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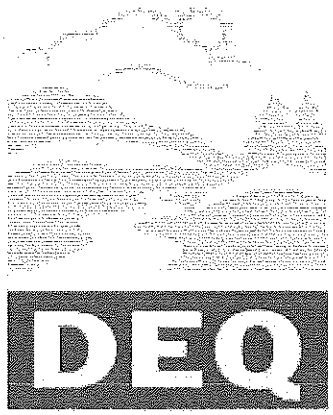

State of Oregon
Department of Environmental Quality

OREGON STATE SANITARY AUTHORITY
AIR QUALITY CONTROL
1400 S. W. 5th Avenue
Portland, Oregon

January 30, 1967

THE WIGWAM WASTE BURNER PROGRAM

Phase-Out Implementation Procedures

1.0 BACKGROUND

1.1 HISTORICAL SUMMARY

On December 18, 1963, the Sanitary Authority adopted the following policy regarding wigwam burners:

(a) That prior to January 1, 1965, the Authority will consider adoption of regulations which will deny approval for proposed new wigwam burner installations after that date.

(b) That the lumber industry and individual lumber mills located near Oregon communities are urged to develop improved disposal methods and phase-out the use of wigwam waste burners, and,

(c) That the Authority instruct its staff to prepare additional regulations to produce an orderly phasing out of the existing wigwam burners causing air pollution problems.

Following the December 1963 Authority meeting, the Associated Oregon Industry staff held regional meetings in Eugene, Roseburg, and Medford, "...to gain understanding of the air pollution problems from burners and the Authority's program to bring about reasonable control. The local groups appointed committee members to seek clarification of the Sanitary Authority's position and to work with the Authority on the proposed rules and regulations."

At the January 30, 1964, meeting of the Authority, several industry representatives were present. The spokesman for the industrial group stated that, "...the sawmill operators had greatly improved the operation of their burners and that as a consequence, much of the air pollution had been abated." He also discussed industry progress in utilization and expressed the opinion that in time the problem would correct itself to a considerable degree. In response to questions, he stated that he felt that efficient high temperature burners would be too expensive, and that cooperative burning would be impractical due to high transportation costs. He further indicated that sawmill operators "...would be willing to help draft reasonable rules and would help educate the mill owners." Mr. Wendel "expressed disappointment concerning the statements made by industry representatives."

1.1 Continued

Subsequently a conference sponsored by the Oregon State Experiment Station was held at Oregon State University to discuss the effects of wood residue utilization and disposal on air quality. Austin Evanson authored a report entitled "Power or Pollution" which encouraged the generation of power by use of wood wastes. The Forest Industries Air Quality Committee of Associated Oregon Industries later initiated a study in the Medford area of wood waste disposal by combustion and its effects on air quality. The study included 21 mills and a total of 25 waste burners.

The current regulation governing the construction and operation of wigwam waste burners was developed through the efforts of the timber products industries, and with the participation of Oregon State University and the Sanitary Authority. As a result of the adopted regulation, the 1963 policy statement and its stated intent to bring about the orderly phase-out of the existing wigwam waste burners "located near Oregon Communities", was set aside and a program of upgrading the existing burners substituted.

1.2 REACTIVATING THE PHASE-OUT POLICY

The inadequacy of the burner upgrading approach has now become evident.

It also appears evident that in the three years which have been invested in the experiment, public attitudes have changed. Air contamination levels which were tolerated three years ago are now the subject of complaints, petitions, and political campaigns. The citizen has become more concerned about his environment, and less permissive of industry's use of the atmosphere for refuse disposal.

The current staff recommendations regarding a policy to phase-out the wigwam burner are thus tantamount to a recommendation that the Authority's policy statement of three years ago be reactivated.

Much more is now known about the wigwam burner and about the effects of multiple sources on the atmospheric contamination of an airshed. Also, the character of mill wastes has changed in the three year interim, and trends in utilization can now be more accurately assessed. We can thus now proceed with fewer unknown factors, and with no illusions regarding the wigwam burner's capabilities.

