about compliance due to the nature of the Company's emissions; and the Company would not be able to arrange financing and would not comply with the terms of the variance.

3. Deny the variance extension request and require strict compliance with the Department's opacity limits. Because of the magnitude of the current opacity violations, it is expected that severe production curtailments or plant closure would be necessary to achieve compliance.

Although the Department does not look forward to another 14 months of opacity violations from one dryer and 6 months from the other, the schedules proposed and a commitment to achieve compliance by January, 1986 (contingent upon the Department certifying this system) represents an acceptable solution. In addition, the possibility of developing a new control technology for use on wood fired veneer dryers is desirable. Therefore, the Department concurs with the variance request as submitted.

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There is risk that the commercial control equipment will not bring about compliance due to the nature of the Company's emissions; and the Company would not be able to arrange financing and would not comply with the terms of the variance.

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Although the Department does not look forward to another 14 months of opacity violations from one dryer and 6 months from the other, the schedules proposed and a commitment to achieve compliance by January, 1986 (contingent upon the Department certifying this system) represents an acceptable solution. In addition, the possibility of developing a new control technology for use on wood fired veneer dryers is desirable. Therefore, the Department concurs with the variance request as submitted.

Summation

1. Brand-S Corporation, Leading Plywood Division, operates a sheathing grade plywood mill at Corvallis, Oregon. Veneer dryer emissions are currently out of compliance with the Department's 10% average, 20% maximum opacity limitations. They are operating under a Notice of Violation and Intent to Assess Civil Penalty for these violations.
2. Leading Plywood's emissions represent the "worst case" situation because of the poor quality and resinous veneer they process; salts included in the dryer heat cell fuel; lack of dryer exhaust recirculation/incineration; and high exhaust flows from the dryers. Application of existing control technology would be difficult.
3. The Company was unable to finance and purchase add-on emission control equipment and received a variance from the Commission in October, 1983, that required modifications to their "home built" scrubber; review of commercially available veneer dryer control equipment; and selection, installation, and demonstration of compliance with opacity limits by October 1, 1984.
4. Leading Plywood completed modification of their "home built" scrubber but was unable to achieve compliance. Investigations into other types of control systems led them to believe no equipment was available which would assure continuous compliance with the Department's limitations. They did not meet the October 1, 1984, deadline.
5. Concurrent with the other work underway, the Company commissioned pilot-scale testing of two experimental control systems. Of the two, GeoEnergy's ARS control system appeared to hold promise in successfully controlling wood fired dryer emissions. The pilot-scale unit showed better opacity and particulate control than currently available scrubbers.
6. A statewide study by the Department in mid-1983 showed significant problems with wood fired dryer emission controls. As a result, the Department is encouraging Leading Plywood to pursue development of the GeoEnergy ARS control device, which appears to be a more suitable technology for wood fired dryers.
7. Leading Plywood reached agreement with GeoEnergy in early September, 1984, for purchase of a control system at a reduced price and favorable financing. They requested an extension of the October, 1983, variance under ORS 468.345 for a period of 14 months, and proposed an acceptable schedule for controlling dryer emissions. The extension would allow continued violation of the opacity limitations until adequate controls could be installed.

The Company has based their request on the lack of adequate control equipment available to assure continuous compliance due to special problems with wood fired dryer emissions and financial hardship if immediate compliance is required.

8. The Commission is authorized by ORS 468.345 to grant variances from Department rules if it finds that special circumstances render strict compliance unreasonable, burdensome or impractical due to special physical conditions or cause.
9. The Commission should find that special circumstances exist (lack of adequate control technology to insure continuous compliance of wood fired veneer dryer emissions) that render strict compliance impractical due to special physical cause.

Director's Recommendation

Based on the findings in the Summation, it is recommended that the Commission grant an extension to the October 7, 1983, variance to Brand-S, Leading Plywood Division, Corvallis, for OAR 340-25-315(1)(b), Veneer Dryer Emission Limits, with final compliance and increments of progress as follows:

1. Submit plans and specifications and Notice of Intent to Construct for one (1) GeoEnergy ARS prototype control unit before November 15, 1984.
2. Complete installation and begin operation of the prototype GeoEnergy ARS control unit on the Moore dryer by February 15, 1985.
3. Complete troubleshooting and system tuning and notify the Department the system is ready for evaluation by March 15, 1985. (Department staff will evaluate the system and determine compliance status by August 1, 1985.)
4. Submit plans and specifications and Notice of Intent to Construct for the second GeoEnergy ARS control unit by October 1, 1985.
5. Install and begin operation of the second ARS control unit by January 1, 1986.
6. Submit status reports, in writing, within 10 days after each of the above dates, notifying the Department if the requirements are being met.

Fred Hansen
Director

Attachments:

- A. October 7, 1983 Variance Report.
- B. Brand-S, Leading Plywood, Emission Control Status Report.
- C. Variance Extension Request, September 27, 1984.
- D. October 2, 1984, Notice of Violation and Intent to Assess Civil Penalty.

Dale Wulffenstein: wr
378-8240
October 9, 1984

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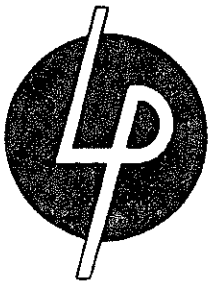
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378-8240
October 9, 1984



LEADING PLYWOOD CORP.

PHILOMATH 929-3143

P. O. BOX 1

CORVALLIS, OREGON 97330

Attachment II
January 31, 1986
EQC Meeting

November 25, 1985

RECEIVED

NOV 25 1985

Department of Environmental Quality
955 Summer St. N.E.
Salem, OR 97305

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
SALEM, OFFICE

Gentlemen:

As you are well aware, Brand-S Corporation and GeoEnergy International Corporation have made a major effort during this past year to achieve compliance with opacity requirements. We proceeded with the contract negotiations, construction and installation of the first electrostatic precipitator with the purpose of meeting the timelines approved by the Department of Environmental Quality. We began evaluating and testing the operational unit on March 21, 1985, just two days after the March 19 date that was projected in our status report of October 8, 1984. It became clearly evident, though, that the revolutionary concept would be in need of significant modifications before continuous operation could be expected. This modification process has caused us to miss the date of the purchase of the second precipitator and will cause the date for opacity compliance.

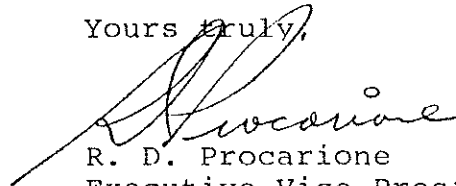
As has been our intention since the precipitator discussions began, the second unit will be purchased and installed as soon as the first is certified by the DEQ as being in continuous compliance with opacity requirements. Therefore, it is necessary to request an extension of our opacity compliance variance.

It is important to consider our request for an extension of variance in the proper perspective. First, we are still of the opinion that there is not another emission control device currently being marketed that would allow the Leading Plywood operation to achieve compliance with DEQ opacity levels. Second, we believe that everything possible was done to achieve full operation of the first electrostatic precipitator during the past year. And while there were numerous disappointments and setbacks, they were not caused by Brand-S or GeoEnergy but rather by the failure of components provided by third parties or by circumstances that could not be predicted. Third, while we understand our obligation to conform to the DEQ opacity requirements, it would be a poor business decision to purchase and install a second unit until the first has demonstrated its ability to function continuously.

NOV 25 1985
AIR QUALITY CONTROL

On the following pages is a chronological history of the installation and operation of the precipitator at Leading Plywood.

Yours truly,

A handwritten signature in cursive script, appearing to read "R. D. Procarione". The signature is written in dark ink and is positioned above the typed name.

R. D. Procarione
Executive Vice President

RDP/db

CHRONOLOGICAL HISTORY OF
LEADING PLYWOOD PRECIPITATOR

3/21/85 - PRESENT

- 3/21/85 Finished mechanical installation of unit.
- 3/25/85 Determined that a design problem with the bottom grid existed causing arcing at lower voltages than desirable.
- 4/7/85 Finished removing all probes and reinstalling 12 without a bottom grid.
- 4/8/85 Determined that the operation of the unit without the lower grid would result in higher voltages.
- 4/9/85 A circuit board in the control panel for the TR set fails. The board was sent back to NWL for rebuilding.
- 4/12/85 Received and installed rebuilt board which fails within 5 minutes. Sent circuit board back to NWL for repair.
- 4/24/85 Mr. Gary Ellis of NWL arrives on site with a rebuilt board. He determines that not only is the control unit defective but that the TR set itself has failed.
- 4/30/85 Removed controller and TR and shipped it back to NWL.
- 7/30/85 Received controller and TR back.
- 7/9 - 7/12 Mr. Don Richardson of NWL arrived to check out the TR set and controller. He determined everything in good order. Also hired Mr. Steve Jaasund of Jaasund AirTech to assist. It was determined that a carry over of large water drops from the plant scrubber was occurring (see attached report).
- 7/12 - 8/30 Designed cyclone and had fabricated.
- 8/31/9/05 Installed cyclone.
- 9/6/85 Controller fails again.
- 9/9 - 9/13 Mr. Jeff Richmond from NWL arrived to trouble shoot controller and finds unusually high frequency hi voltage spikes coming down instrumentation lines. He tries some filters on the lines, believing they will prevent controller failure but that they could possibly about the TR set. He takes information back to the lab to be analyzed.

- 9/16 - 9/20 NWL informs that they feel the problem lies in the grounding system. Mr. Bill Schrader, a professional electrical engineer from CH2M Hill is hired to troubleshoot grounding system. He determines that the ground is not the problem.
- 9/23 - 9/27 NWL suggests that we try some resistors in series with the output of the TR to try to cut down on the magnitude of the high voltage spikes. Several tests were made with limited success. At this point it is decided to put a permanent resistor in and run.
- 9/30 - 10/4 Obtain resistor.
- 10/7/85 Install resistor.
- 10/8/85 Hire services of Professor Corwin Alexander of OSU Electrical Engineering Department to look at problem. He feels that as long as controller stays working we will not burn out TR set.
- 10/9/85 Start up unit, control panel fails. Replace chip in control panel and unwind some wires that were wrapped around each other. The thought is that maybe the wires are inducing a field on the output of the chip causing failure. Initial observations appear to support this thought.
- 10/10/85 Visitation and field test by DEQ officials who observed and reported continuous opacity readings of 10% or less with no sightings in excess of 15%.
- 10/31/85 Second visitation and field test by DEQ officials who reported improved performance and more favorable opacity readings than the visitation on 10/10.
- 11/9/85 Transformer failed. After examination, it was concluded by GeoEnergy that design and engineering flaw resulted in the failure of the TR set. Until this TR set failed, however, the precipitator performed at or above expectations, well within DEQ requirements.
- 11/12/85 Located transformer made in Sweden which could be diverted to Leading Plywood to arrive during the first week of December. The Design specifications of the unit are consistent with the precipitator requirements and the manufacturer has units in similar precipitator operations in Sweden. Decision is made to purchase transformer.

The new transformer is scheduled to arrive on or about December 6, 1985. Installation is expected to be completed within one week of arrival. Restarting of the precipitator will follow immediately.

17
76



LEADING PLYWOOD CORP.

PHILOMATH 929-3143

P. O. BOX L

CORVALLIS, OREGON 97330

Department of Environmental Quality
Attention: Don Neff.
522 SW 5th Avenue
Portland, Oregon 97207

Dear Don,

January 15, 1986

We would like to ask the Board for a variance in replacing our present scrubber on the #2 dryer at Leading Plywood. The GEO unit on #1 dryer appears to be working well and our original plans were to install a second GEO scrubber on the #2 dryer as soon as the first GEO unit had been approved by the D.E.Q.

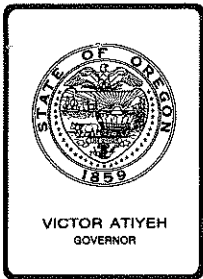
Our circumstances are such that we now have to get clearance from the bank for any capital additions or improvements. Unfortunately the necessity to build inventories combined with the normal higher winter operating costs and seasonal depressed prices for our plywood have adversely affected our cash flow. The bank has analyzed our current position and has told us that they will not approve the expenditure for a second scrubber at this time. However they do feel that we would be able to meet a July 1, 1986 date for ordering the second GEO scrubber.

The bank will confirm their analysis of our present financial situation and on the basis of that analysis we would like to get the Board's approval for a variance.

Sincerely,

Owen Bentley
Vice President of Corporate Affairs

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
JAN 19 1986
AIR QUALITY CONTROL



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Work Session, January 31, 1986, EQC Meeting

Proposed Stipulated and Final Order Settling Contested Cases
Regarding Transco Industries, Inc. (17-HW-NWR-84-45 and
18-HW-NWR-84-46)

Background

Transco Industries, Inc. is a metal fabricator which operates in east Multnomah County on 122nd Avenue. Many years ago, the company acquired about 8,000 barrels of magnesium chloride, also known as "still salts" from a rare metal refiner. These still salts are classified as a hazardous waste due to reactivity.

In May of 1984, DEQ issued a \$2,500 civil penalty assessment against Transco for the unlicensed storage of hazardous wastes (17-HW-NWR-84-45) and also issued a Department order (18-HW-NWR-84-46) requiring the still salts to be removed. Transco appealed both the civil penalty and the Department order, which are both pending before the Commission's hearings officer.

Over the past year, Transco had proposed several types of disposal methods including on-site treatment of the waste. Alternatives other than disposal at a licensed hazardous waste facility were explored due to the high cost of transportation and disposal at a licensed facility. Transco has recently decided that off-site shipment for disposal is the preferable option

Conditions of Proposed Order

After many months of negotiations, Transco and the Department have reached agreement on settling of the two above cases. The hazardous waste is stored at two locations; in a Troutdale warehouse, and at Transco manufacturing facility at 122nd Avenue in Portland. Transco intends to dispose of the material at the Chem-Security Systems, Inc. hazardous waste disposal site.

Transco does not have the financial resources to remove all the material at one time. However, the company is willing to dedicate money to resolving its violations over the next 7 calendar quarters.

The order provides for an orderly removal of the material to a licensed disposal site, and is projected to be within Transco's operating revenues. The Stipulation and Final Order requires Transco to ship 100 tons of still salts off-site each quarter. A penalty of \$750 per ton is to be levied against Transco if at least 100 tons of still salts are not shipped. This \$750 per ton payment will be held in a separate account for Transco or the Department to use in properly disposing of the material.

In addition, Transco is required to remove at least 15 tons of still salts per month, or pay \$5,000 into a special account which will again be dedicated to the expenses of proper disposal of the material.

Additional stipulated penalties are included for the timely submittal of the closure plans, personnel training plans, and contingency plans.

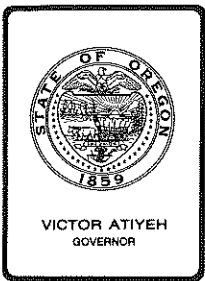
EPA has been involved in reviewing the order and agrees to this approach.

Recommendation

The Department recommends that the Commission consider the proposed Stipulated and Final Order and approve it.

Fred Hansen

JAGillaspie:r
RR447
229-5292
1/31/86



Environmental Quality Commission

Mailing Address: BOX 1760, PORTLAND, OR 97207

522 SOUTHWEST 5th AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

ENVIRONMENTAL QUALITY COMMISSION

January 31, 1986

Breakfast Agenda

- | | |
|-----------------------------------|--------|
| 1. Forestry Matters | Hansen |
| 2. Review of Legislative Concepts | Biles |

Lunch Agenda

- | | |
|-----------------------------------|-------|
| 1. Review of Legislative Concepts | Biles |
|-----------------------------------|-------|

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE MEMO

TO: Environmental Quality Commission

DATE: January 27, 1986

FROM: Stan Biles

SUBJECT: 1987 Legislative Concepts

Since November, agency staff have been considering legislative proposals for introduction to the 1987 Legislature. Staff were encouraged to employ their maximum creativity to develop suggestions that would: 1) enhance the effectiveness of current programs, and 2) establish new programs where needs could be documented.

The concepts attached are the first attempt to define the agency's 1987 legislative agenda. Each concept is only a proposal at this time. Clearly more work is necessary before we proceed to formal drafting and introduction. We bring these concepts before the Commission at this time for two purposes. First, the staff would appreciate hearing the Commission's evaluation of the proposals. Are some clearly unacceptable? Are revisions needed to others? As the surviving concepts are developed during the Spring we will insure that the Commission's thoughts are incorporated into the final proposals. Second, are there statutory revisions that the Commission believes are necessary but the attached concepts do not adequately address? At this point in the process we have sufficient time to fully research and otherwise develop new concepts for the Commission. By hearing the Commission's analysis at this time, we will have greater confidence that the Department's final legislative package fully reflects your thoughts.

During your breakfast and lunch meeting staff will make short presentations on their highest priority concepts and respond to the Commission's inquiries and suggestions.

A copy of our proposed legislative preparation schedule is attached for your review.

SB:r

BR428

cc: Fred Hansen
Division Administrators

Legislative Preparation Schedule

(Draft 1/24/86)

November (85)-January(86): Initial concept development

January 31: Initial EQC concept review.

February: Further development of concepts.

March 1: Submissions of preliminary concepts for Executive Department review.

March - May: Further development of concepts.

May - June: EQC review of surviving concepts.

August: Submission of approved concepts to Governor for authorization.

September-October: Legal Counsel drafts legislation.

November: Final EQC review.

December: Formal Introduction.

January (87): Session begins.

BR429

AIR QUALITY
LEGISLATIVE CONCEPTS

PRELIMINARY
1987 LEGISLATIVE CONCEPTS

A. Indoor Air Quality

Concept: Establish statutory authority to address indoor air quality

Purpose: Because most people spend more than 80 percent of their time indoors, the potential health affects of indoor air pollution may be more serious than those resulting from outdoor air pollution. Indoor air pollution takes many forms: gaseous products from unvented indoor combustion, tobacco smoke, radioactive gas from subsoil or well waters, toxic chemicals from cleaning agents, disinfectants, or pesticides, formaldehyde, and asbestos, as well as other pollutants, viruses and bacteria. Many of these substances have been linked to cancer, heart and respiratory diseases, infectious diseases, and allergies. The establishment of indoor air quality standards and model building codes can have a significant impact on improving air quality of the home and office environment and thereby improve overall health levels. Since no State agency currently has statutory authority in this area, legislation is needed to establish the appropriate laws to address this serious threat to public health.

B. Asbestos Control

Concept: Require that asbestos removal contractors be certified to insure that safe removal procedures are being followed in order to minimize public exposure to asbestos.

Purpose: The Department now regulates the removal of asbestos during renovation and demolition activities involving industrial and commercial buildings, apartment structures over four units in size, and certain other structures. These activities are regulated under rules adopted by the Environmental Quality Commission (EQC) in 1975 as a delegation of the Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAPS).

Because of the growing concern about asbestos related disease, the Department is proposing to add provisions to the asbestos regulations to provide greater protection for the public from asbestos exposure. These added provisions would require that contractors who work with asbestos be certified. In order to be certified, contractors would need to demonstrate that their workers have been trained in the correct procedures for removing asbestos and that safe procedures for removal, transportation, and disposal of asbestos are being followed. The development of this type of program would be closely coordinated with the Workers' Compensation Department because of their responsibility to protect workers from asbestos exposure.

A review of the Oregon Revised Statutes (ORS) needs to be conducted to determine if the EQC already has the authority to adopt the proposed additional regulations. If the EQC has the authority to adopt these regulations without further legislative authority, the Department would develop proposed regulations for presentation to the EQC in late 1986. If legislation is required, proposed legislation could be drafted for the next legislative session.

C. Asbestos Control

Concept: Provide assistance to homeowners to assess and minimize asbestos exposure.

Purpose: Asbestos-containing products have been widely used in home construction. Many homes in Oregon have asbestos in the heating system insulation, textured ceilings, woodstoves, vinyl flooring, and other materials. These products can present a health hazard if allowed to deteriorate or be improperly handled. The hazard is particularly significant because of the presence of children in homes and the long developmental period for asbestos-induced diseases.

Homeowners are turning to several State agencies for information and assistance in asbestos. Calls are frequently precipitated by concerns over renovation work that has recently been done in the home by a hired contractor. However, no State agency has funding to assist the homeowner.

The proposed legislation would fund an asbestos assistance program for homeowners. One or two persons would be available to answer homeowners' questions, conduct home inspections, prepare informational pamphlets, and provide other assistance to homeowners.

D. Asbestos Control

Concept: Require that publicly-owned or accessed buildings be surveyed for asbestos materials to minimize worker and public asbestos exposure.

Purpose: The risks attendant with exposure to asbestos in buildings have been acknowledged through two building surveys in Oregon. One survey project, administered by the U.S. Environmental Protection Agency (EPA), required the inspection of all primary and secondary public schools for asbestos and certain follow-up actions. The other survey was conducted by the State in buildings owned by State agencies in preparation for filing a claim for relief from Johns Manville, Inc. These surveys point out the need to identify asbestos in buildings and undertake asbestos abatement when necessary.

This legislative concept would require that publicly accessible buildings throughout the State be inspected for asbestos. The owners of publicly-owned buildings; commercial buildings such as retail stores, banks, office buildings, apartment buildings, common areas, and medical facilities; and other classes of buildings which may present significant asbestos exposure risks, would be required to inspect each building.

The information obtained from the inspection would be provided to all building tenants, the supervising State agency, and, on request, other affected parties. Any building owner would also be required to notify any prospective lessee of the presence of any friable asbestos in the building. In any building which had airborne concentrations of asbestos in excess of 0.1 fibers per cubic centimeter as a result of the presence of friable asbestos materials in the building, asbestos hazard warning signs would be required at each building entrance.

This building survey would be beneficial in identifying asbestos health risks, increasing public awareness, supporting existing State programs on asbestos abatement, and potentially reducing the exposure of workers and the general public to a known carcinogen. Funding would be required for a State agency to establish survey requirements, ensure compliance, assist building owners, and provide information and answer questions from the public.

E. Woodstove Retrofit Labelling

Concept: Require all woodstove retrofit emission control systems sold in the State to be labelled for emission and efficiency performance.

Purpose: Woodstove air pollution is the most widespread serious outdoor air pollution problem in the State. Department studies have found elevated levels of carbon monoxide (CO) and particulate in small communities and residential neighborhoods which are attributed to woodstove use. In addition, national studies are revealing these sources to be major emitters of toxic air pollutants. Weatherization and new stove certification programs now in existence will help alleviate the problem but are relatively long-term solutions. Application of retrofit emission control systems to existing woodstoves has the potential to reduce emissions in the range of 50 percent in a relatively short period of time. Labelling of retrofit performance would provide such devices and thereby reduce this particular threat to public health.

see "H"

F. Licensed Self-Inspecting Fleet Fee Increase

Concept: It is proposed that the fees specified in Oregon Revised Statutes (ORS) 468.405(1)(a)(A) and (B) be increased from \$5 and \$1 to \$40 and \$20, respectively.

Purpose: ORS 468.405 establishes the fee schedule for fees for both the Certificate of Compliance and for fees for licensing of self-inspection fleets. Only the fees for self-inspecting fleet licenses are proposed to be increased; no changes in fees for the Certificate is suggested.

Currently, there are over 40 self-inspecting fleets. These fleets have an average of one analyzer and three inspectors. The current licensing fees of \$5 with a \$1 renewal are too low. They do not cover the administrative cost of billing and invoicing. They do not cover the costs that the program incurs in the biennially required fleet inspector training class.

The suggested fees of \$40 for the initial registration and \$20 per year for renewal of these licenses are in line with fees charged by other State agencies for equipment and personnel with similar licensing responsibility. The Department of Agriculture charges a \$15 per year fee for each gasoline pump. The Department of Commerce charges \$30 for registration of air compressors.

The fiscal impact of such a change would provide the Department an additional \$4,000 revenue from licensing fees given the current amount of licenses outstanding. The proposed fees are reasonable and appropriate, and would not be a burden on the current fleets. No discount provisions is suggested for governmental agencies.

G. Counterfeit Certificate of Compliance

Concept: Change penalty for counterfeiting of Certificate of Compliance from a Class C Traffic Infraction to a Class C Felony.

Purpose: Oregon Revised Statutes (ORS) 815.315 provides that the offense of use of improper certificates for pollution control systems is a Class C Traffic Infraction. The statute defines the offense of use of improper certificate of compliance when a person makes, issues, or knowingly uses any imitation or counterfeit Certificate of Compliance.

At this time, there is no known activity dealing in counterfeit certificates. There have been allegations of such activity in the past.

During this last summer, as the result of a complaint, the Department cooperated with the State Police on an investigation in alleged improprieties regarding certificate issuance. The State Police indicated that other statutes, rather than the statute dealing with counterfeiting, would have had to have been used if prosecution of charges were warranted. No evidence of any wrong doing was discovered in the State Police investigation.

The reason for proposing the change is that the penalty, a Class C Traffic Infraction, is not appropriate to the offense. The offense of counterfeiting of government documents is usually classified as a Felony. A change in penalty to an appropriate level is proposed. Without such a change, there might not be sufficient incentive to investigate similar allegations in the future.

H. Woodstove Retrofit Certification-Rebate Program

Concept: Certify, on a voluntary basis, woodstove emission control retrofits that meet minimum emission control and design criteria. Provide 35 percent rebate for certified retrofits--funding for rebates to be provided by minimal increase in woodcutting permit fees.

Purpose: Woodstove air pollution is the most widespread serious outdoor air pollution problem in the state having adverse impacts on public health, generating neighborhood nuisances and using airshed space that might otherwise be available for growth and development. In addition, use of inefficient woodstoves increase fire hazards and accelerate consumption of the state's wood resources. A New stove certification program now in existence will help alleviate the problems but it is a relatively long-term solution. Short-term strategies, including weatherization and curtailment during severe pollution conditions, have not worked as well as had been hoped. Application of retrofit emission control systems to existing woodstoves has the potential to reduce emissions in the range of 50 percent in a relatively short period of time. It is apparent that the market will need significant stimulation if significant installation of woodstove retrofits is to occur. A voluntary certification-rebate program could provide the needed incentive to both manufacturers and stove owners.

WATER QUALITY
LEGISLATIVE CONCEPTS

Preliminary
1987 LEGISLATIVE CONCEPTS

A. Construction Grants Revolving Loan Fund

The federal Sewage Works Construction Grants program has provided substantial funds to cities to assist in financing required sewage works construction. Continued funding for the program is awaiting final action by Congress to reauthorize the Federal Clean Water Act. Both the House of Representatives and the Senate have passed reauthorization bills. A Conference Committee has been appointed, and is expected to meet beginning in February or March 1986.

Both bills contain provisions to phase out the historic "grant" program and convert it to a state administered loan program. Although the details differ in the timing of the transition, both bills provide for appropriated funds to be used for grants to states for establishment of a water pollution control revolving fund.

It is likely that final legislation will require that funds be used for low interest loans to cities to construct sewerage facilities which are listed on the State's project priority list (currently developed pursuant to federal law to determine which projects receive grants). A state match of 15-20 percent will likely be required for the federal funds used to capitalize the revolving loan fund.

If Oregon is to be able to take advantage of the federal funds that may be made available for this program, state statutory authority to establish and administer a revolving loan fund for sewerage works construction will be needed. The legislation will likely have to:

1. Establish a revolving loan fund account in the state treasury which is continuously appropriated for the established purpose.
2. Authorize the Environmental Quality Commission to adopt rules for administration of the fund in a manner consistent with minimum federal requirements.
3. Authorize the Department of Environmental Quality to administer the fund.
4. Authorize the Department of Environmental Quality to transfer funds from the pollution control bond fund as necessary to meet match requirements.

B. Revisions of On-Site Sewage Disposal Statutes

The existing statutes regulating on-site sewage disposal were enacted in 1973. At that time, small lot subdivisions were being created relying on

on-site sewage disposal. Substantial funds were being expended to construct sewers to solve health hazards in areas previously developed using on-site sewage disposal methods. The 1973 legislation established a uniform statewide permit program to regulate on-site system installation, transferred administration from the Health Division to DEQ, and provided for contracts with counties to operate the state program.

Since the uniform statewide program was established, substantial program has been made in land use planning in Oregon. Plans have been developed which establish urban growth boundaries for cities. Urban densities are generally not allowed without adequate public facilities. In short, problems of the type being pursued in 1973 are no longer being created.

In addition, a number of alternative systems have been developed and approved to allow use of existing lots that previously were unbuildable. The combination of these changes over the past 10 years have changed the nature of the need for a regulatory program.

The present program is costly to operate. Fees received for permits and services are not adequate to fund the operation of the program. Significant increase in fees will not likely resolve the problem since higher fees may encourage illegal installation of systems.

There are several areas where modification of the program appears appropriate to streamline efforts without causing adverse environmental impact. The present statute is quite specific and precludes modification of the program to achieve better operating efficiency.

Potential streamlining efforts generally involve expanding flexibility for the EQC in rulemaking as follows:

1. Establish a statement of Purpose and Policy for regulation of on-site sewage disposal.
2. Establish clean authority to exempt geographic areas or specific types of systems from certain permit procedures; eg., issue general permits rather than individual permit.
3. Establish clean authority to require commercial installers of on-site systems to be trained, certified, and responsible for proper installation of systems.
4. Eliminate the present complex variance process and replace it with a simpler process.
5. Eliminate the requirement for state issuance of a certificate of satisfactory completion. Make the installer of the system responsible for proper installation in compliance with requirements of rules or the permit.

C. Sludge Rule Enforcement

ORS 468.778, enacted in 1983, requires the Environmental Quality Commission to adopt rules governing the use of sewage sludge on agricultural, horticultural or silvicultural land. The Commission adopted rules pursuant to this statute in August 1984.

Civil Penalties can be used to enforce these rules. However, if criminal penalties are to be available as an enforcement mechanism for violations of sludge disposal rules, amendments of the criminal penalty provisions of ORS Chapter 468 may be necessary.

The Department generally considers civil penalty authority to be sufficient for dealing with the majority of potential problems. However, historic problems with improper disposal of septic tank pumpings suggest that criminal penalties may be appropriate in some instances.

ORS 468.990 and 468.992 should be amended to extend criminal penalties to violation of sewage sludge disposal rules.

D. Streamline Health Hazard Annexation Process

When the Health Division certifies that a health hazard exists as a result of inadequate sewage disposal in an area adjacent to a city, the city can be ordered to annex the area (without opportunity for remonstrance) and construct sewers to solve the problem. The process dictated in the statute is complex, has numerous steps, and is generally designed to assure opportunity for residents in the area to be heard through the process.

The process has been used numerous times. A backlog exists at the Health Division of areas awaiting study, data collection, and hearing. The complexity of the process tends to discourage its use on small health hazard areas with relatively few homes.

If more rapid progress is to be made in resolving sewage disposal related health hazards, the process needs to be streamlined and simplified.

Potential options for streamlining include:

1. Define health hazard in more specific terms to simplify the determination of the existence of a hazard.
2. Establish a shortened process for small areas within a specified distance of existing sewers and/or for areas within Urban Growth Boundaries.

E. Containment for Above-Ground Storage Tanks

Legislation passed in 1985 authorizes the Department to initiate a program to regulate underground storage tanks to prevent and abate pollution of groundwater resulting from leaks.

Existing legislation and programs require some above-ground petroleum tanks to have containment for contents of the tank to limit the spread of flammable or hazardous materials and risk to the public in the event of tank rupture. Current containment requirements do not cover non-flammable hazardous materials.

Experience has shown that such facilities are generally not designed to prevent seepage of spilled product into groundwater. In fact, ground absorption may even be encouraged to minimize risk of fire or explosion.

Amendment of the recently passed underground tank regulation legislation to include above-ground tank containment may be necessary to assure protection of groundwater and surface water.

An alternative may be to work with the Department of Commerce to modify the Uniform Building Code for Oregon to require containment and groundwater protection.

F. Financial Assurance

The Department has recently been involved in several abandoned operations for recovering gold from ore by cyanide leaching. Some of these operations were covered by DEQ issued Water Pollution Control Facilities permit. The operators abandoned the operation without proper cleanup -- leaving a potential water pollution problem and an abandoned hazardous waste site.

This is but one type of facility where some form financial assurance to guarantee resources for proper closure would be an appropriate condition of permit issuance.

Legal counsel advises informally that specific statutory authority would be desirable to support inclusion of a financial assurance condition in NPDES or WPCF permits.

The appropriateness of such a legislative authority should be discussed further.

HAZARDOUS AND SOLID WASTE
LEGISLATIVE CONCEPTS

Preliminary
1987 LEGISLATIVE CONCEPTS

A. Enforcement of METRO's Waste Reduction Plan

SB 662 requires METRO to submit a waste reduction plan to the Commission by January 1, 1986. The EQC must approve or reject the plan by July 1, 1986. After the Commission approves the plan, it has no specific statutory authority to require METRO to implement the plan or submit proposed revisions for EQC approval.

The Department proposes to submit a bill to the 1987 Legislature amending ORS 459 to provide the Commission authority to enforce METRO's Waste Reduction Plan.

B. Plastics Recycling

The amount of plastics in the solid waste stream is steadily increasing. The variety and chemical composition of these materials makes it difficult for the untrained person to recycle them. The Department is concerned that if action is not taken to assist in the recycling of plastics their share of the wastestream will continue to grow offsetting much of the progress made in recycling other materials.

The Department is establishing a Plastics Recycling Task Force to review the situation and propose appropriate legislation for the 1987 session. A report is expected by June 1986.

C. Alternative Technology Siting

SB 662 provides the Commission with authority to site solid waste disposal facilities for the Portland metropolitan area. This authority expires July 1, 1987. METRO's schedule for determining which alternative technology facilities, if any, will be constructed does not allow the EQC to site by the July 1 deadline. Examples of potential alternative technology facilities include: mass burner; refuse-derived fuel plant; composting plant.

The Department believes alternative technology facilities are a very important component of METRO's Waste Reduction Plan, and the authority for the EQC to site them under SB 662 may be critical to their success. Thus, the Department proposes to develop a bill to amend ORS 459 to extend the Commission's siting authority for alternative technology facilities beyond July 1, 1987.

D. Recycling Markets Incentives

As SB 405, The Opportunity to Recycle Act, is implemented and the supply of recycled commodities increases, it is hoped that markets for these materials will develop and grow. As the Department has reported to the Commission previously, these markets are often weak and unstable. To the extent they can be strengthened, the chances for successful implementation of SB 405 improve significantly.

The Department proposes to review Oregon statutes to determine where changes can be made to provide the same financial incentives to use recycled products as exist for virgin materials. Further, it is proposed to strengthen current statutes involving procurement of recycled materials by government agencies. State and local governments combined are the largest employer in the state and as such represent a significant untapped market for recycled goods.

E. Comprehensive Rewrite of Solid Waste Statutes, ORS 459

ORS Chapter 459 sets forth a comprehensive statutory scheme for management of the recycling and disposal of solid waste in the state of Oregon. First adopted in 1971, these statutes have been amended many times to adjust to changing conditions. However, Chapter 459 does not provide a clear road-map for how solid waste is to be managed in the state.