2.0 RECOMMENDED PROCEDURES

In defining the staff's December 1966 policy recommendations, and as a result of further staff studies and conferences, the following specific procedures are now recommended:

2.0 Continued

(1) That the Authority adopt a policy aimed at prohibiting the use of wigwam waste burners by a specific date in critical areas of the state, and institute the following initial steps in implementation:

a) Notification of the timber products industries by appropriate means, that it is the intent of the Sanitary Authority to prohibit the incineration of refuse in wigwam waste burners after December 31, 1968, and to require Sanitary Authority approval of the alternative methods or devices to be utilized.

b) Request of the timber products industries that a program and time schedule for the development, demonstration, and installation of alternative methods be submitted by September 30, 1967. At that time, and upon evaluation of the proposals and schedules which have been submitted, the Authority may consider advancing or extending the December 1968 termination date as conditions then pertaining may warrant.

c) Adopt the areas designated in Appendix II of this report as being those of critical concern from the standpoint of air pollution and thus subject to application of the above adopted policy.

(2) That in view of the staff conclusions, a) that wigwam waste burners cannot, by nominal alteration, be made capable of consistent operation within acceptable air quality standards, and, b) that further investment by industries can be more productively applied toward the development of acceptable alternative methods of incineration, the current regulation pertaining to construction and operation of wigwam waste burners (OAR Chapter 334, Division 2, Subdivision 4) should be rescinded with the exception of that portion which prohibits wigwam waste burner construction without Sanitary Authority approval.

Attached is a copy of the regulation (Appendix I) upon which the paragraphs which would be rescinded are cross-hatched, and those which would be retained are within block outlines.

(3) That as an interim procedure, the staff be authorized and directed to seek, through voluntary cooperation or appropriate enforcement action, abatement of the more serious air pollution problems caused by wigwam waste burners, and that the content of the present regulation be expanded and used as a guide in this effort.

3.0 CRITICAL ABATEMENT AREA DEVELOPMENT

Criteria upon which the designation of critical air pollution areas of Oregon have been based were discussed in the December 13, 1966 staff report on the wigwam waste burner program, under Appendix I, "Critical Air Pollution Abatement Areas". The December report presented a preliminary study subject to further development and refinement. These studies have now been expanded to cover the entire state, and the areas in which the procedures recommended under Section 2.0 should appropriately be applied are as shown on the attached map, and as defined below.

3.1 AIR QUALITY MANAGEMENT REGIONS OF OREGON

To facilitate the future integration of the critical air pollution abatement areas into air resource management programs, the state of Oregon has been divided into regions, as follows:

Region	Counties
1	Multnomah, Clackamas, Washington, Yamhill, Polk, Benton, Marion, Linn, and Lane.
2	Coos, Curry, and Douglas
3	Jackson and Josephine
4	Tillamook and Lincoln
5	Clatsop and Columbia
6	The remaining counties, those east of the approximate summit of the Cascade Range.

3.2 DEFINING THE CRITICAL ABATEMENT AREAS

The critical abatement areas are presented in Appendix II by means of, a) a description of their boundaries, which, in general, follow range and township lines, and b) a cartographic presentation whereby the boundary lines are shown superimposed in red on an Oregon State highway map.

The numbering system, which has been used to designate the areas, utilizes the number of the management region which encompasses the abatement area or areas, followed by an alphabetical designation of each specific area within that region. For example, Region 4, composed of Tillamook and Lincoln Counties, encompasses the Tillamook and Yaquina abatement areas which are designated as areas 4A and 4B, respectively.

Subdivision 4

CONSTRUCTION AND OPERATION OF WIGWAM WASTE BURNERS

[ED. NOTE: Unless otherwise specified, sections 24-005 through 24-025 of this Chapter of the Oregon Administrative Rules Compilation were adopted by the State Sanitary Authority, June 24, 1965 and filed with the Secretary of State, July 6, 1965 as Administrative Order SA 22.]

24-005 DEFINITIONS. (1) "Approved" means approved in writing by the Sanitary Authority staff.

(2) "Auxiliary Fuel" means any carbonaceous material which is readily combustible (includes planer ends, slabs and sidings).

(3) "Overfire Air" means air introduced directly into the waste burner in the upper burning area around the refuse or fuel pile.

(4) "Underfire Air" means air introduced into the waste burner under the fuel pile.

(5) "Wigwam Waste Burner" means a burner which consists of a single combustion chamber, has the general features of a truncated cone, and is used for incineration of wood wastes.

24-010 WIGWAM WASTE BURNERS-PURPOSE. Section 24-010 through Section 24-025 are adopted for the purpose of preventing or eliminating air pollution or public nuisance caused by smoke, gases and particulate matter discharged into the air from wigwam waste burners.

24-015 WIGWAM WASTE BURNER CONSTRUCTION PROHIBITED. Construction of wigwam waste burners is hereby prohibited after July 1, 1965, unless plans and specifications have been submitted to and approved by the Sanitary Authority prior to construction.

24-020 COMPLIANCE. All existing Wigwam waste burners shall comply by January 1, 1966, with the following:

(1) Adjustment of forced draft underfire air shall be by variable speed blower or fans, dampers or by-passes or by other approved means.

(2) The introduction of overfire air shall be principally by adjustable tangential air inlets located near the base of the wigwam waste burner or by other approved means.

(3) A thermocouple and pyrometer or other approved temperature measurement device shall be installed and maintained. The thermocouple shall be installed on the burner at a location six inches above and near the center of the horizontal screen or at another approved location.

(4) During burner operation the burner exit temperatures shall be maintained as high as possible so as to maintain efficient combustion.

(5) A daily written log of the waste burner operation shall be maintained to determine optimum patterns of operation for various fuel and atmospheric conditions. The log shall include, but not be limited to, the time of day, draft settings, exit gas temperature, type of fuel and atmospheric conditions. The log or a copy shall be submitted to the Sanitary Authority within ten days upon request.

(6) Auxiliary fuel shall be used as necessary during start up and during periods of poor combustion to maintain exit temperatures required under subsection (4). Rubber products, asphaltic materials or materials which cause smoke discharge in violation of Section 21-011 or emissions of air contaminants in violation of Section 21-016 or Section 21-021 shall not be used as auxiliary fuels.

(7) Light fuels or wastes shall be introduced into the burning area in such a manner as to minimize their escape from the burner.

24-025 VARIANCE. (1) Waste burners operating within the modifications and criteria of Section 24-020 are granted a variance for one year from the effective date of these rules from compliance with Section 21-011 Smoke Discharge, Section 21-016 Particle Fallout Rate and Section 21-021 Suspended Particulate

Matter.

(2) Wigwam waste burners located in sparsely populated areas of the state where their potential for causing an air pollution problem in the immediate or surrounding area is slight, may be granted variances from the provisions of Section 24-020 pursuant to ORS 449.810.

THE WIGWAM MASTER BURNER PROGRAM

Phase-Out Implementation Procedures

APPENDIX II A

CRITICAL AIR POLLUTION ABATEMENT AREAS OF OREGON

Boundary Descriptions

REGION 1

AREA 1A (WILLAMETTE)

The area bounded by the following line:

Beginning at the point where rangeline 5E, W.M. intersects the Oregon-Washington boundary; thence S on rangeline 5E to the SE corner of T5S, R5E; thence W to the NW corner of T6S, R4E; thence S to the SE corner of T7S, R3E; thence W to the NW corner of T8S, R2E; thence S to the SE corner of T14S, R1E; thence W to the SW corner of T14S, R1E; thence S on the W.M. line to the SE corner of T19S, R1W; thence W to the SW corner of T19S, R1W; thence S to the SE corner of T21S, R2W; thence W to the SW corner of T21S, R3W; thence N to the NW corner of T21S, R3W; thence W to the SW corner of T20S, R4W; thence N to the NE corner of T12S, R7W; thence W to the NW corner of T12S, R7W; thence N to the NE corner of T7S, R8W; thence W to the NW corner of T7S, R8W; thence N to the NW corner of T5S, R9W; thence E to the NE corner of T5S, R6W; thence N to the NW corner of T2N, R5W; thence E along township line 2N to the Oregon-Washington boundary; then S and E along the Oregon-Washington boundary to the point of beginning.