Some of the areas where there are gaps in the current statutory structure follow:

1. No government agency is required to provide for the proper disposal or recycling of all solid waste or to ensure that it is provided by other public or private entities.
2. Local governments are allowed, but not required, to develop solid waste management plans and submit them to the Department for review and approval.
3. It is not clear what government agency is responsible for cleaning up abandoned solid waste disposal sites and no funding mechanism is provided.
4. No program or incentives are available to assist business and industry to make changes in their processes to reduce or minimize their generation of solid wastes.
5. Local governments in rural counties find it difficult to allocate adequate resources to solid waste management. A better funding mechanism is needed to ensure solid waste can be managed and disposed in an environmentally sound manner.
6. Siting replacement solid waste disposal facilities is a state-wide problem that is not adequately addressed by the current statutes.
7. Civil penalties for violation of EQC regulations are limited to \$500 per violation. This is not adequate in some cases to motivate the desired environmental remedy.

F. Change Basis for Solid Waste Permit Fees from Benefit Received to Unit Charge

Background

The statute currently requires that fees for Solid Waste Disposal Permits be based upon the anticipated cost of filing and investigating

the application, of issuing or denying the requested permit, and of "an inspection program to determine compliance or noncompliance with the permit."

Discussion

During public hearings on the rules (fee schedule) to implement these fees, there was overwhelming testimony that the fees should be more responsive to the population served and amount of solid waste received by a disposal site. To many, this represents the relative overall contribution to the solid waste "problem" and the best indicator of overall amount of attention drawn from the Department. The Department agrees. Much of the solid waste regulatory activity related to disposal is indirect to the disposal site operation and more direct to the users of the sites. For example, rule development and maintenance is a necessary part of the required "inspection program" that affects all disposal sites and the public. Other examples of indirect services are assisting in landfill siting and inspection of closed landfills (closed before July 1, 1984). Accordingly, the costs for these activities would most equitably be reflected in a uniform unit charge rather than by attempting to distribute costs on some sort of a case-by-case basis.

As a practical matter, it is easier to determine the amount of waste received at a disposal site than to determine the population served. For example, more than one disposal site may serve a specific geographic area and waste may flow out of one service area into another due to access, cost of disposal, etc. Also, the amount of waste received is more significant than the theoretical population served in determining the probable environmental impact of a disposal site. A unit charge would also eliminate the large increase in fees when moving upward into the next highest fee range. Under the current schedule, there is as much as \$12,000 difference when moving from one fee category to a higher one. For these reasons, the Department recommends a unit charge system based on amount of waste received, rather than population served or the amount of direct staff time a given disposal site receives.

Legislative Concept

Amend ORS 468.065(2), relating to fees for Solid Waste Disposal Permits, such that fees are assessed on the basis of a unit charge. Unit charges could be for the amount of waste received, number of people served or the actual amount of service (staff time) received from the Department. The Department recommends that fees be based on the amount of waste received.

Support and Opposition

Although a unit charge is the most equitable way to assess fees, support for this concept may be difficult to obtain. This statute pertains to air quality and water quality permits, as well as to solid waste permits. Therefore, any change in the statute could potentially affect the way that air and water quality permit fees are assessed. This will no doubt be a concern to both programs, as well as to the industries and local governments who hold those permits.

In reality, all three programs currently assess fees on a modified unit charge basis, by the use of fee categories which are defined by the amount of waste received or discharged. While we would prefer to have this authority clarified and modified, it is probable that we can achieve most of our goals by amending our administrative rules (i.e., changing the fee schedule). It may be prudent to attempt this solution first, before pursuing this proposed statute change.

G. Tire Tax/Fees to Clean Up Tire Piles and/or Fund Recycling/Disposal of Waste Tires.

Background

Regional Offices have identified fifteen tire piles throughout the state which contain approximately 4 million tires. Of these 15 piles, five are located at permitted landfills (1.5 million tires). This leaves 2.5 million tires in non-permitted piles. Further investigation will probably produce additional tires on private lands. The Department has the authority to require a permit on these tire sites, but this does not assure removal if there is no current source of income. Most owners have limited resources and will probably be unable to remove the tires. When enforcement action has been initiated in the past against illegal tire piles, they have been known to "mysteriously" ignite. In recent years there has been at least 22 tire fires.

Examples of larger accumulations of reject tires are the Les Schwab Tire Landfill in Prineville - 1 million tires (divided into piles of 50,000); Harpold site, Klamath County - 1 million tires; Bracelin & Yeager, Coos Bay !! - 35,000 tires; Roseburg Landfill - 200,000 tires; and The Steve Wilson Company, White City - 1.5 million tires. After a very large tire fire occurred at Everett, Washington in 1984, the U.S. Environmental Protection Agency issued a "Remedial Order" to The Steve Wilson Company requiring perimeter fencing and separation of the tires into smaller piles with fire lanes.

Need

The existing tire piles should, over time, be eliminated. For those sites where there is no revenue or limited resources, state grant money or some other subsidy may be the only way to solve the problem. As many as 2.5 million tires may be in this category.

Concepts

1. The State of Washington has recently enacted legislation which levies a fee of \$.12/\$100 of tire sales. This money is to be used for an informational program relating to tire recycling and for grants to local governments for removal of tire piles. Based on an estimated sale of 2 million tires/year in Oregon, this could generate \$100,000 to \$150,000 revenue. Removal of tires from tire piles for recycling can cost between \$.40 and \$.80 per tire. Using an average cost of \$.65/tire the dollars generated under Washington's Program would remove between 150,000 and 230,000 tires each year. Using the 2.5 million tires figure it would take 10 to 16 years to clean up existing piles (if 100%

grants were given) a higher fee, of course would speed this up. The program could terminate ("sunset") after the backlog of tires is taken care of.

2. Tire "Bottle Bill" legislation. This could assure that "new" reject tires would be available for recycling. If a fee of \$2/tire were charged, we could expect the following:
 - a. Return of \$1 to consumer when old casing was turned in. This would assure that most reject tires would return to the recycling system.
 - b. The \$1/tire remaining could be used to assure transport to Portland for recycling (average of \$.65) and the remainder (\$.35) could be used for grants to reduce existing tire piles. This would accelerate removal of tire piles from the initial concept (existing piles could be eliminated in approximately 2-3 years). After existing piles are eliminated, the fee could be reduced to maintain the actual cost of refund and disposal.

The above fees do not reflect cost of program administration - collecting the fee and administering the program. In addition a system for identifying tires which have been assessed the \$2 fee would have to be developed such as marking the tires or issuing a sticker with the sale to be placed on the reject tire when turned in. Tires entering the system without proof of payment could be charged \$1 to cover disposal.

H. Improved Financial Assurance on Landfills

Background

ORS 459.270 requires land disposal sites, which are not exempt under Department Rules, to provide a financial assurance plan 5 years prior to closure. The financial assurance requirements are supposed to make certain that there are enough funds to adequately close the site well in advance of closure.

1. It is very difficult to accurately "guess" when the 5 year period prior to closure begins. It can always be argued that the site intends to operate longer than 5 years from any point in time. This makes enforcement of the financial assurance requirements very difficult. Butte Falls and Warrenton are examples of this situation.
2. Sites may not have 5 years "advance notice" that they are going to close.
 - a. Sites such as the Turner site in Morrow County, the LaVelle site in Portland, and the Sherman County site in Biggs, may have to close on short notice because the land owner refuses to renew their lease.

- b. Sites, such as Warrenton, Hood River, and Butte Falls, may be required by the Department to close on relatively short notice due to environmental contamination.
 - c. Sites such as the Lawen site in Harney County may be forced to close by natural occurrences (flooding of Harney Lake).
 - d. Sites, such as the George Ward Sludge Processing site may be forced to close on short notice for failure to meet contractual obligations.
 - e. Industrial sites, such as the Champion Building Products site at Gold Beach, may be forced to close on short notice due to deteriorating economic conditions.
 - f. Sites, such as Tillamook landfill may potentially be ordered closed by court action resulting from litigation brought by neighboring land owners.
 - g. There is a potential for other sites to close on short notice to avoid the upcoming changes in federal (and state) regulations due to the RCRA reauthorization legislation.
3. It is these sites which either have closed or will close on short notice that are the least prepared financially to fund adequate closure activities.

Recommendations:

Change ORS 459.270 to require all land disposal sites to develop a "closure trust fund" during the first 3 years that the site operates or within 3 years after the law change becomes effective for existing sites.

Each site operator would make monthly payments into their closure trust fund on a 3 year schedule so it is fully funded to finance closure at any time from then one. The amount in the trust fund would be evaluated each year and adjusted as needed based on the rate of inflation, the cost of closing the site at that point in time, changes in technology, and the need for any additional environmental controls. Interest earned would remain in the account to keep pace with inflation.

Comment: This concept would require financial assurance to be in place on over 100 disposal sites with yearly updates. Based on our experience with the present forms of financial assurance, we would need a large block of Department of Justice time and, at a minimum, an additional 1/2 FTE to track and approve these plans.

This concept was submitted by Joe Schultz before he left the Department. Financial assurance is very complicated and we are just now beginning to process financial assurance documents and learn the advantages and disadvantages of the various options. For the 87-89 biennium, this is a lower priority concept, but our experience in the immediate years ahead will probably show its merit.

I. Solid Waste Permits Requiring Compliance with Rules (and Statutes)
Delete EQC Issuance of "Conditional" Permits.

Background

In 1984, the Department was named as a defendant in a civil suit, by a citizen who lives near the Hood River County Landfill. The suit alleged that the Department had acted improperly in issuing and renewing permits for the landfill, knowing that the landfill could not comply with the Department's regulations. Legal counsel for the Department agreed that the statutes were not clear with respect to the conditions under which compliance schedules or "conditional permits" could be used. The case was settled out-of-court so the issues were not clarified by a court. The statutes in question are as follows:

1. ORS 459.245(1) which states that if a disposal site meets the requirements of ORS 459.005 to 459.105 and 459.205 to 459.285, the Department shall issue a permit. (Note that compliance with the Department's rules is not mentioned.)
2. ORS 459.245(3) which states that the Department may refuse to renew a permit unless the disposal site and the facilities thereon meet the requirements of ORS 459.005 to 459.105, 459.205 to 459.245 and 459.255 to 459.285 and the rules of the Commission adopted pursuant thereto.
3. ORS 459.225(1) through 459.225(5) which state that if the Commission finds that a disposal site cannot meet a requirement of ORS 459.005 to 459.105, 459.205 to 459.245 and 459.255 to 459.285 or any rule or regulation adopted pursuant thereto, and if certain conditions exist, the Commission may issue a variance or a conditional permit or both.

Discussion

There appear to be some inconsistencies or at least unclear sections in the statutes, concerning the issuance of permits for solid waste disposal sites. The statutes imply that for a proposed new disposal site, the Department shall issue a permit, even if the disposal site does not comply with the Department's rules, provided that certain statutory requirements are met. Also, the statutes state that only the Commission may issue variances and/or conditional permits, to disposal sites which cannot comply with the Department's rules. On the other hand, the statute clearly states that the Department may or may not renew a permit, for an existing disposal site that does not comply with the Department's rules. ORS 459.245(3) seems to give the Department this discretionary authority and does not require a variance or conditional permit.

The term "conditional permit" is not defined in the statutes and this has caused confusion. The Department routinely issues permits which contain time schedules for achieving compliance with the Department's rules. Variances are requested from the Commission only in cases where it has been determined that a permittee cannot comply at any time. Attorneys for the plaintiff, in the Hood River Landfill case, argued that the Department's actions constituted the issuance of a

"conditional permit." Therefore, they alleged, the Department had acted without authority and in violation of the statute. The Department's legal counsel concluded that the statute was unclear and was, at least, arguable.

Legislative Concept

To clarify certain existing passages in the statutes that are inconsistent, arguable and/or impractical, I propose the following changes:

1. Change ORS 459.245(1) to read: "any permit issued by the Department shall specify the conditions for compliance with the rules and standards, if any, adopted by the Commission pursuant to this chapter." This is consistent with the language in ORS 468.065(1) which pertains to air quality and water quality permits.
2. Add ORS 459.245(4) to read: "The Department may, in accordance with a specific permit containing a compliance schedule, grant reasonable time for solid waste disposal sites or facilities to comply with the rules of the Commission adopted pursuant to this chapter." This is consistent with the language in OAR 340-61-020(3).
3. Delete all references to "conditional permits" in ORS 459.225 (i.e., so that the Commission is authorized to issue variances only). This is consistent with the language in ORS 468.345 pertaining to air quality permits. There is no authority for variances or conditional permits in the water quality statutes. As a practical matter, the Commission has only issued variances and not conditional permits to solid waste disposal sites.

Support and Opposition

Disposal site operators, both private and local government, should continue to want the Department to have the ability to grant time schedules for obtaining compliance. They should support the clarification of this authority.

Environmental groups may view this proposal as a weakening of the Department's regulatory program and an invitation for disposal site operators to seek leniency and delays in compliance. If this concern is raised, qualifying language such as that found in ORS 459.225(3) could be added, to assure that conditional permits are not issued capriciously.

- J. Establish Strict Liability for Person in Control of Tire Piles

Background

Disposal of spent tire casings has been a continuous problem. Accumulations of tires at landfills and on private property have on occasion been set on fire either by vandals or other means. The most

recent fires have occurred at the Crook County Landfill, Hendrix Landfill (Grant County), on private property in Clackamas County and Klamath County.

Piles of waste tires occur statewide. Many piles are located at or near tire sales shops and contain from 100 to over 1,000 tires. Most of these are not protected from vandalism and possible tire fires.

Burning tires produce dense, black smoke and emit large amounts of particulate and toxic gases. Very large tire fires (i.e. Everett, WA) have been observed to produce a liquid waste stream of pyrolytic oil which is contaminated with hazardous compounds. This oil flow can contaminate surface and groundwater as it flows from the burning tires.

Generation of tire piles can be regulated by rule at permitted solid waste disposal facilities or by enforcement action at other locations. However, when enforcement action has been initiated in the past against illegal tire piles, they have been known to "mysteriously" ignite. In recent years there has been at least 22 tire fires. There is only one known successful civil penalty action against a tire fire (Hendrix landfill - Grant County). Other action has been successfully defeated by land owners citing ORS 468.300 which exempts persons from statute and rules by "any violation which was caused by an act of God, war, strife, riot or other condition as to which any negligence or willful misconduct on the part of such person was not the proximate cause."

Legislation to tighten the exemption granted by 468.300 should be introduced. A concept was developed near the end of the 1983 legislative session but did not get filed as a bill. The concept is to amend the civil penalty section of the law ORS 468.140 to impose a civil penalty on burned tires as follows:

468.140(6) Notwithstanding the limits of ORS 468.130(1) and 468.300 and in addition to any other penalty provided by law, any person owning land upon which tires are stored or disposed or having the care, custody or control of such storage or disposal shall incur and be strictly liable for a civil penalty of at least \$1 but not more than \$10 for each tire that is open burned in violation of ORS chapter 459, this chapter or any rule, order, standard or permit condition adopted thereunder.

K. Statutory Authority to Achieve HSWA Authorization

Proposal

Oregon hazardous waste statutes (recodified as ORS Chapter 466) would be amended to provide regulatory authority necessary for Oregon to achieve authorization for the Hazardous and Solid Waste Amendments of 1984 ("HSWA"). Additional authority may be needed to regulate hazardous waste fuel distributors and marketers, and to require corrective action for prior releases, including those extending beyond the facility boundary.

Background

In January 1986, Oregon received Final Authorization from the EPA to operate the state's hazardous waste program in lieu of the federal program. Authorized states, such as Oregon, are required to periodically modify their respective state programs to maintain equivalency to revisions in the federal program.

The Hazardous and Solid Waste Amendments of 1984 greatly expanded the requirements of and added new prohibitions to the federal program. Most of the HSWA provisions will not require new state statutory authority (although additional rules will be needed). However, the Department has identified a few areas of HSWA which may require expanded statutory authority. We expect to know more definitely if these potential deficiencies are indeed real after consulting with the Department of Justice. For now, DEQ presumes some limited additional statutory authority may be needed to allow modification of the state program and hence maintenance of our "authorized" status.

L. Recovery of Expenditures of CERCLA Matching Fund

Proposal

ORS Chapter 466 would be amended to provide for recovery of DEQ expenditures from the CERCLA Matching Fund. Furthermore, recovered amounts would be deposited to the CERCLA Matching Fund.

Background

The 1985 Oregon Legislature established two funds for DEQ to administer to address spills and releases of oil and hazardous materials. The CERCLA Matching Fund is to be used to provide the required state match for remedial actions financed by the Federal CERCLA. The Oil and Hazardous Material Emergency Response and Remedial Action Fund (OHMERRAF) is used for training local and state government spill responders and for carrying out monitoring and cleanup of spills.

ORS Chapter 466 does not specifically provide for assessment and recovery of CERCLA Matching Fund expenditures, although recovery of OHMERRAF expenditures is authorized. The Department believes recovery of matching fund expenditures should be authorized since the Department's cost-sharing obligation at federally-financed site cleanups may exceed several hundred thousand dollars and there may be solvent responsible parties associated with these sites.

M. Concept:

Establish a state-wide program to handle abandoned hazardous waste disposal sites (a state superfund program)

Need:

As the state inspects generators of hazardous waste and responds to complaints and spills, we are discovering more and more situations where hazardous waste clean-up is necessary to protect groundwater,

human health and the environment. Many of these situations are a result of past operating practices that are not currently regulated under state hazardous waste management requirements or RCRA. Therefore, these company's cannot be legally held to meet these requirements for clean-up and there is no program available to deal with these situations. Regulations and resources are needed to insure that environmentally protective measures can be taken. These are sites that are not handled under the federal Superfund program.

Proposal:

Legislation and a budget appropriation is needed to provide authority to take clean-up action and correct hazardous waste contamination problems at sites that are not RCRA regulated and are not considered federal Superfund clean-up, (i.e. not on the National Priorities List (NPL)). The authority should cover abandoned sites and sites where there is an identified responsible party. The state should have the ability for cost recovery as well as the establishment of a fund for clean-up where cost recovery is not possible. This program should consist of two phases.

Phase 1:

Assessment of the problem. This should include collecting information on the number of potential sites, the extent of risk to human health, and the environment and development of program implementation criteria, including administration of such a program, staffing and definition process and standards for clean-up.

Phase 2:

Establish a fund for implementation of the program. The fund would provide dollars for program administration, state match for federal clean-up activities under CERCLA and independent state clean-up projects.

N. Concept:

Remove the statutory requirement that the state must own hazardous site disposal property.

Need:

As the statute (ORS 466.150) currently reads a hazardous waste disposal site must have a license from the state and all licensed facilities must deed to the state that portion of their hazardous waste site where hazardous waste is disposed. There are situations in Oregon where hazardous waste has been or is being disposed (by definition ORS 466.005) and must be managed through the treatment, storage and disposal permit requirements. It is questionable whether the state, by deed of property, wants to or has the resources to become financially and statutorily liable for the clean-up and management of these facilities and also whether or not company's willingly will want to deed major portions of their property over to the state. In addition to this primary consideration, there is also a significant secondary affect. If we do not call a facility practice

disposal we cannot require a post closure permit. This hinders our ability to require long-term care and monitoring where there is potential for movement of contaminants in groundwater.

Proposal:

Remove the statutory requirement that the state must own hazardous waste site disposal property or redefine hazardous waste disposal site to exclude on-site disposal, closures, post closure permits and superfund sites.

0. Concept:

Make changes in law to strengthen our position in bankruptcy cases.

Need:

The state is restricted in its ability to hold liable a property owner and/or facility operator who owns a site on which hazardous waste has been disposed and needs to be cleaned up where that owner has not caused or permitted such disposal. If there is no knowledge or evidence of who disposed of the waste, then there is no ability to hold liable the party currently possessing the disposed waste. This is more restrictive than the liability under RCRA. The state needs to be able to hold liable the property owner for clean-up of the hazardous waste.

Proposal:

Amend ORS 459.685 to include strict liability for both RCRA regulated hazardous waste sites and superfund clean-up.

P. INCREASE REVENUE TO CERCLA MATCHING ACCOUNT

In light of current cost estimates for the United Chrome cleanup (\$2 million), it may take the state four or five years to generate the required state match (estimate \$1.25 million because of 3 to 5 year operation and maintenance costs). Current revenue projections are \$300,000 per year minus 15% that the Department can use for Superfund investigations of potential sites or \$255,000 per year. At a minimum, it appears necessary to double or triple the fee to \$20 or \$30 per ton or identify a different financing mechanism.

(5) If the amount of state incurred expenses and damages under this section are not paid by the responsible person to the department within 15 days after receipt of notice that such expenses are due and owing, or, if an appeal is filed within 15 days after the court renders its decision if the decision affirms the order, the Attorney General, at the request of the director, shall bring an action in the name of the State of Oregon in a court of competent jurisdiction to recover the amount specified in the notice of the director.

SECTION 17. (1) In addition to any other penalty provided by law, any person who violates a provision of sections 1 to 20 of this Act, or any rule or order entered or adopted under sections 1 to 20 of this Act, may incur a civil penalty not to exceed \$10,000. Each day of violation shall be considered a separate offense.

(2) The civil penalty authorized by subsection (1) of this section shall be established, imposed, collected and appealed in the same manner as civil penalties are established, imposed, collected and appealed under ORS 468.090 to 468.125, except that a penalty collected under this section shall be deposited to the fund established in section 14 of this Act.

SECTION 18. Violation of a provision of this Act or of any rule or order entered or adopted under this Act is punishable, upon conviction, by a fine of not more than \$10,000 or by imprisonment in the county jail for not more than one year or both. Each day of violation shall be considered a separate offense.

SECTION 19. (1) Except as provided by subsection (2) of this section, beginning on January 1, 1986, every person who operates a facility for the purpose of disposing of hazardous waste or PCB that is subject to interim status or a license issued under ORS 459.410 to 459.450 and 459.460 to 459.690 shall pay a monthly hazardous waste management fee by the 45th day after the last day of each month in the amount of \$10 per dry-weight ton of hazardous waste or PCB brought into the facility for treatment by incinerator or for disposal by landfill at the facility. Fees under this section shall be calculated in the same manner as provided in section 231 of the federal Comprehensive Environmental Response, Compensation and Liability Act, P.L. 96-510, as amended.

(2) When the balance in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund established in section 20 of this Act reaches \$500,000 minus any moneys approved for obligation under subsection (3) of section 20 of this Act, payment of fees under subsection (1) of this section shall be suspended. Payment of fees shall resume upon approval of funds by the Legislative Assembly or the Emergency Board to the department sufficient to decrease the balance in the fund to \$150,000 or lower.

(3) If payment of fees is to be suspended or resumed under subsection (2) of this section, the department shall

give reasonable notice of the suspension or resumption to every person obligated to pay a fee under subsection (1) of this section.

SECTION 20. (1) The Comprehensive Environmental Response, Compensation and Liability Act Matching Fund is established separate and distinct from the General Fund in the State Treasury. All fees received by the Department of Environmental Quality under section 19 of this Act shall be paid into the State Treasury and credited to the fund.

(2) The State Treasurer may invest and reinvest moneys in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund in the manner provided by law.

(3) The moneys in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund are appropriated continuously to the department to be used as provided in subsection (4) of this section and for providing the required state match for planned remedial actions financed by the federal Comprehensive Environmental Response, Compensation and Liability Act, P.L. 96-510, as amended, subject to site by site approval by the Legislative Assembly or the Emergency Board.

(4) Up to 15 percent of the moneys appropriated under subsection (3) of this section may be used for investigating and monitoring potential and existing sites which are or could be subject to remedial action under the federal Comprehensive Environmental Response, Compensation and Liability Act, P.L. 96-510, as amended

SECTION 21. ORS 401.025 is amended to read:

401.025. As used in ORS 401.015 to 401.105, 401.260 to 401.325 and 401.355 to 401.580, unless the context requires otherwise:

(1) "Administrator" means the Administrator of the Emergency Management Division.

(2) "Beneficiary" has the meaning given that term in ORS 656.005 (3).

(3) "Division" means the Emergency Management Division of the Executive Department.

(4) "Emergency" includes any man-made or natural event or circumstance causing or threatening loss of life, injury to person or property, human suffering or financial loss, and includes, but is not limited to, fire, explosion, flood, severe weather, drought, earthquake, volcanic activity, spills or releases of oil or [other substances] hazardous material as defined in section 1 of this 1985 Act, contamination, utility or transportation emergencies, disease, blight, infestation, civil disturbance, riot, sabotage and war.

(5) "Emergency management agency" means an organization created and authorized under ORS 401.015 to 401.105, 401.260 to 401.325 and 401.355 to 401.580 by the state, county or city to provide for and assure the conduct and coordination of functions for comprehensive emergency program management.

Q. REAUTHORIZATION OF STATE UNDERGROUND STORAGE TANK PROGRAM

Section 9, Subsection 1 of HB 2142 provided a broader exemption to farm and residential tanks storing motor fuel than is provided in Federal Law. In order to attain authorization of a state program, it must be at least as stringent as the federal program.

Section 10 of HB 2142 provided conceptual approval for a state authorized program. In order to provide statutory support for future administrative rules (i.e., new tank construction standards), language similar to that contained in Subtitle I of the Resource Conservation and Recovery Act should be sought.

ORS 468.150 to 468.190 should be reviewed to determine if replacement of a leaking underground storage tank is eligible for a water pollution tax credit. If not, the tax credit laws should be amended to make replacement of leaking tanks eligible for a tax credit. Such an addition is consistent with the thrust of the tax credit program which is to encourage the earliest possible correction of existing pollution problems.

connected to the tank, is 10 percent or more beneath the surface of the ground.

SECTION 3. Sections 2 to 13 of this 1985 Act are enacted to enable the Environmental Quality Commission to adopt a state-wide program to govern the prevention, reporting and cleanup of leaks and spills from underground storage tanks. The state-wide program shall establish uniform procedures and standards providing reasonable safeguards for health, safety, welfare, comfort and security of the residents of this state in the prevention, reporting and cleanup of leaks and spills from underground storage tanks.

SECTION 4. The state-wide underground storage tank program shall be applicable and uniform throughout this state and in all cities and counties, and no city or county shall enact or enforce any ordinance, rule or regulation relating to the same matters encompassed by the state program but which provides different requirements unless authorized by the Environmental Quality Commission. The commission's authorization shall not be considered an amendment to the state underground storage tank program.

SECTION 5. In addition to any other duty imposed by law, it shall be the responsibility of any person owning or having control over underground storage tanks to take the following actions as they pertain to an underground storage tank owned by or under the control of such person:

- (1) Prevent spills or leaks that may pollute ground water or surface water;
- (2) Report any spills or leaks to the department as soon as they are detected;
- (3) Take prompt action to stop and clean up spills and leaks; and
- (4) Pay all costs of investigating, testing, preventing, reporting, stopping and cleaning up a spill or leak.

SECTION 6. (1) To aid the department in finding spills or leaks that may be contributing to an identified ground water or surface water pollution problem, the department may, after giving reasonable notice, require the owner or person in control of underground storage tanks to make available to the department for inspection product inventory records.

(2) The department may also require the owner or person in control of underground storage tanks to make tests to determine if there are spills or leaks from the underground storage tanks that are contributing to an identified ground water or surface water pollution problem.

(3) The department shall have the power to enter and inspect at any reasonable time any public or private property, premises or place for the purpose of investigating reported leaks or spills of industrial chemicals that may pollute ground water or surface water.

SECTION 7. The commission shall establish the following rule:

(1) Procedures for carrying out the responsibilities imposed by section 5 of this 1985 Act; and

(2) Testing procedures to be used under section 6 of this 1985 Act that are the most appropriate and economically feasible.

SECTION 8. (1) Except as provided in subsection (2) of this section, any information filed or submitted under section 6 of this 1985 Act shall be made available for public inspection and copying during regular office hours of the department at the expense of any person requesting copies.

(2) Unless classified by the director as confidential, any records, reports or information obtained under sections 2 to 13 of this 1985 Act shall be available to the public. Upon a showing satisfactory to the director by any person that records, reports or information, or particular parts thereof, if made public, would divulge methods, processes or information entitled to protection as trade secrets under ORS 192.500, the director shall classify as confidential such record, report or information, or particular part thereof. However, such record, report or information may be disclosed to any other officer, medical or public safety employe or authorized representative of the state concerned with carrying out sections 2 to 13 of this 1985 Act or when relevant in any proceeding under sections 2 to 13 of this 1985 Act.

SECTION 9. Sections 2 to 13 of this 1985 Act shall not apply to a:

- (1) Farm or residential tank or tanks used for storing motor fuel, each of which has a capacity of 10,000 or fewer gallons.
- (2) Tank used for storing heating oil for consumptive use on the premises where stored.
- (3) Septic tank.
- (4) Pipeline facility including gathering lines regulated under:
 - (a) The Natural Gas Pipeline Safety Act of 1968 (49 U.S.C. 1671); or
 - (b) The Hazardous Liquid Pipeline Safety Act of 1979 (49 U.S.C. 2001).
- (5) Surface impoundment, pit, pond or lagoon.
- (6) Storm water or waste water collection system.
- (7) Flow-through process tank.
- (8) Liquid trap or associated gathering lines directly related to oil or gas production and gathering operations.
- (9) Storage tank situated in an underground area if the storage tank is situated upon or above the surface of a floor.
- (10) Pipe connected to any tank described in subsections (1) to (8) of this section.

SECTION 10. The commission and the department are authorized to perform or cause to be performed any

act necessary to gain interim and final authorization of a state program for the regulation of underground storage tanks under the provisions of Section 9004 of the Federal Resource Conservation and Recovery Act, P.L. 94-580 as amended and P. L. 98-616, and federal regulations and interpretive and guidance documents issued pursuant to P.L. 94-580 as amended and P.L. 98-616. The commission may adopt, amend or repeal any rule necessary to implement sections 2 to 13 of this 1985 Act.

SECTION 11. (1) The owner or person in control of an underground storage tank which is found to be the source of a spill or leak shall reimburse the department for all costs incurred by the department and other underground storage tank owners in the investigation of the identifiable spill or leak from the underground storage tank, including tests performed by other underground storage tank owners.

(2) Payment of costs to the department under subsection (1) of this section must be made to the department within 15 days after the end of the appeal period or, if an appeal is filed, within 15 days after the court or the commission renders its decision, if the decision affirms the order. The department shall reimburse the underground storage tank owners within a reasonable period after collection of their costs as provided in subsection (1) of this section.

(3) If the amount of state-incurred expenses under subsection (1) of this section is not paid by the owner or person in control of the underground storage tank to the department within the time provided in subsection (2) of this section, the Attorney General, upon the request of the director, shall bring action in the name of the State of Oregon in the Circuit Court of Marion County or the circuit court of any other county in which the spill or leak may have taken place to recover the amount specified in the order of the department.

(4) In addition to any other penalty provided by law, if reasonable prevention measures are not used, or if the spill or leak is not reported promptly, the commission or the court may award double the sum of money sufficient to compensate for the costs of investigating the spill or leak.

SECTION 12. (1) When requested in writing by the Director of the Department of Environmental Quality, the Executive Department shall draw a warrant on amounts appropriated to the department for operating expenses in favor of the Department of Environmental Quality for use as a revolving fund. Warrants drawn to establish or increase the revolving fund, rather than to reimburse it, may not exceed the aggregate sum of \$75,000. The State Treasurer shall hold the revolving fund in special account against which the Department of Environmental Quality may draw checks.

(2) The Department of Environmental Quality may use the revolving fund created in subsection (1) of this

section only to finance investigations authorized by section 6 of this 1985 Act into spills or leaks from underground storage tanks pending the recovery of costs from the responsible party.

(3) All claims for reimbursement of advances paid from the revolving fund are subject to approval by the Director of the Department of Environmental Quality and by the Executive Department. When such claims have been approved, a warrant covering them shall be drawn in favor of the Department of Environmental Quality, charged against the appropriate funds and accounts, and used to reimburse the revolving fund.

SECTION 13. All moneys received by the department under section 11 of this 1985 Act shall be paid into the General Fund in the State Treasury and credited to the revolving fund created in section 12 of this 1985 Act. All moneys in the revolving account are appropriated continuously to the Department of Environmental Quality for carrying out the purposes of sections 2 to 13 of this 1985 Act.

Approved by the Governor July 15, 1985
Filed in the office of Secretary of State July 15, 1985

CHAPTER 738

AN ACT HB 2163

Relating to personal income taxes.
Be It Enacted by the People of the State of Oregon:

SECTION 1. Section 2 of this Act is added to and made a part of ORS chapter 316.

SECTION 2. ORS 316.680 (1)(a) shall apply to the interest or dividends described under ORS 316.680 (1)(a) to the extent such interest or dividends are includable in arriving at federal taxable income as distributions from plans to benefit the self-employed or from individual retirement accounts described under sections 401 to 408 of the Internal Revenue Code.

SECTION 3. Section 2 of this Act applies to tax years beginning on or after January 1, 1985, and prior to January 1, 1989.

Approved by the Governor July 13, 1985
Filed in the office of Secretary of State July 15, 1985

CHAPTER 739

AN ACT HB 2133

Relating to workers' compensation; amending ORS 656.245, 656.248, 656.430, 656.506 and 656.636; repealing ORS 656.637 and section 3, chapter 770,

R. PERMIT PROCESSING FEES

Previous authority to collect permit processing fees rested in ORS 459.530(3) and 459.610 ("to cover related administrative costs"). Legislative counsel has questioned our authority to collect permit filing and processing fees in Rule 340-105-110 - Table 1 under the guise of annual compliance fees.

Senate Bill 138 partially solved our problem by establishing treatment and disposal application fees (Section 11 - Subsections 3 and 4). That still leaves as questionable, permit application fees for storage facilities.

Recommend amending hazardous waste statutes to create authority to collect storage application permit fees. Maximum fee of \$30,000 with excess refundable (language from SB 138 - Section 11).

shall be the state's fiscal year (July 1 through June 30) and shall be paid annually by July 1. Any annual compliance determination fee submitted as part of an application for a new permit shall apply to the fiscal year the permitted management facility is put into operation. For the first year's operation, the full fee shall apply if the management facility is placed into operation on or before April 1. Any new management facility placed into operation after April 1 shall not owe a compliance determination fee until July 1 of the following year. The Director may alter the due date for the annual compliance determination fee upon receipt of a justifiable request from a permittee.

(4) For the purpose of determining appropriate fees, each management facility shall be assigned to a category in Table 1 of this Division based upon the amount of hazardous waste received and upon the complexity of each management facility. Each management facility which falls into more than one category shall pay whichever fee is higher. The Department shall assign a storage and treatment facility to a category on the basis of design capacity of the facility. The Department shall assign a new disposal facility to a category on the basis of estimated annual cubic feet of hazardous waste to be received and an existing disposal facility on the basis of average annual cubic feet of hazardous waste received during the previous three calendar years.

(5) Where more than one management facility exists on a single site, in addition to the compliance determination fee required by rules 340-105-110(3) and (4), a flat fee of \$250 shall be assessed for each additional management facility.

(6) Modifications of existing, unexpired permits which are instituted by the Department due to changing conditions or standards, receipt of additional information or any other reason pursuant to applicable statutes and do not require re-filing or review of an application or plans and specifications shall not require submission of the filing fee or the application processing fee.