AREA 1B (OAKRIDGE)

All the area in the following township:

T21S, R5E, W.M.

AREA 1C (MAPLETON)

All the area in the following adjacent townships:

T7S, R9W and R10W; and T8S, R9W and R10W, W.M.

REGION 2

AREA 2A (UMPQUA)

The Area bounded by the following line:

Beginning at the NE corner of T24S, R4W; W.M.; thence S along range line 3W to a point 3 miles S of the SE corner of T30S, R3W; thence due west to a point 3 miles S of the SW corner of T30S, R7W; thence N along range line 7W to the NW corner of T24S, R7W; thence E along township line 25S to the point of beginning.

AREA 2B (COOS)

The area bounded by the following line:

Beginning at the point of intersection of township line 23S, W.M. with the coastline; thence E to the NE corner of T24S, R13W; thence S to the SE corner of T24S, R13W; thence E to the NE corner of T25S, R12W; thence S to the SE corner of T28S, R12W; thence W along township line 28S to the point of intersection with the coastline; thence N along the coastline to the point of beginning.

AREA 2C (REEDSPORT)

The area bounded by the following line:

Beginning at the point of intersection of township line 20S, W.M. with the coastline; thence E to a point 3 miles E of the NE corner of T21S, R12W; thence due S to a point 3 miles S of township line 21S; thence due W to the point of intersection with the coastline; thence N along the coastline to the point of beginning.

AREA 2D (GOLD BEACH)

The area bounded by the following line:

Beginning at the point of intersection of township line 35S, W.M. with the coastline; thence E to a point 3 miles W of the NW corner of T36S, R13W; thence due S to township line 37S; thence W along township line 37S to its point of intersection with the coastline; thence N along the coastline to the point of beginning.

REGION 3

AREA 3A (ROGUE)

The area bounded by the following line:

Beginning at the NE corner of T32S, R2E, W.M.; thence S along range line 2E to the SE corner of T39S, R2E; thence W along township line 39S to the NE corner of T40S, R7W; thence S to the SE corner of T40S, R7W; thence W to the SW corner of T40S, R8W; thence N to the NW corner of T37S, R8W; thence E to the NE corner of T37S, R8W; thence N to the NW corner of T34S, R7W; thence E to the SW corner of T32S, R2W; thence N to the NW corner of T32S, R2W; thence E to the Willamette Meridian; thence N to the NW corner of T32S, R1E; thence E to the point of beginning.

REGION 4

AREA 4A (TILLAMOOK)

The area bounded by the following line:

Beginning at the point of intersection of township line 1N, W.M. with the coastline; thence E to the NW corner of T1N, R9W; then S to the SW corner of T1N, R9W; thence E along the base line to the SE corner of T1N, R9W; thence S to the SE corner of T2S, R9W; thence W along township line 2S to its point of intersection with the coastline; thence N along the coastline to the point of beginning.

AREA 4B (YAQUINA)

The area bounded by the following line:

Beginning at the point of intersection of township line 10S, W.M. with the coastline; thence E to the NE corner of T11S, R10W; thence S to the SE corner of T11S, R10W; thence W to the SW corner of T11S, R10W; thence S to the SE corner of T13S, R11W; thence W along township line 13S to its point of intersection with the coastline; then N along the coastline to the point of beginning.

REGION 5

AREA 5A (COLUMBIA)

The area bounded by the following line:

Beginning at the point of intersection of township line 2N, W.M., Multnomah County with the Oregon-Washington boundary; thence W to the NE corner of T2N, R5W; thence N to the NE corner of T6N, R5W; thence W to the NW corner of T6N, R6W; thence N along range line 6W to its point of intersection with the Oregon-Washington boundary; thence E and S along the Oregon-Washington boundary to the point of beginning.