(7) Upon the Department accepting an application for filing, the filing fee shall be nonrefundable.

(8) The application processing fee, except for disposal permits, may be refunded in whole or in part when submitted with an application if either of the following conditions exist:

(a) The Department determines that no permit will be required.

(b) The applicant withdraws the application before the Department has approved or denied the application.

(9) The annual compliance determination fee may be refunded in whole or in part when submitted with a new permit application if either of the following conditions exist:

(a) The Department denies the application.

(b) The permittee does not proceed to construct and operate the permitted facility.

(10) All fees shall be made payable to the Department of Environmental Quality.

Table 1: Fee Schedule

(1) Filing Fee. A filing fee of \$50 shall accompany each application for issuance, renewal or modification of a hazardous waste management facility permit. This fee is nonrefundable and is in addition to any application processing fee or annual compliance determination fee which might be imposed.

(2) Application Processing Fee. An application processing fee varying between \$25 and \$5,000 shall be submitted with each application. The amount of the fee shall depend on the type of facility and the required action as follows:

(a) A new facility (including substantial expansion of an existing facility):

(A) Storage facility	\$ 150
(B) Treatment facility - Recycling	150
(C) Treatment facility - other than incineration	250
(D) Treatment facility - incineration	500
(E) Disposal facility	5,000
(F) Disposal facility - post closure	2,500

(b). Permit Renewal:

(A) Storage facility	50
(B) Treatment facility - recycling	50
(C) Treatment facility - other than incineration	75
(D) Treatment facility - incineration	175
(E) Disposal facility	5,000
(F) Disposal facility - post closure	800

(c) Permit Modification - Changes to Performance/Technical Standards:

(A) Storage facility	50
(B) Treatment facility - recycling	50
(C) Treatment facility - other than incineration	75
(D) Treatment facility - incineration	175
(E) Disposal facility	1,750
(F) Disposal facility - post closure	800

(d) Permit Modification - All Other Changes not Covered by (2)(c):
All categories 25

(e) Permit Modifications - Department Initiated . no fee

(3) Annual Compliance Determination Fee. (In any case where a facility fits into more than one category, the permittee shall pay only the highest fee):

(a) Storage facility:

(A) 5-55 gallon drums or 250 gallons total or 2,000 pounds	250
(B) 5 to 250 - 55 gallon drums or 250 to 10,000 gallons total or 2,000 to 80,000 pounds	1,000
(C) >250 - 55 gallon drums or >10,000 gallons total or >80,000 pounds	2,500

(b) Treatment Facility:

(A) <25 gallons/hour or 50,000 gallon/day or 6,000 pounds/day	250
(B) 25-200 gallons/hour or 50,000 to 500,000 gallons/day or 6,000 to 60,000 pounds/day	1,000

- (C) >200 gallons/hour or >500,000
gallons/day or >60,000 pounds/day . . . 2,500
- (c) Disposal Facility:
 - (A) <750,000 cubic feet/year or
<37,500 tons/year \$ 50,000
 - (B) 750,000 to 2,500,000 cubic feet/year
or 37,500 to 125,000 tons/year 100,000
 - (C) >2,500,000 cubic feet/year or
>125,000 tons/year 150,000
- (d) Disposal Facility - Post Closure:
 - All categories 5,000

Interim status.

340-105-115 The provisions of 40 CFR 270.70 to 270.73, pertaining to interim status, are not included in the State's hazardous waste management program.

(Comment: State requirements applicable to existing hazardous waste management facilities are identified in rule 340-105-010 and include provisions analogous to those of 40 CFR 270.71 and 270.72.)

waste disposal sites operating under department permit issued pursuant to ORS 459.205 to 459.245, 459.255 and 459.265. Such authorization may be granted only under procedures approved by the commission, which shall include a determination by the department that such disposal will not pose a threat to public health, welfare or safety or to the environment. [1971 c.699 §2; 1973 c.778 §3; 1973 c.335 §151; 1977 c.367 §7; 1981 c.709 §9]

459.517 Duties of collection or treatment site licensee. Each hazardous waste collection or treatment site licensee shall be required to do the following as a condition to holding the license:

(1) Maintain records of any hazardous waste identified pursuant to provisions of this chapter which is stored or treated at the site and the manner in which such waste was stored or treated, transported and disposed of.

(2) Report periodically to the department on types and volumes of wastes received and their manner of disposition.

(3) Participate in the manifest system designed by the department.

(4) Maintain current contingency plans to minimize damage from spillage, leakage, explosion, fire or other accidental or intentional event.

(5) Maintain sufficient liability insurance or equivalent financial assurance in such amounts as determined by the department to be reasonably necessary to protect the environment and the health, safety and welfare of the people of this state.

(6) Assure that all personnel who are employed by the licensee are trained in proper procedures for handling, transfer, transport, treatment and storage of hazardous waste including, but not limited to, familiarization with all contingency plans.

(7) Maintain other plans and exhibits pertaining to the site and its operation as determined by the department to be reasonably necessary to protect the public health, welfare or safety or the environment.

(8) Restore, to the extent reasonably practicable, the site to its original condition when use of the area is terminated.

(9) Maintain a cash bond or other equivalent financial assurance in the name of the state in an amount estimated by the department to be sufficient to cover any costs of closing the site and monitoring it or providing for its security after closure and to secure performance of all license

requirements. The financial assurance shall remain available for the duration of the license and until the site is closed, except to the extent it is released or modified by the department. [1977 c.367 §13; 1979 c.132 §11; 1981 c.709 §10; 1983 c.703 §11]

459.520 [1971 c.699 §2a; 1973 c.335 §152; repealed by 1977 c.367 §8]

459.530 Waste disposal license applications; fees. (1) The department shall furnish an application form to any person interested in developing or constructing a hazardous waste disposal site upon request. Each such form shall contain:

(a) The name and address of the applicant.

(b) A statement of financial condition of the applicant, including assets, liabilities and net worth.

(c) The experience of the applicant in construction, management, supervision or development of hazardous waste disposal sites and in the handling of such substances.

(2) The department shall also require the submission of such information relating to the construction, development or establishment of proposed hazardous waste disposal sites and facilities to be operated in conjunction therewith, and such additional information, data and reports as it deems necessary to make a decision on granting or denying a license.

(3) The application shall be accompanied by a nonrefundable fee of \$5,000, which shall be continuously appropriated to the department for administrative expenses. [1971 c.699 §4; 1977 c.367 §9]

459.535 Waste collection or treatment applications; form. (1) The department shall furnish an application form to anyone who wishes to operate a hazardous waste collection or treatment site.

(2) In addition to information requested on the application form, the department shall also require the submission of such information relating to the construction, development or establishment of a proposed hazardous waste collection or treatment site and facilities to be operated in conjunction therewith and such additional information, data and reports as it deems necessary to make a decision on granting or denying a license. [1977 c.367 §14; 1979 c.132 §12]

459.540 Waste disposal application information. License applications submitted to the department for managing, operating, constructing, developing or establishing a hazardous waste disposal site must contain the following:

ed to produce over the site use period a sum sufficient to:

- (a) Secure performance of license requirements;
- (b) Close the site;
- (c) Provide for any monitoring or security of the site after closure; and
- (d) Provide for any remedial action by the state necessary after closure to protect the public health, welfare and safety and the environment.

(2) The amount so paid shall be held in a separate account and when the amount paid in by the licensee together with the earnings thereon equals the amount of the financial assurance required under ORS 459.590 (2)(f), the licensee shall be allowed to withdraw the financial assurance.

(3) If the site is closed before the fees reach an amount equal to the financial assurance, appropriate adjustment shall be made and the reduced portion of the financial assurance may be withdrawn. [1971 c.699 §11; 1979 c.132 §9; 1981 c.709 §12]

459.610 Annual fees; use. An annual fee may be required of every generator, air or water transporter and licensee under ORS 459.410 to 459.450 and 459.460 to 459.690. The fee shall be in an amount determined by the commission to be adequate, less any federal funds budgeted therefor by legislative action, to carry on the monitoring, inspection and surveillance program established under ORS 459.670 and to cover related administrative costs. All such fees are continuously appropriated to the department to pay the cost of the program under ORS 459.670. [1971 c.699 §12; 1973 c.835 §154; 1981 c.709 §13; 1983 c.90 §1]

459.620 Revocation of licenses; judicial review. The commission may revoke any license issued under ORS 459.410 to 459.450 and 459.460 to 459.690 after public hearing upon a finding that the licensee has violated any provision of ORS 459.410 to 459.450 and 459.460 to 459.690 or rules adopted pursuant thereto or any material condition of the license, subject to review under ORS 183.310 to 183.550. [1971 c.699 §16; 1973 c.835 §155]

459.625 [1975 c.483 §3; 1977 c.796 §3; renumbered 469.375]

459.630 [1975 c.483 §2; 1977 c.796 §4; renumbered 469.525]

459.635 Chemical waste disposal site; regulation; modification or waiver of requirements. The legislature finds that there is an urgent need for an Oregon site for the

disposal of hazardous chemical wastes and that such a site should be regulated but not operated by the Department of Environmental Quality. In order to secure such a site, the commission may modify or waive any of the requirements of this chapter, but not ORS 469.375 or 469.525, if it finds that such waiver or modification:

- (1) Is necessary to make operation of the site economically feasible; and
- (2) Will not endanger the public health and safety. [1975 c.483 §4]

459.640 Limits on disposal at state site; monitoring of disposal. (1) The department may limit, prohibit or otherwise restrict the disposal of certain hazardous wastes at a hazardous waste disposal site owned by the state if necessary to protect public health, welfare or safety or the environment or to prolong the useful life of the hazardous waste disposal site.

(2) The department shall monitor the origin and volume of hazardous waste received at a hazardous waste disposal site and may curtail or reduce the volume of the wastes that may be accepted for disposal as necessary to prolong the useful life of the site. [1981 c.709 §22]

(Enforcement)

459.650 Investigation upon complaint; hearings; orders. (1) The department shall investigate any complaint made to it by any person that the operation of any generator, air or water transporter or hazardous waste disposal, collection or treatment site is unsafe or that the operation is in violation of the provisions of ORS 459.410 to 459.450 and 459.460 to 459.690 or the rules adopted under ORS 459.410 to 459.450 and 459.460 to 459.690.

(2) If, after making an investigation under subsection (1) of this section, the department is satisfied that sufficient grounds exist to justify a hearing upon the complaint, it shall give 10 days' written notice of the time and place of the hearing and the matters to be considered at the hearing. A copy of the complaint shall be furnished by the department to the respondent. Both the complainant and the respondent are entitled to be heard, produce evidence and offer exhibits and to require the attendance of witnesses at the hearing.

(3) The commission or a hearings examiner appointed by the commission shall hear the matter. Within 30 days after the date of the hearing and after considering all evidence and testimony submitted, the commission shall make a specific order as it considers necessary. Any

to treat or dispose of hazardous waste or PCB that shall be subject to the provisions of sections 4 to 27 of this 1985 Act.

SECTION 9. The commission may impose specific standards for the range and type of hazardous waste or PCB treated or disposed of at a facility in order to protect the public health and safety and environment of Oregon.

SECTION 10. Whenever the Environmental Quality Commission finds there is a need for an additional hazardous waste or PCB treatment or disposal facility according to the criteria established in section 5 of this 1985 Act, the commission shall establish an application period during which persons may apply for a PCB disposal facility license according to the provisions of sections 15 to 20 of this 1985 Act or a hazardous waste disposal facility license under ORS 459.410 to 459.450 and 459.460 to 459.690.

SECTION 11. (1) Upon request, the department shall furnish an application form to any person interested in developing or constructing a hazardous waste or PCB treatment or disposal facility. Each such form shall contain:

- (a) The name and address of the applicant.
- (b) A statement of financial condition of the applicant, including assets, liabilities and net worth.
- (c) The experience of the applicant in construction, management, supervision or development of hazardous waste or PCB treatment or disposal facilities and in the handling of such substances.

(2) The department shall also require the submission of such information relating to the construction, development or establishment of a proposed hazardous waste or PCB treatment or disposal site and facilities to be operated in conjunction therewith, and such additional information, data and reports as it deems necessary to make a decision on granting or denying a license.

(3) If the application is for a new license to operate a new hazardous waste or PCB treatment or disposal facility, the application shall be accompanied by a fee in an amount sufficient to cover the department's costs in investigating and processing the application, but which shall not exceed \$70,000, which shall be continuously appropriated to the department for payment of the department's administrative expenses incurred in the process of licensing the treatment or disposal facility. Any portion of the fee that exceeds the department's administrative expenses shall be refunded to the applicant.

(4) If the application is for the renewal of an existing license, the application shall be accompanied by a fee in an amount estimated by the department to be sufficient to cover the department's costs in investigating and processing the renewal application. If the department incurs expenses in excess of the estimated fee, the applicant shall pay the excess fees. Under no circumstances shall the renewal fee exceed a total of \$50,000. Any

portion of the fee that exceeds the department's administrative expenses shall be refunded to the applicant. Such fees shall be continuously appropriated to the department for payment of the department's administrative expenses incurred in the process of renewing the license for a treatment or disposal facility.

SECTION 12. (1) To aid and advise the director and the commission in the selection of a hazardous waste or PCB treatment or disposal facility or the site of such facility, the director shall establish citizen advisory committees as the director considers necessary. The director shall determine the representation, membership, terms and organization of the committees and shall appoint their members. The director or a designee shall be a nonvoting member of each committee.

(2) The advisory committees appointed under subsection (1) of this section shall review applications during an application period established under section 10 of this 1985 Act and make recommendations on the applications to the commission.

SECTION 13. As used in sections 13 to 33 of this 1985 Act, "PCB disposal facility" includes a facility for the treatment or disposal of PCB.

SECTION 14. (1) No person shall treat or dispose of any PCB anywhere in this state except at a PCB disposal facility licensed pursuant to sections 4 to 33 of this 1985 Act.

(2) No person shall establish, construct or operate a PCB disposal facility without a license therefor issued under sections 4 to 33 of this 1985 Act.

SECTION 15. The department shall:

(1) Provide for the administration, enforcement and implementation of sections 4 to 33 of this 1985 Act and may perform all functions necessary:

(a) To regulate the operation and construction of a PCB disposal facility; and

(b) For the licensing of a PCB disposal facility in consultation with the appropriate county governing body or city council.

(2) Coordinate and supervise all functions of state and local governmental agencies engaged in activities subject to the provisions of sections 4 to 33 of this 1985 Act.

SECTION 16. In accordance with applicable provisions of ORS 183.310 to 183.550, the commission shall:

(1) Adopt rules and issue orders, including but not limited to establishing minimum requirements for the disposal of PCB, minimum requirements for operation, maintenance, monitoring, reporting and supervision of disposal facilities, and requirements and procedures for selection of such facilities.

(2) Adopt rules and issue orders relating to the procedures of the department with respect to hearings,

S. PHASE II SPILL RESPONSE

Five issues not dealt with by HB 2146 are:

- 1) Language authorizing rural fire districts to enter into mutual aid agreements for purposes of hazardous material response.
- 2) Long-term funding approach for hazardous material training and staffing.
- 3) State financial assistance to purchase equipment for regional hazardous material teams.
- 4) The current cost-recovery provisions only capture our costs when we do the cleanup (see Sections 9 and 16 of HB 2146). If the spiller does the cleanup, we can't recover our response costs other than indirectly through a civil penalty assessment. Furthermore, we can't recovery any other state or local expenses unless we contracted for the expenditure.
- 5) Delete the words "dry weight" from Section 19 of HB 2146 and cite the applicable section of a new CERCLA law. The effect would be to direct the Department to collect the \$10 per ton fee in the same manner as the federal waste disposal tax will be collected.

In addition, the master planning process currently getting under way may identify additional issues that need to be incorporated prior to its introduction in January.

Lastly, Stan Biles is debating whether the Department should sponsor this bill or whether the Joint Interim Committee on Hazardous Materials should.

the plan adopted by the Interagency Hazard Communications Council pursuant to the provisions of chapter 696, Oregon Laws 1985 (Enrolled House Bill 3005), and after consultation with the Interagency Hazard Communications Council, the Oregon State Police, the Oregon Fire Chiefs Association and any other appropriate agency or organization.

(2) The master plan adopted under subsection (1) of this section shall include but need not be limited to provisions for ongoing training programs for local government and state agency employes involved in response to spills or releases of oil and hazardous material. The department may coordinate its training programs with emergency response training programs offered by local, state and federal agencies, community colleges and institutes of higher education and private industry in order to reach the maximum number of employes, avoid unnecessary duplication and conserve limited training funds.

SECTION 5. In accordance with applicable provisions of ORS 183.310 to 183.550, the commission may adopt rules including but not limited to:

(1) Provisions to establish that quantity of oil or hazardous material spilled or released which shall be reported under section 7 of this Act. The commission may determine that one single quantity shall be the reportable quantity for any oil or hazardous material, regardless of the medium into which the oil or hazardous material is spilled or released.

(2) Establishing procedures for the issuance, modification and termination of permits, orders, collection of recoverable costs and filing of notifications.

(3) Any other provision consistent with the provisions of this Act that the commission considers necessary to carry out this Act.

SECTION 6. (1) By rule, the commission may designate as a hazardous material any element, compound, mixture, solution or substance which when spilled or released into the air or into or on any land or waters of the state may present a substantial danger to the public health, safety, welfare or the environment.

(2) Before designating a substance as hazardous material, the commission must find that the hazardous material, because of its quantity, concentration or physical or chemical characteristics may pose a present or future hazard to human health, safety, welfare or the environment when spilled or released.

SECTION 7. Any person owning or having control over any oil or hazardous material who has knowledge of a spill or release shall immediately notify the Emergency Management Division as soon as that person knows the spill or release is a reportable quantity.

SECTION 8. Any person owning or having control over any oil or hazardous material spilled or released or

threatening to spill or release shall be strictly liable without regard to fault for the spill or release or threatened spill or release. However, in any action to recover damages, the person shall be relieved from strict liability without regard to fault if the person can prove that the spill or release of oil or hazardous material was caused by:

(1) An act of war or sabotage or an act of God.

(2) Negligence on the part of the United States Government or the State of Oregon.

(3) An act or omission of a third party without regard to whether any such act or omission was or was not negligent.

SECTION 9. (1) Any person liable for a spill or release or threatened spill or release under section 8 of this Act shall immediately clean up the spill or release under the direction of the department. The department may require the responsible person to undertake such investigations, monitoring, surveys, testing and other information gathering as the department considers necessary or appropriate to:

(a) Identify the existence and extent of the spill or release;

(b) Identify the source and nature of oil or hazardous material involved; and

(c) Evaluate the extent of danger to the public health, safety, welfare or the environment.

(2) If any person liable under section 8 of this Act does not immediately commence and promptly and adequately complete the cleanup, the department may clean up, or contract for the cleanup of the spill or release or the threatened spill or release.

(3) Whenever the department is authorized to act under subsection (2) of this section, the department directly or by contract may undertake such investigations, monitoring, surveys, testing and other information gathering as it may deem appropriate to identify the existence and extent of the spill or release, the source and nature of oil or hazardous material involved and the extent of danger to the public health, safety, welfare or the environment. In addition, the department directly or by contract may undertake such planning, fiscal, economic, engineering and other studies and investigations it may deem appropriate to plan and direct clean up actions, to recover the costs thereof and legal costs and to enforce the provisions of this Act.

SECTION 10. (1) If the commission finds that a proposed remedial action cannot meet any of the requirements of ORS chapter 459 or 468 or any rule adopted under ORS chapter 459 or 468, the commission may issue a variance.

(2) The commission may issue a variance under subsection (1) of this section if:

(a) Special conditions exist that render strict compliance unreasonable, burdensome or impractical;

(b) Strict compliance would result in substantial delay or preventing a remedial action from being undertaken; or

(c) The public health, safety, welfare and the environment would be protected.

SECTION 11. The director may allow a person to store, treat, destroy or dispose of offsite oil or hazardous material in lieu of other remedial action if the director determines that:

(1) Such actions are more cost effective than other remedial actions; or

(2) Are necessary to protect the public health, safety, welfare or the environment from a present or potential risk which may be created by further exposure to the continued presence of oil or hazardous material.

SECTION 12. (1) In order to determine the need for response to a spill or release or threatened spill or release under this Act, or enforcing the provisions of this Act, any person who prepares, manufactures, processes, packages, stores, transports, handles, uses, applies, treats or disposes of oil or hazardous material shall, upon the request of the department:

(a) Furnish information relating to the oil or hazardous material; and

(b) Permit the department at all reasonable times to have access to and copy, records relating to the type, quantity, storage locations and hazards of the oil or hazardous material.

(2) In order to carry out subsection (1) of this section, the department may enter to inspect at reasonable times any establishment or other place where oil or hazardous material is present.

SECTION 13. (1) In order to determine the need for response to a spill or release or threatened spill or release under this Act, any person who prepares, manufactures, processes, packages, stores, transports, handles, uses, applies, treats or disposes of oil or hazardous material shall, upon the request of any authorized local government official, permit the official at all reasonable times to have access to and copy, records relating to the type, quantity, storage locations and hazards of the oil or hazardous material.

(2) In order to carry out subsection (1) of this section a local government official may enter to inspect at reasonable times any establishment or other place where oil or hazardous material is present.

(3) As used in this section, "local government official" includes but is not limited to an officer, employe or representative of a county, city, fire department, fire district or police agency.

SECTION 14. (1) The Oil and Hazardous Material Emergency Response and Remedial Action Fund is established separate and distinct from the General Fund in the State Treasury. As permitted by federal court decisions,

federal statutory requirements and administrative decisions, after payment of associated legal expenses, moneys not to exceed \$2.5 million received by the State of Oregon from the Petroleum Violation Escrow Fund of the United States Department of Energy that is not obligated by federal requirements to existing energy programs shall be paid into the State Treasury and credited to the fund.

(2) The State Treasurer shall invest and reinvest moneys in the Oil and Hazardous Material Emergency Response and Remedial Action Fund in the manner provided by law.

(3) The moneys in the Oil and Hazardous Material Emergency Response and Remedial Action Fund are appropriated continuously to the Department of Environmental Quality to be used in the manner described in section 15 of this Act.

SECTION 15. Moneys in the Oil and Hazardous Material Emergency Response and Remedial Action Fund may be used by the Department of Environmental Quality for the following purposes:

(1) Training local government employes involved in response to spills or releases of oil and hazardous material.

(2) Training of state agency employes involved in response to spills or releases of oil and hazardous material.

(3) Funding actions and activities authorized by section 9 of this Act, ORS 459.685, 468.800 and 468.805.

(4) Providing for the general administration of sections 1 to 20 of this Act including the purchase of equipment and payment of personnel costs of the department or any other state agency related to the enforcement of this Act.

SECTION 16. (1) If a person required to clean up oil or hazardous material under section 9 of this Act fails or refuses to do so, the person shall be responsible for the reasonable expenses incurred by the department in carrying out section 9 of this Act.

(2) The department shall keep a record of all expenses incurred in carrying out any cleanup projects or activities authorized under section 9 of this Act, including charges for services performed and the state's equipment and materials utilized.

(3) Any person who does not make a good faith effort to clean up oil or hazardous material when obligated to do so under section 9 of this Act shall be liable to the department for damages not to exceed three times the amount of all expenses incurred by the department.

(4) Based on the record compiled by the department under subsection (2) of this section, the commission shall make a finding and enter an order against the person described in subsection (1) or (3) of this section for the amount of damages, not to exceed treble damages, and the expenses incurred by the state in carrying out the action authorized by this section. The order may be appealed in the manner provided for appeal of a contested case order under ORS 183.310 to 183.550.

(5) If the amount of state incurred expenses and damages under this section are not paid by the responsible person to the department within 15 days after receipt of notice that such expenses are due and owing, or, if an appeal is filed within 15 days after the court renders its decision if the decision affirms the order, the Attorney General, at the request of the director, shall bring an action in the name of the State of Oregon in a court of competent jurisdiction to recover the amount specified in the notice of the director.

SECTION 17. (1) In addition to any other penalty provided by law, any person who violates a provision of sections 1 to 20 of this Act, or any rule or order entered or adopted under sections 1 to 20 of this Act, may incur a civil penalty not to exceed \$10,000. Each day of violation shall be considered a separate offense.

(2) The civil penalty authorized by subsection (1) of this section shall be established, imposed, collected and appealed in the same manner as civil penalties are established, imposed, collected and appealed under ORS 468.090 to 468.125, except that a penalty collected under this section shall be deposited to the fund established in section 14 of this Act.

SECTION 18. Violation of a provision of this Act or of any rule or order entered or adopted under this Act is punishable, upon conviction, by a fine of not more than \$10,000 or by imprisonment in the county jail for not more than one year or both. Each day of violation shall be considered a separate offense.

SECTION 19. (1) Except as provided by subsection (2) of this section, beginning on January 1, 1986, every person who operates a facility for the purpose of disposing of hazardous waste or PCB that is subject to interim status or a license issued under ORS 459.410 to 459.450 and 459.460 to 459.690 shall pay a monthly hazardous waste management fee by the 45th day after the last day of each month in the amount of \$10 per dry-weight ton of hazardous waste or PCB brought into the facility for treatment by incinerator or for disposal by landfill at the facility. Fees under this section shall be calculated in the same manner as provided in section 231 of the federal Comprehensive Environmental Response, Compensation and Liability Act, P.L. 96-510, as amended.

(2) When the balance in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund established in section 20 of this Act reaches \$500,000 minus any moneys approved for obligation under subsection (3) of section 20 of this Act, payment of fees under subsection (1) of this section shall be suspended. Payment of fees shall resume upon approval of funds by the Legislative Assembly or the Emergency Board to the department sufficient to decrease the balance in the fund to \$150,000 or lower.

(3) If payment of fees is to be suspended or resumed under subsection (2) of this section, the department shall

give reasonable notice of the suspension or resumption to every person obligated to pay a fee under subsection (1) of this section.

SECTION 20. (1) The Comprehensive Environmental Response, Compensation and Liability Act Matching Fund is established separate and distinct from the General Fund in the State Treasury. All fees received by the Department of Environmental Quality under section 19 of this Act shall be paid into the State Treasury and credited to the fund.

(2) The State Treasurer may invest and reinvest moneys in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund in the manner provided by law.

(3) The moneys in the Comprehensive Environmental Response, Compensation and Liability Act Matching Fund are appropriated continuously to the department to be used as provided in subsection (4) of this section and for providing the required state match for planned remedial actions financed by the federal Comprehensive Environmental Response, Compensation and Liability Act, P.L. 96-510, as amended, subject to site by site approval by the Legislative Assembly or the Emergency Board.

(4) Up to 15 percent of the moneys appropriated under subsection (3) of this section may be used for investigating and monitoring potential and existing sites which are or could be subject to remedial action under the federal Comprehensive Environmental Response, Compensation and Liability Act, P.L. 96-510, as amended.

SECTION 21. ORS 401.025 is amended to read:

401.025. As used in ORS 401.015 to 401.105, 401.260 to 401.325 and 401.355 to 401.580, unless the context requires otherwise:

(1) "Administrator" means the Administrator of the Emergency Management Division.

(2) "Beneficiary" has the meaning given that term in ORS 656.005 (3).

(3) "Division" means the Emergency Management Division of the Executive Department.

(4) "Emergency" includes any man-made or natural event or circumstance causing or threatening loss of life, injury to person or property, human suffering or financial loss, and includes, but is not limited to, fire, explosion, flood, severe weather, drought, earthquake, volcanic activity, spills or releases of oil or [other substances] hazardous material as defined in section 1 of this 1985 Act, contamination, utility or transportation emergencies, disease, blight, infestation, civil disturbance, riot, sabotage and war.

(5) "Emergency management agency" means an organization created and authorized under ORS 401.015 to 401.105, 401.260 to 401.325 and 401.355 to 401.580 by the state, county or city to provide for and assure the conduct and coordination of functions for comprehensive emergency program management.

MANAGEMENT SERVICES
LEGISLATIVE CONCEPTS

Preliminary
1987 LEGISLATIVE CONCEPTS

- A. Establish a no or low interest revolving fund to help finance local sewerage, recycling, waste disposal or other environmental infrastructure needs in Oregon. Allow for long term infrastructure financing.
- B. Revise state pollution control bond fund legislation and if necessary, constitutional provisions, to allow money from the fund to be placed in a no or low interest infrastructure revolving fund.
- C. The Pollution Control Tax Credit Program is scheduled to sunset December 31, 1988. The Department will be very influential with the Legislature in determining the future of the program. Currently an advisory committee with representation from OEC, AOI, Economic Development Department, industry and DEQ is meeting to discuss whether the program should continue and, if so, what changes are needed in the program.

Changes to the program could include making preliminary certification optional; expanding the staff review period for preliminary certification applications from 60 days to 90 days; making new programs and facilities eligible for tax credit (e.g. TSCA facilities; slash burning alternatives); amending the "sole purpose" definition; and eliminating tax credits for pollution control facilities which control potential problems (eg. spill containment walls; monitoring wells).

BR410

ENFORCEMENT SECTION
LEGISLATIVE CONCEPTS

Preliminary
1987 LEGISLATIVE CONCEPTS

Background

In enforcement actions, the Department occasionally uses Oregon Revised Statute (ORS) 164.785, which prohibits the placement of offensive substances in water, on highways, or other property. During a contested case hearing last fall, a problem in statutory cross referencing was noted.

Statutes

ORS 164.785(5) states that "In addition to and not in lieu of the criminal penalty authorized by ORS 468.140 may be imposed for violation of this section."

ORS 468.140 in turn provides:

"Any person who violates any of the following shall incur a civil penalty for each day of violation in the amount prescribed by the schedule adopted under ORS 468.130."

Problem

The "following" in ORS 468.140 does not include ORS 164.785 nor any of the provisions of the Solid Waste Management Act in ORS Chapter 459.

Recommendation

Change ORS 468.140 to include ORS 164.785.

BR424

ATTORNEY GENERAL'S
LEGISLATIVE CONCEPTS

Preliminary
1987 LEGISLATIVE CONCEPTS

Concept

Amend ORS 468.130 to allow greater latitude in determining the amount of civil penalties.

Description

ORS 468.130(2) presently mandates the consideration of three factors in imposing a penalty. The agency's rules, however, allow for consideration of other factors and, therefore, arguably conflict with the statute. Other legal and practical problems with assessment of penalties could be addressed at the same time.

BR425



METROPOLITAN SERVICE DISTRICT
Providing Zoo, Solid Waste and Local Government Services

January 31, 1986

527 S.W. Hall St.
Portland, Oregon
97201-5287
(503) 221-1646

Environmental Quality Commission
522 SW 5th Avenue
Portland, Oregon 97204

Rick Gustafson
Executive Officer

Dear Commissioners:

Metro Council

Ernie Bonner
Presiding Officer
District 8

Richard Waker
Deputy Presiding
Officer
District 2

Bob Oleson
District 1

Jim Gardner
District 3

Corby Kirkpatrick
District 4

Tom DeJardin
District 5

George Van Bergen
District 6

Sharron Kelley
District 7

Hardy Myers
District 9

Larry Cooper
District 10

Marge Kafoury
District 11

Gary Hansen
District 12

The Metropolitan Service District Supports the authorization of public hearings on the proposed rule changes indentifying yard debris as a principle recyclable material in the Portland, Washington, Multnomah, Clackamas, and proposed West Linn wastesheds. Metro feels such hearings are warranted for the following reasons:

- 1) Existing yard debris processing facilities have demonstrated continued growth in the amounts of material received, processed and marketed over the last several years.
- 2) The cost of collecting and recycling yard debris as a source separated material is less than the cost of collecting and disposing of the material as solid waste.
- 3) Metro has targeted the removal of yard debris from the waste stream as part of its Waste Reduction Program.
- 4) Metro is constructing a yard debris processing facility at the St. Johns Landfill, with capacity which will exceed the supply currently available at the site.

Metro believes that the factors outlined above warrant further consideration for placing yard debris on the list of principle recyclable materials. We also hope that the public hearings will act as a forum for discussion of issues such as phased implementation and alternative collection methods for the material.

Sincerely,

Rick Gustafson
Executive Director



CITY OF
PORTLAND, OREGON
BUREAU OF ENVIRONMENTAL SERVICES

Dick Bogle, Commissioner
John Lang, Administrator
1120 S.W. 5th Ave.
Portland, Oregon 97204-1972
(503) 796-7169

January 31, 1986

Department of Environmental Quality
Water Quality Division
PO Box 1760
Portland, OR 97207

RE: Proposed Adoption of Standards for Nuisance Phytoplankton Growth

We wish to offer our general support of the Department of Environmental Quality staff recommendation. A serious concern exists, however, over potential misinterpretation of two provisions in the Standards. Specifically, the first sentence of Item (1) states that "No waste shall be discharged and no activities shall be conducted which will cause average chlorophyll "a" concentrations to exceed the following values:".

This language could easily be misinterpreted as requiring immediate control measures or the institution of a building ban in areas served by treatment works discharging to water bodies in noncompliance with the standard. Imposition of such controls prior to development of rationally based site specific water quality standards is clearly contrary to the basic thrust of the recommendation and hopefully is not its intent.

A second concern relates to interpretation of the last paragraph of Section (2) (b) which reads "Where natural conditions are responsible for exceedance of the standard in subsection (1) above, or beneficial uses are not impaired,, the standard in subsection (1) may be modified to an appropriate level for that water body." This appears to indicate that no change in the standard will be made unless one of the above conditions is met. These conditions do not encompass the range of factors which need to be examined in establishing a standard and, therefore, should not be the only criteria for modification of the standard. The standards should be modified or affirmed, based upon the results of a site specific study. An example may assist in illustrating this point.

Let us assume that a river were identified as being in noncompliance with the standard and, therefore, subject to study. The study results indicated that noncompliance was not caused solely by natural conditions and/or beneficial uses were impaired. Therefore, the standard remains in effect. The study also concludes, however, that compliance is not technically or economically feasible. Consequently, no control strategy

Department of Environmental Quality
January 31, 1986
Page 2

is developed. In such cases, it appears that the DEQ, the public, and affected dischargers would be left with impaired uses, an unenforceable standard and no strategy for control of pollutant discharges. Since the foregoing scenario is likely, it appears appropriate to modify the proposed language to provide that standards will be affirmed or revised following completion of site specific studies.

To facilitate consideration of the above issues, we offer the attached enlarged copies of pages A-1 and A-2, Attachment A, with suggested language modifications.

Thank you again for receiving the foregoing comments. If the Department or the Commission has any questions regarding the above, we would be pleased to respond.

Sincerely,

A handwritten signature in dark ink, appearing to read 'W.C. Gaffi', written in a cursive style.