AREA 5B (VERNONIA)

All the area in the following adjacent townships:

T4N, R4W, and the S ½ of T5N, R4W; W.M.

REGION 6

AREA 6A (KLAMATH)

All the area in the following adjacent townships:

T38S, R9E; and T39S, R9E, W.M.

AREA 6B (BEND)

All the area in the following adjacent townships:

T17S, R12E; and T18S, R12E, W.M.

AREA 6C (REDMOND)

All the area in the following township:

T15S, R13E; W.M.

AREA 6D (PRINEVILLE)

All the area in the following adjacent townships:

T14S, R15 and 16E; and T15S, R15And 16E, W.M.

AREA 6E (HOOD RIVER)

The area bounded by the following line:

Beginning at the point of intersection of the Hood River-Wasco County boundary line with the Oregon-Washington boundary line; thence S to a point 3 miles N of township line 1N, W.M.; thence due W to range line 9E; thence N along range line 9E to its point of intersection with the Oregon-Washington boundary; thence E along the Oregon-Washington boundary line to the point of beginning.

AREA 6F (THE DALLES)

The area bounded by the following line:

Beginning at the point of intersection of range line 13E, W.M. with the Oregon-Washington boundary; thence S to a point 3 miles N of the Willamette Meridian Baseline; thence due W to range line 12E; then N along range line 12E to its point of intersection with the Oregon-Washington boundary; thence southeasterly along the Oregon-Washington boundary to the point of beginning.

AREA 6G (ATHENA)

All the area in the following adjacent partial township areas:

The eastern half of T5N, R34E; and the western half of T5N, R35E, W.M.

AREA 6H (PENDLETON)

All the area in the following township:

T2N, R32E, W.M.

AREA 6J (PILOT ROCK)

All the area in the following township:

T3S, R32E; W.M.

AREA 6K (BAKER)

All the area in the following township:

T9S, R40E; W.M.

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December 13, 1966

A REPORT ON THE WIGWAM WASTE BURNER PROGRAM

Planning and Implementation Guidelines

1.0 INTRODUCTION

Increasing public concern over air pollution in the state of Oregon dictates that the disposal of mill wastes be accomplished without an appreciable contribution to the state's air pollution load. Program planning must be tailored to meet this objective.

This report endeavors to relate, a) the current regulations, b) the evolutionary changes taking place within the forest products industries and, c) the development of air pollution abatement methods which must accompany these changes; and to present staff recommended action based on their evaluation.

2.0 BACKGROUND

The disposal of unused mill wastes by incineration in the wigwam burner is the time honored method. No other device has seriously challenged the wigwam burner as the "cheapest way" which would satisfy fire insurance underwriters' requirements. Were it not necessary for fire protection, the wigwam shaped enclosure would itself not likely have evolved, and open burning would be the standard method of disposal now subject to air quality control regulation. Substitution of a correctly designed incinerator would likely have provided the needed control of emissions in a single step, although at greater first cost than for the wigwam burner.

With the wigwam burner an established fact, the logical approach was first to endeavor to modify it in such a manner as to reduce its emissions. Accordingly, Oregon State University, under a federal grant, studied the wigwam burner from a combustion engineering standpoint and concluded that, in general, it could be modified in such a manner as to perform with reasonable combustion efficiency and reduced level of emissions. Subsequent studies financed by timber industries in the Medford area further verified the direct relationships between smoke discharge, exit temperatures, and percent excess air; and developed modifications to the burner which would make possible the attainment of reduced emission levels. A statement published in Oregon State University Engineering Experiment Station Circular No. 34 reads, "It has been generally found from field observations that if tepee burners can be operated so that the temperature of the gases leaving the top of the burner are greater than 600° F, the smoke and other particulate will be minimized."