W. C. Gaffi, P.E.
Chief Engineer

Alternative No. 1

STANDARDS APPLICABLE TO ALL BASINS

Nuisance [Aquatic Growths] Phytoplankton Growth

340-41-150 The following standard and implementation program shall be applied to lakes, reservoirs and streams, [to prevent nuisance growths of phytoplankton:] except for ponds and reservoirs less than 10 acres in surface area, marshes, and saline lakes, to identify water bodies where phytoplankton may create a nuisance condition and may affect the recognized beneficial uses:

- (1) ~~(No wastes shall be discharged and no activities shall be conducted which will cause the level of Chlorophyll a in the waters of the state to exceed an average of 0.01 mg/l measured over any 3 consecutive month period)~~ ^{subsequent to Commission adoption of control strategies} ~~average Chlorophyll a concentrations to exceed the following values~~ ^{the Commission may adopt:}

- (a) Natural lakes which thermally stratify: 0.01 mg/l
(b) Natural lakes which do not thermally stratify, reservoirs, rivers and estuaries: 0.015 mg/l

Average chlorophyll a concentrations shall be based on the following collection methodology (or other methods approved by the Department): a minimum of three (3) samples collected over any three consecutive months at a minimum of one representative location (e.g., above the deepest point of a lake or reservoir or at a point mid-flow of a river) from samples integrated from the surface to a depth equal to twice the secchi depth or the bottom (the lesser of the two depths). Analytical methods shall be in accordance with the most recent edition of Standard Methods for the Examination of Water and Wastes or methodology approved by the Department.

- (2) Upon determination by the Department that the standard in Paragraph (1) is exceeded, the Department shall:
- (a) Declare the appropriate stream reach or water body to be in (non-attainment) with the standard.
- (b) In accordance with a schedule approved by the Commission, conduct such studies as are necessary to describe present water quality; determine the impacts on beneficial uses; determine the probable causes of the standard violation and beneficial use impact; and develop a proposed control strategy for attaining compliance where technically and economically feasible. Proposed strategies could include [including] standards for additional pollutant parameters, pollutant discharge load limitations, and such other provisions as may be appropriate.

~~Where natural conditions are responsible for exceedance of the standard in subsection (1) above, or beneficial uses are not impaired, the standard in subsection (1) may be modified to an appropriate level for that water body.~~

-A1-

where study results so indicate, propose modified standards.

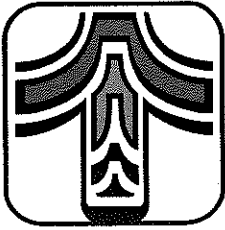
Nuisance Aquatic Growths

January 31, 1986

Page 2

- (c) Conduct ~~necessary~~ public hearings preliminary to adoption of a control strategy, and ^{amended standards} additional standards after obtaining commission authorization;
- (d) Implement the strategy upon adoption ^{amended standards and additional standards} by the Commission.

Andy Schaedel:c
WC102
229-5983
January 17, 1986



CITY OF TUALATIN

18880 SW MARTINAZZI AVE. PO BOX 369
TUALATIN, OREGON 97062-0369
(503) 692-2000

MEMORANDUM

TO: Environmental Quality Commission

FROM: Mark Piliiod, Tualatin City Attorney

SUBJECT: Proposed Adoption of Standards of Nuisance of
Phytoplankton Growth

DATE: January 31, 1986

The following is a list of issues which either have not been addressed or which have been inadequately addressed by the Commission through the public hearings process.

As a preliminary matter, I direct your attention to ORS 468.735(1)(h):

"The Commission by rule may establish standards of quality and purity for the waters of the State in accordance with the public policies set forth in ORS 468.710. In establishing such standards, the Commission shall consider the following factors: the value of stability and the public's right to rely upon standards as adopted for a reasonable period of time to permit institutions, municipalities, commerce, industries, and others to plan, schedule, finance, and operate improvements in an orderly and practical manner."

This policy statement requires the Commission to, among other things, consider the status quo and the implementation of new standards on the public.

1. The Commission has failed to consider the economic impact which the rule will have on small businesses. The written and oral material submitted through the public hearing's process clearly indicates that the proposed rule will have a significant adverse effect upon small business among others. ORS 183.540, therefore, requires that to the extent consistent with the public health and safety purpose of the rule, the Environmental Quality Commission must reduce the economic impact of the rule on small business by following the four steps listed in the statute. Those four steps are as follows:

- (1) Establishing differing compliance or reporting requirements or time tables for small business;

- (2) Clarifying, consolidating, or simplifying the compliance and reporting requirements under the rule for small business;
- (3) Utilizing objective criteria for standards; or
- (4) Exempting small business from any or all requirements of the rule.

No where in the rule has the Commission ever considered, let alone expressed, any variation in applicability of the rule to small business.

2. The Commission has not followed the requirements of state law by fully considering the effect of such rule on economic development.

During the Oregon Legislature's special session in 1982, a bill was considered and adopted which recognized the adverse economic impact of the nation's recession upon the Oregon economy. In response to that recognized concern, the Legislature adopted Chapter 15 during that special session. Chapter 15 has, since 1982, been readopted and extended and currently applies, according to Chapter 535 of the 1985 laws, until 1989. This bill, which remains uncodified in Oregon laws requires that all public agencies during the conducting of their affairs, including this rule making proceeding, must recognize and examine the potential adverse economic consequences of its acts. Although the Commission's staff report contains references to fiscal impact, the actual rule leaves the analysis of the potential fiscal impact of the rule to some future, and as of yet unspecified, time table. The Commission's adoption of this rule as currently written clearly violates the spirit, if not the letter, of this legislative mandate.

3. The proposed rule violates the United States Constitution, 14th Amendment--Due Process.

The proposed rule includes a set of standards for chlorophyll concentrations. Upon the determination that such standards are exceeded, the department is required to declare a body of water to be in "nonattainment." The department has recommended no standards whatsoever for enforcement of or compliance with nonattainment. The enforcement standards are as yet unannounced and, for the most part unknown, according to the proposed rule. After a declaration of nonattainment, a water body and the actual users of the water body, are prohibited from any further activity and left without recourse or standards to be met for the continued use of the water body for discharge. This, therefore, leaves the potential sources of discharge in nonattainment without a remedy by which corrective action or appeal can be determined. The rule leaves these potential remedial procedures and standards to "further study" in clear violation of constitutional Due Process principles.

The proposed rule violates the same Constitution principle in yet another way. The standard declares that when the specified level of "chlorophyll a" is exceeded, the subject body of water may be a "nuisance," which is a legally imprecise and vague term. In the context of this rule, there are no standards which can be drawn upon to determine the parameters or scope of application for this term. The Due Process clause of the Constitution in the context of administrative rule making requires that terms be clearly defined so that those who potentially come within their scope can fairly predict when and under what conditions a rule applies.

4. The Commission has already begun enforcement of this rule without following its own selection process by singling out the Tualatin Basin for a "pilot study." The director of the Environmental Quality Commission has indicated in the staff report that the Tualatin basin will be the subject of a "pilot study" to determine compliance with the proposed standards. However, the Commission's policies and guidelines, which are generally applicable to all basins, OAR 340-41-026(1)(a) indicates that more sensitive or more scenic waterways are required to be examined according to such priority status. There is nothing in the director's report to indicate this rule has been compiled with in determining that the Tualatin Basin is a sensitive or scenic waterway and therefore it should not be the first basin for examination by the department. The Commission's adoption of the rule and approval of the accompanying staff report gives tacit approval to the director to begin an examination of the Tualatin basin when the Commission rules require that the most sensitive or most scenic of waterways be given priority in terms of examination.

5. There has been no public comment on the rule currently under consideration. The Commission is proposing to adopt a rule, which is a modified version of a rule which had been considered during a series of public hearings. However, the now modified rule has never been subjected to a public scrutiny. Although one might argue that some of the earlier opponents of the initial wording of the rule might now be more favorably inclined toward the rule currently being considered, there has been no effort by the Commission to elicit public input to this proposal. It appears from the director's efforts that the proposed rule is simply being rushed through the adoption process in order to meet the director's or someone else's timetable for examination of the Tualatin Basin.

6. No fiscal impact statement has been presented. Although a court might not be empowered to declare a given rule invalid because of an inadequate or insufficient fiscal impact statement, the proposed rule is not merely insufficient or inadequate in this respect. The proposed rule and the accompanying staff report contain no fiscal impact statement. The rule by its terms leaves the preparation of such statement to some future, and as yet unknown, timeframe. This absence of a fiscal impact statement violates ORS 183.335 and offers the courts an opportunity under ORS 183.400(7), to declare the rule invalid.

7. The rule violates statewide landuse goals. The proposed rule and the accompanying staff report clearly violate ORS 197.180, relating to compliance with the Statewide Landuse Goals, especially Goals 3, 8, 9, and 14. The staff report contains no discussion or consideration of the following Statewide Landuse Planning Goals, which are made applicable to the EQC by ORS 197.180:

- Goal 3 -- Agricultural Lands Goal
- Goal 8 -- Recreational Needs
- Goal 9 -- Economy of the State
- Goal 14 -- Urbanization

8. Adoption of the rule as proposed will severely prejudice the City of Tualatin and its citizens. The rule will effectively place a moratorium on all development, including sewer construction, storm drainage projects, plant construction and residential construction, which will affect existing contracts, reduce anticipated fees and threaten the tax base.

MP/se

JOHN R. COUTRAKON, P.C.
JOHN C. BABIN, P.C. '

' ALSO LICENSED IN
CALIFORNIA

COUTRAKON & BABIN
PROFESSIONAL CORPORATIONS

ATTORNEYS AT LAW

January 29, 1986

P.O. BOX 1600
(517 CHETCO AVENUE)
BROOKINGS, OREGON
97415-0600
TELEPHONE
(503) 469-5331

Environmental Quality Commission
522 SW Fifth Ave.
P.O. Box 1760
Portland, OR 97207

Re: Petition to Amend OAR 340-21-027
Agenda Item J, January 31, 1986, EQC Meeting

Dear Commissioners:

As you are aware from my attendance on behalf of Brookings Energy Facility at your November 22, 1985 meeting, I had not planned to attend your meeting on January 31, 1986 in reference to my client's petition to initiate rule-making in this matter. For the reasons set forth below, however, I do feel it necessary to make these further comments, which I would request you consider and make part of the record in reference to this agenda item.

I will try to be short and to the point. It is a little difficult not to get "lost", so to speak, in all the details and background of this matter; however, my basic concern is one of substantial fairness to all parties concerned and, in that regard, I respectfully submit that the Department bears much of the responsibility in not helping to resolve these on-going issues concerning the operation of the Consumat burners.

I first would like to give the Commission my perspective and knowledge of this matter since I first "came on the scene", so to speak, in the middle of the summer of 1985. On August 12, 1985 I, Mr. Smart, Ms. Simms and Mr. Hammond met in Coos Bay to discuss much of the background of what had developed to that point. By letter of August 15, 1985 to Mr. Hansen I indicated that my clients wished to "submit a list of statements and concerns for consideration of the Commission regarding suggested modifications of the present permit so that the operations of my client's facilities could realistically meet the rules and guidelines".

Little, if any, constructive discussions or ideas came about from that time until the Commission's meeting on September 27. On September 24, 1985 I had written a letter to the Commission again bringing up these same concerns. After the Commission's denial of the variance at it's September meeting, I submitted the Petition to amend the present rule regarding incinerator operations in coastal areas. I, on behalf of my client, willingly waived the strict time limits such that that request could be considered in the January meeting rather than the November meeting.

January 29, 1986

Page Two

During this entire process I, at least, up to the present time have received no real communication from the Department in reference to resolving the operating temperature issue. If anything, I was led to believe that the Department would at least not be objectionable to the proposed rule-making request as that would serve as a vehicle to allow time for the parties to "find a middle ground", so to speak, in the resolution of that issue.

Four days after your November meeting, on November 26, 1985, I wrote to Ms. Sims proposing a plan for temperature testing at my client's facility. The Commission, of course, had adopted the Director's recommendation at it's November 22 meeting. A part of that recommendation was that "a test of the temperature capabilities of the incinerators" be conducted "according to a plan approved in advance by the Department".

On December 10, 1985 a letter from Mr. Bispham addressed not to myself, but to Mr. Smart, set forth a lengthy testing procedure which simply ignored, even by mention or acknowledgment, the plan which I had submitted on November 26.

On December 12 I received a letter from Ms. Simms containing the test result documentation on the Coos County burners (which I had requested earlier of her). On December 24 I wrote to Ms. Simms in reference to Mr. Bispham's letter and my understanding of what the Commission's ruling was in regards to this "testing". I attach a copy of that letter herewith for your information; however, the thrust thereof is that the Commission directed that BEF submit a plan for the Department's approval and not that the Department would make up an extensive testing program or plan of it's own and simply use Brookings Energy Facility's incinerators as a research laboratory.

At the Commission's meeting on November 22 the Department's main objection to my client's proposed rule change was that the Department did not have information on how the incinerators would run according to the manufacturers installation and operating procedures. The Department already has the test data from the Coos County burners in reference to how the Department thinks Consumat incinerators should run.

From my reading of the Commission's minutes in it's September meeting and my definite recollection of the Commission's comments in it's November meeting, both the Department and BEF are to be cooperating in resolving this temperature issue; however, as it appears at least from my desk, the Department has not only been not communicative but in fact has been simply unavailing of sharing or admitting what information it has previously had. Two points illustrate this in the extreme.

January 29, 1986
Page Three

Unbeknownst to either myself or my client, on May 22, 1985 Ms. Sims wrote a letter to the manufacturer, Consumat Systems Inc. On May 29, 1985 Consumat Systems replied to Ms. Sims. Copies of that correspondence are attached hereto; however, the thrust of the communications clearly demonstrates that the present rule, OAR 340-21-027 is simply not workable nor the temperature requirements realistically designed for normal operating standards.

What is most frustrating, of course, is that that vital correspondence was never brought to me or my client's attention in the summer meeting of 1985 and I believe it was only discovered by my client after your September meeting when he was in further contact with the manufacturer. This set of correspondence clearly shows the Department's knowledge and recognition of the problem almost a year ago and that the detailed technical response of the manufacturer was never brought to light. Almost immediately after the November Commission meeting I had indicated to Ms. Sims that all of the testing be done at a most convenient date to the Department according to that detailed plan.

Secondly, in the present memorandum to you from the Department in reference to this agenda item, there is simply left out of that package my January 6, 1986 letter to Mr. Bispham, which was a response to his December 26, 1985 letter to me asking if I wished "to submit any written views" for the hearing. A copy of that letter is also attached hereto.

The point here is not so much that my January 6 letter was of such grave importance or concern, but that "something" once again was left out for the Commission's consideration. As I have said before herein, it was my understanding that the parties were going to be working together and that the rule-making petition would not be objected to so that it could serve as a "vehicle" within which to come to some well reasoned modification of the rule, taking both technicalities and practicalities into account. I cannot stress strongly enough that the Consumat manufacturer's letter of May 29, 1985, in direct response to technical questions posed by the Department, firmly supports and gives good grounds for the requested petition to amend this rule.

Finally, the following considerations lend credence to petitioner's request:

- 1.) The Department has received test results from the Coos County incinerators. These test results have apparently been known to the Department for quite some time being done, I believe, in 1981 or 1982. Although I had initially requested these from the Department in my first meeting in the summer of 1985, I finally received one chart on December 12, 1985. A copy of what I received is attached hereto.

January 29, 1986
Page Four

To simply demonstrate what I must respectfully term and can only imagine to be an aspect of the absurdity of the Department's position in this matter, Mr. Bispham's proposed testing plan commences with the requirement that in the "start up phase" fuel be pumped into the burners "until the upper chamber exhaust gas temperature reaches 1600 degrees F. or for six hours, whichever occurs first". To simply look at the chart of the Coos Bay incinerator test attached hereto, it is obvious with all the fuel usage available that for a period of three and one half hours the temperature never got above 400 degrees.

The manufacturer's letter of May 29, 1985 states that "the systems are not designed to achieve a pre-set temperature in the secondary (chamber) prior to loading waste".

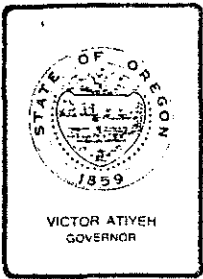
2.) Attached to your agenda item is the full and unanimous support of the Board of Commissioners of both Coos and Curry Counties in reference to the requested rule modification. I would urge, in particular, that the Coos County letter be viewed with seriousness, where in some detail it summarizes that "Coos County has found it impossible to meet the temperature requirements within the parameters of the current rule".

I do apologize for this dictation having perhaps gone on at too great a length; however, I felt it incumbent to demonstrate through these few details, among the many others in the chronology of events between the parties, the unfortunate posture which the Department continues to maintain. Rule-making modification procedures seem a most apt vehicle to truly resolve this issue on the facts and on the merits. I do thank you for your attention.

Very truly yours,


John R. Coutrakon

JRC/nj
Enclosures
cc: Client
Dept. of Environmental Quality



Department of Environmental Quality

522 S.W. FIFTH AVENUE, BOX 1760, PORTLAND, OREGON 97207 PHONE (503) 229-5696

May 22, 1985


Mr. Bill Wiley
Consumat Systems, Inc.
P. O. Box 9379
Richmond, VA 23075

Dear Mr. Wiley:

The Consumat installations in Oregon are the source of potential air quality problems. Since April 8, 1985, I have been requesting information from Consumat on the operation of the units in Oregon. As I have not received this information from Consumat or Thermal Reduction Company, your representative in Washington, I am reiterating my request below. Your prompt attention to this matter would assist us in developing parameters under which the Consumat units might be operated in compliance with Oregon regulations.


The particular units information is needed on are: CS2000 #4156 and #4157 (1980 models), C760M #4035 (1978), C760M #2937 (1977) at Beaver Hill, Oregon and the two CS1200 units installed at Brookings, Oregon in 1979. The serial number on one of these units is #4070. Please send operating manuals on these units, if they are available.

Start Up

Our regulations require that exhaust gases be preheated to 1600° F. before waste is introduced. This regulation was developed based on data gathered from various modular incinerator manufacturers, particularly Consumat. However, operators at both facilities report maximum temperatures of about 600° F. using only auxiliary fuel. What are the maximum upper chamber temperatures achievable on auxiliary fuel only? What is the volume of each upper chamber? What are the burner specifications for each upper and lower chamber? 