2.0 Continued

On the basis of these studies, the Sanitary Authority initiated the drafting of regulations which were finalized with the concurrence of the staffs of Associated Oregon Industries and Oregon State University. The regulations as adopted, stipulated that certain modifications be incorporated in all wigwam burners and that a high exit temperature be maintained. They did not specify criteria for the design of the modifications, nor did they stipulate a minimum exit temperature, stating only that exit temperature be maintained, "as high as possible".

3.0 FIELD OBSERVATIONS AND EVALUATION

3.1 FACTORS LIMITING EFFECTIVENESS

Over 130 waste burners have been surveyed by the Authority staff during the first 12 months' efforts in program implementation. From the accumulated data, the most significant factors limiting the effectiveness of the present program are observed to be:

a) The response of industry in incorporating the required modifications.

b) The inadequacy of engineering design evident in the air handling systems and devices being installed.

c) The lack of operating proficiency exhibited on those burners in physical compliance.

d) The relationship and effect of limitations in fuel quantity and quality on elevated exit temperature capability.

e) The trends in utilization and their impact on the efficacy of the current regulatory approach.

While the needs of both the state's economy and its air quality control would best be served by the profitable use of the entire tree, the anachronism of the wigwam burner is that it must have adequate fuel to operate efficiently. Staff estimates, based on fuel available at the time surveyed, are that only 62% of the burners had adequate fuel with which to have the potential capability of maintaining exit gas temperature of 600° or over which is a prerequisite to compliance with discharge standards.

3.2 DESIGN AND OPERATIONAL REQUIREMENTS

It is the opinion of the authority staff that a burner's "potential capability" cannot be realized unless the following conditions are satisfied:

a) That the waste burner size be compatible with the fuel load.

3.2 Continued

b) That fuel be correctly introduced at a reasonably uniform rate and be of such physical characteristics as not to obstruct passage of underfire air or combustion gases from the heat release within the fuel pile.

c) That an adequately designed underfire air system be provided.

Such a system must be adjustable, of sufficient capacity for the maximum rate of fuel supply, and must introduce air with sufficient dispersion to preclude "channeling" through the fuel pile.

d) That adjustable, tangential overfire ports be provided of ample capacity to supply at least 10 times the underfire air volume at a differential pressure corresponding to the burner stack effect at 300° exit and 90° F ambient temperatures.

e) That the burner shell be reasonably airtight to preclude parasitic leakage and thus cooling effect and lack of control of overfire air.

f) That adequate maintenance practices be observed to assure optimum performance of the underfire air system at all times.

g) That operational practices include frequent adjustment of underfire air volume (firing rate) and overfire air volume as required to maintain optimum exit temperature at all times.

Lack of ability to meet the requirements as to quantity and/or quality of fuel results from either a) curtailed production, b) waste utilization, or c) species or process variations. Curtailed production is by nature transitory, and hopefully of short duration. Waste utilization is by contrast continuously increasing and non-reversible.

4.0 CONSIDERATIONS IN FUTURE PLANNING

4.1 THE IMPACT OF UTILIZATION

The impact of progressively increasing utilization is of inescapable significance in planning the future program. Such planning must be predicated on the assumption that the point will eventually be reached when the wigwam burner in physical compliance with the present regulation will in few cases constitute a satisfactory disposal device by itself.

Basic to studies in the development of program and policy is the evolutionary progression through which a mill passes as markets are found for its waste products. The progression starts with the wigwam burner receiving all wastes, and culminates with its need

4.1 Continued

for the disposal of yard cleanup materials only. At some point in the progression, fuel reaching the burner becomes inadequate for efficient combustion as evidenced by exit temperature. The burner becomes, in effect, too large for the fuel load. However, throughout the progression, the threat of breakdown in the utilization process usually dictates standby capacity for total waste disposal.

There are, of course, alternative methods possible in the event of a breakdown in hog, chipper, transport device, or customers receiving facility. Experience has shown, however, that most mills prefer to maintain the burner on standby.