The units have been started by loading the primary chamber with waste before ignition. Were any of these units originally equipped with interlocks to prevent loading of waste before the unit reaches a specified temperature? Can they be retrofitted and, if so, at what cost? For a unit charged with waste as soon as the 1600° F. gas temperature is achieved, what is the time period required to reach 1800° F.?

Operating Temperature

Under Oregon regulations, the flue gases must be brought to at least 1800° F. within 30 minutes of charging with waste and maintained at that temperature until 2 hours after the final charge. The operator of the CS1200 units has represented that those units are incapable of achieving 1800° F. gas temperatures during periods of high moisture content in the waste. He further claims 

Mr. Bill Wiley
May 22, 1985
Page 2

that clinker production increases at this temperature, causing wear and damage to the ash removal system. Are the CSI200 units capable of maintaining 1800° F. in the secondary while wet municipal waste is being charged? What has been your experience with clinker production? Do the ash removal rams have sufficient hydraulic pressure to clear the clinkers? I should note that these units are being operated on a one shift per day schedule. △

In addition, ~~please describe the design operating schedule for each upper and lower chamber burner.~~ What would have to be done to the units to change the temperature set points? What are the maintenance requirements to insure that the burners operate according to specification? △

Shutdown

The Oregon regulations further specify that the minimum exhaust gas temperature of 1800° F. be maintained for 2 hours after the final charge of waste. From your experience, should this present any problem? How much of this time would auxiliary fuel be required? What condition would the waste in the primary chamber be in after this two hour period, that is, what fraction would be burned out, how long until complete burnout, etc.?

I realize that assembling this amount and type of information is a time consuming process. However, there has been a history of problems with the Con-sumate installations in Oregon. We look forward to resolving these latest difficulties so that the unit can be operated in a manner that would both benefit the State of Oregon and be a credit to your firm. I would appreciate an expeditious response.

Please contact me at (503) 229-6414 if you have any questions.

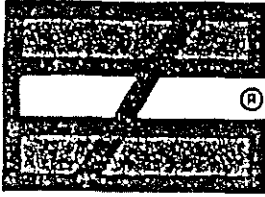
Sincerely,



Wendy L. Sims
Senior Environmental Engineer
Air Quality Division

WLS:ahe

cc: Thermal Reduction Company



Consumat Systems, Inc.

OPERATIONS DIVISION

P. O. BOX 9379 • RICHMOND, VIRGINIA 23227 • PHONE (804) 746-4120

May 29, 1985

Ms. Wendy L. Sims
Senior Environmental Engineer
Department of Environmental Quality
Box 1760
Portland, Oregon 97207

Dear Ms. Sims:

Thank you for your letter dated May 22, 1985 requesting detailed technical information on various Consumat® models. We regret that you have not received a prompt response to your requests in the past but can see why it would be difficult for our representative to supply some of the details requested. We will answer your questions below and will be happy to supply any other details which you might require.

The specific installations you mention are MSW applications. The "CS" models (CS2000 and CS1200) are designed for 24 hour per day operation while the "C" models are designed for 8 - 12 hours loading with an automatic burndown period. Each installation of this size tends to have some slight differences from other installations and the operating and maintenance manuals are assembled specifically for the unit. Two copies are usually supplied with the equipment. Additional copies are assembled for \$150 per copy. Our records show the following information.

<u>Unit</u>	<u>L/C Vol., Ft.³</u>	<u>U/C Vol., Ft.³</u>	<u>Aux. Burner, Btu/Hr x 10⁶</u>
CS-2000	1600	500	0.5/2.5
CS-1200	1000	210	0.5/2.0
C760M	760	220	0.5/2.0

The installations at Coos Bay and at Brookings are fitted for future addition of energy recovery boilers.

Start-Up Information

The systems are not designed to achieve a pre-set temperature in the secondary prior to loading waste. The units are started with all burners in operation. Interlocks are provided to assure that all burners are in operation prior to loading. The operators are instructed to charge initially with clean, relatively dry waste (cardboard, wood) to aid in rapid start-up. Since on start-up all gases generated in the lower chamber must pass through the full flame of the secondary burner and since these gases are initially low in volume start-up is a relatively clean procedure for an experienced operator. The actual flame temperature of the secondary burner will be in the 3000° F range (about 20% excess air) although the average outlet temperature will read less than 800 - 900° F because of the initially "cool" walls and various losses. It is not practical to operate with the thermocouple directly in the burner flame.

Designing the system to achieve a pre-set average outlet temperature would involve several significant design and operating changes which would increase costs for a not-so-clear result. For example, if the 1600° F temperature were to be achieved with the burners alone, all the refractory heat sink and loss would have to be supplied by fossil fuel. Because the stack opening represents the largest loss, the temperature mentioned cannot be achieved without some type of damper arrangement. Hot gas dampers have always given problems because of the harsh environment. From a practical standpoint, the burner sizes would also have to be increased. The average total heat release rate on a CS-2000 with MSW is about 20 million Btu per hour. To achieve the 1600° F in a reasonable time period with hot gas outlet damper the upper burner would need to be in the 8 million Btu/Hr range. The CS-1200 and C-760M have an average heat release rate in the 10 million Btu/Hr range and would need a burner in the 4 million Btu/Hr range. The controls would also need to be changed to provide the desired interlocks. It is difficult to determine the cost of a retrofit system since a good deal of field work is required. An estimate would be in the \$40,000 - \$50,000 per unit range. Operating costs would also increase because of the additional fuel consumption.

Once the upper chamber reaches the 1600° F point and waste is charged, a time period in the 30 - 60 minute range is estimated to be needed to achieve an 1800° F outlet. This assumes no precharging and the primary chamber being cool. The overall time and temperature relationship depends somewhat on the maintenance of the equipment. A "tight" system where air infiltration is kept at a minimum will take less time to heat and will be controlled more precisely.

Operating Temperature

Achieving an average flue gas temperature of 1800° F within 30 minutes from the first charge, starting cold and assuming equilibrium, is not attainable for systems of the size being considered here. The heat sink capacity of the refractory precludes equilibrium conditions in this period of time. The actual flame temperature would of course,

Start down

be greater than the 1800° F but the walls would be lower and the thermocouple would read lower. Maintaining the preset temperature for a two hour period after the final charge should be achievable provided the system is being run close to the design point with typical MSW or better.

1600°

It is difficult to judge the capabilities of an individual system after a period of time. Performance depends on the operator, the maintenance, and the waste. In some of the continuous energy recovery facilities operated by CSI the secondary chamber will be operated in the 1800° F - 2100° F in order to keep the excess air low and the recovery efficiency high. The higher the temperature is in the secondary, the more difficult the working environment. Refractory wears faster, thermocouples burn out, and upper chamber cleaning becomes more difficult. We generally regard typical MSW as being in the 4500 Btu/Lb HHV and in the 25% or less free moisture. Waste with much higher moisture and lower calorific value would have a lower theoretical flame temperature, require less excess air at a given temperature and might require more auxiliary fuel.

Clinker problems are generally associated with primary (lower) chamber operation and are not influenced by secondary chamber. Early in the development cycle of the continuous system design (CS models), we experienced considerable clinker problems. This condition would generally occur near the end of the week when operating on a continuous basis. The clinker formation is associated with localized hot spots which allow molten glass and residue to combine. Once started, clinkers can be substantial. Changes were made in the air injection system, lower chamber component cooling, and shut down procedures which substantially eliminated the clinker problem. Clinker formation has not been considered a problem with the Consumat® for a number of years. The transfer rams have substantial force and can deal with normal ash problems. Large clinkers are not normal and are indicative of other problems.

The lower chamber burner is for ignition only in an MSW system. The burner operates for a pre-set time period, once the upper burner is on, and then is automatically turned off for the remainder of the cycle.

The upper burner is set to operate upon initial start-up and to continue to operate as long as the upper chamber temperature is below set point. The burner modulates (hi-low-off for oil burners) in combination with combustion air requirements. For example, upon start-up the combustion air will be at the minimum setting to prevent excess air into the system and to maintain a high flame temperature. As the temperature approaches the set-point, the combustion air is increased and the burner fuel is decreased. A point is reached when the system is in equilibrium when the auxiliary fuel is off and the temperature is automatically controlled by modulating combustion air. During shutdown, the combustion air modulates closed to maintain the setpoint temperature. Once the air reaches a minimum point, the upper burner modulates "on" to assist in maintaining the temperature. This continues until the burn-down time period is satisfied. For systems which operate on a continuous basis, the burner is off except on start-up and shutdown.

Normal burner maintenance is needed to keep the system operating properly. Flame tube cleaning, electrode cleaning and adjustment, flame sensor cleaning, periodic nozzle changes, and primary relay maintenance are the main considerations.

Shut Down

As mentioned earlier, maintaining the preset temperature for 2 hours after final charge is not believed to present a problem for a properly operating system although we have not collected data to substantiate this. The primary chamber will still be very hot at this point but most of the oxidation will be from the fixed carbon. Since it is not practical to measure burnout at this time period, we have no data to indicate the degree of burnout. The normal burndown period could run for 5 hours or more. Again, determining burnout after 2 hours is of little practical value since the system must cool beyond this time.

You might not be completely familiar with the controlled-air process and I have enclosed a brief description for your information. It is important to the process to maintain the lower chamber in a reducing atmosphere and the secondary chamber in an oxidizing atmosphere. The controlled reducing conditions keep many of the undesirable ash components from vaporizing and entering into the flue gas stream. The low velocity, long solids retention time, and quiet reactions keep solid fly ash entrainment to a minimum. These factors are important from a pollution control standpoint. The secondary chamber utilizes an air jet injection concept to provide the turbulent recirculation patterns necessary for a high combustion (destruction) efficiency. The condition here is an oxidizing atmosphere (excess air).

We are somewhat disturbed by your statement that there has been a history of problems with the Consumat® installations in Oregon and have asked our representative to investigate and to report to us these problems. It is not our intention to allow known problems to continue unresolved.

We sincerely appreciate your letter and look forward to assisting you with your efforts. Hopefully, this discussion has been of some use to you.

Please feel free to contact us if you have any questions.

Very truly yours,

CONSUMAT SYSTEMS, INC.



Robert L. Massey
President

WOW:cw

cc: Thermal Reduction

Enclosure

JOHN R. COUTRAKON, P.C.
JOHN C. BABIN, P.C.

* ALSO LICENSED IN
CALIFORNIA

COUTRAKON & BABIN
PROFESSIONAL CORPORATIONS

ATTORNEYS AT LAW

January 6, 1986

P.O. Box 1600
(517 CHETCO AVENUE)
BROOKINGS, OREGON
97415-0600
TELEPHONE
(503) 469-5331

Thomas R. Bispham, Administrator
Air Quality Division
Department of Environmental Quality
522 SW Fifth Ave.
Box 1760
Portland, OR 97207

Re: ACDP No. 08-0039
Petition to Amend OAR 340-21-027

Dear Mr. Bispham:

I am in receipt of your letter dated December 26, 1985 in reference to the above matter. Petitioner's basic reasons for the request to initiate rule making to modify the above referenced rule pertaining to municipal waste incinerators in coastal areas are as set forth in my November 5, 1985 letter to the Environmental Quality Commission (of which I note you have enclosed a further copy to me).

I believe I made some statements before the EQC in reference to this request at their meeting on November 22, 1985 in Eugene, Oregon; and further, the Commission acknowledged that there would be little, if any, need for my further attendance at their January meeting to restate my client's concerns.

We believe there is good cause to initiate rule making to achieve a modification of the present rule, at least in so far as it appears to be necessary to have some "vehicle" within which to resolve the apparent disparity in viewpoints in reference to the operation of these incinerators between the DEQ and the operators of those units. Something appears to be simply askew and the presently posed modification (especially subsection (b) Minimum Exhaust Gas Temperatures) appears to be the best statement of the change which the operators feel is both practical and reasonable. Of course, during the hearing phases of the rule making process other facts might come to light which would allow the EQC to further modify the rule after hearing testimony and evidence presented by the various concerns.

In summary, then, the petitioner at the present time would not request an oral presentation in it's request for rule making

January 6, 1986

Page Two

(unless the Department submits a view or position which would necessitate such); and, petitioner would simply request that the rule making procedure be allowed to commence to get the issue resolved in an orderly process.

Very truly yours,

John R. Coutrakon

JRC/nj

cc: Client

Mr. R. AuFranc

Mr. Don Mayea

(Curry Co. Board of Commissioners)

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Water Quality Committee
Columbia Group-Sierra Club
2637 S.W. Water Avenue
Portland, OR 97201
January 31, 1986

Oregon Environmental Quality Commission
522 S.W. Fifth Avenue
Portland, OR 97207

RE: Comments on Proposed Underground
Storage Tank Notification Requirements
OAR 340-120-010

Dear Commissioners:

My name is Michael Rosen and I'm here representing the Water Quality Committee of the Columbia Group of the Sierra Club. I appreciate the opportunity to make a brief statement this morning regarding the Notification Requirements proposed for the Department of Environmental Quality's Underground Storage Tank Program.

The problem of leaking underground storage tanks is one of the most serious hazards currently threatening the maintenance of a safe and healthy environment in our nation's communities. Recent incidents occurring throughout the country have already resulted in a range of actions including the permanent closing of private and public wells, the installation of new wells, the use of bottled water, the use of in-home and on-site filtering systems and the use of alternate water supplies from surrounding communities. Nationally, property damage alone has already run into the hundreds of millions of dollars. Not only does the public face the health risk of exposure to hazardous chemicals in their drinking water, but they also face the risk of exposure to toxic fumes and the danger of explosion when vapors from flammable liquids penetrate buildings. In response to this severe national problem the Congress has recently enacted legislation requiring states to develop regulatory programs for underground storage tanks.

We would like to commend the DEQ for taking a strong initial stance in the rules proposed for the Oregon Underground Storage Tank Notification Program. The Department must feel, as we do, that the potential for severe water quality problems from leaking underground storage tanks demands a strong program that stresses prevention. The desire to develop this type of program is evidenced by the fact that as originally proposed, DEQ's rules went beyond the minimum standards required by Federal Law. At the public hearing held on January 16 concerning the proposed rules, members of the regulated community were almost unanimously opposed to the fact that the Department was requesting more information than the minimum amount required by EPA. The concern was expressed that it would not be possible to obtain all of this information and still meet the deadline of May 8, 1986, mandated by Federal Law. Based on these comments, DEQ has since decided that

it will no longer require the extra information. They are now recommending that the state simply adopt the EPA form. The additional information originally required will now only be asked for as an optional survey. While we feel that the additional information originally proposed by DEQ is important and should be required, we also sympathize with those who must supply this information on such short notice. Therefore, we would like to suggest a compromise. First, the regulated community should submit the minimum information required by Federal Law to DEQ by the Federal deadline of May 8, 1986. The EPA form could be used for this as is currently proposed. Second, the DEQ should then require that the additional information be submitted at a later date, allowing a reasonable period of time for this process. This would allow DEQ to meet the requirements of Federal Law while still implementing a strong first phase to the Oregon Underground Storage Tank Program.

Therefore, in closing, we would like to respectfully request that the Environmental Quality Commission consider our proposal and direct the Department of Environmental Quality to implement OAR 340-120-010 as originally drafted except for extending the deadline for the submission of the information in question. Though this information exceeds that required by Federal Law, it should be remembered that states have the prerogative to enact more stringent legislation. We believe this will enable DEQ to establish the preventative program which they originally intended.

Yours very truly,

A handwritten signature in cursive script that reads "Michael E. Rosen".

Michael E. Rosen



CITY OF
PORTLAND, OREGON

BUREAU OF ENVIRONMENTAL SERVICES

Dick Bogle, Commissioner
John Lang, Administrator
1120 S.W. 5th Ave.
Portland, Oregon 97204-1972
(503) 796-7169

February 5, 1986

Mr. Jim Peterson, Chairperson
Oregon Environmental Quality Commission
522 SW 5th Avenue
Portland, OR 97204

RE: Section 409 of the Oregon Specialty Plumbing Code - (Backflow
Prevention)

Dear Mr. Peterson:

This is to update you on the subject requirement. The Code currently requires installation of backflow prevention devices on service laterals where the dwelling could be subject to sewer backup if the main line sewer were to be surcharged or blocked.

We have investigated the effectiveness of this requirement as applied to mid-County and have concluded that it is extremely improbable that sewers will be prone to backup in mid-County.

We have also examined the frequency of actual backups in portions of mid-County currently served by separated sanitary sewers and have found that only one house has experienced a backup due to a main line blockage or surcharge during the 16-year period since the creation of the Central County Service District. That backup was caused by a Contractor accidentally dumping gravel into a manhole, plugging the sewer.

This low frequency of backup is primarily attributable to the fact that few illegal roof drain connections have been made to sanitary sewers in the area and groundwater in the area is below the sewers and, therefore, does not infiltrate into the line causing it to become overloaded. Few illegal roof drain connections exist due to the fact that roof drainage can be easily disposed of into drywells which function efficiently in the area's rapidly draining soils. Consequently, we have approached the City of Portland, City of Gresham and State of Oregon Plumbing Divisions to request relief from the requirement in mid-County.


Jim Peterson, EQC
February 5, 1986
Page 2

All parties agree that modification of the requirement is in order. We will be working with the State Plumbing Division to process a Code modification.

The evidence in support of the modification is so overwhelming that we are very confident that the State Plumbing Board will approve the request for modification.

I hope the above information is of assistance. If you have any questions, please call me at 796-7169.

Very truly yours,

A handwritten signature in cursive script that reads "John M. Lang". The signature is written in dark ink and is positioned above the typed name and title.

John M. Lang
Administrator

JML:WCG:em

5/BKF1EQC