Assuming that progressively fewer wigwam burners will be capable of maintaining satisfactory emission levels, it is perhaps also logical to assume that the present estimate of 62% potentially capable is a maximum figure subject to progressive deterioration with time. Thus 38% are already beyond improvement under the present regulatory concept, which is to say that the regulation is already 38% obsolete.

The development of forward-looking solutions is thus a present need, and should be considered of high priority.

4.2 ALTERNATIVE METHODS

The investigation of alternative methods of disposal should be approached in a manner receptive to any concept which holds even a remote chance of development into practical solution. There may be no single solution to all situations, and a combination of methods may yield optimum results in some cases.

4.2.1 Suggested Alternative Methods

The following are suggested concepts representative of methods meriting consideration and study:

a) Further modifications to the wigwam burner to render it capable of efficient combustion under varying rates of fuel feed, and with intermittant or batch loading.

b) Use of auxiliary fuel to supplement minor quantities of mill refuse in existing wigwam burners. This may best accomplish efficient combustion if both primary and secondary burners are included.

c) The addition of exit gas treatment devices, with sufficient corrective capability to offset poor combustion efficiency. Scrubbers, afterburners, and catalytic combustion devices are representative treatment devices.

4.2.1 Continued

d) An auxiliary incinerator designed as an efficient combustion device, to receive all residue when the quantity is not sufficient for efficient combustion in the wigwam burner. A chunt conveyor and switch could be used to select the device appropriate to the fuel load. This concept may have merit where utilization is near 100% and the wigwam burner is on standby.

e) An incinerator, used in conjunction with a wigwam burner used solely as a storage facility or surge bin. A constant rate of fuel feed from storage to incinerator would thus be possible. The incinerator could be most economically sized for disposal in 24 hours of the refuse from one or two shifts.

f) A single wigwam waste burner or a correctly designed incinerator centrally located, to receive the waste transported from several mills operated on a cooperative or corporate basis. The central facility could provide uniform fuel feed rate from bulk storage. A full time operator would be justified, with operation and maintenance costs prorated to the member mills.

4.2.2 The Importance of Automatic Control

Experience with the state's wood waste fired boiler plants points to the universal need for a high degree of automatic control. Even though a boiler installation is usually a far more sophisticated and efficient combustion device than a wigwam burner, few in the state are operated profitably, even with one or more full time operators. The conclusion is that whatever alternative solutions to the wigwam burner evolve, a high degree of instrumentation and control must be provided if satisfactory emission levels are to be assured.

4.3 DEVELOPING THE ALTERNATIVE METHODS

4.3.1 Experimentation and Design

By nature, many of the alternative disposal methods which might appear worthy of development will require pioneering and experimentation in selective mill situations. Some will require a significant capital investment to become operational. All will require knowledgeable engineering design to reduce errors, and thus investment, to a practical minimum.

Upon development of a given concept to practical solution, consideration should be given to thorough documentation. Such documentation may include approved construction drawings, specifications, and operating instructions to serve as a guide for the individual industry and contractor. This, together with an educational program, utilizing demonstration installations at strategic locations, should help overcome the reluctance to invest due to lack of understanding or technical practicality which has followed the present program.

4.3.2 Responsibility. The Statutory Concept.

Early concurrence between those organizations responsive to public and to industry interests, as to the areas of responsibility appropriate for each, is a necessary prerequisite to constructive action. A guideline already exists in the air pollution statutes which stipulate that the party responsible for complying with the air quality standards established by the Sanitary Authority, "...shall determine the means, methods, processes, equipment, and operation to meet the established standards". (ORS Chapter 449, Paragraph 449.795)

While the wording of the statute contemplates singular offenders, the prospect of individual mills each independently bringing all necessary technology to bear on the problem seems both illogical and impractical. The need for a total industry sponsored developmental program appears evident.

The statutory role of the Sanitary Authority in such an effort is defined in ORS 449.780, (3), which charges the Authority with the responsibility to "Encourage the formulation and execution of plans in conjunction with...industries,...who severally or jointly are or may be the source of air pollution, for the prevention and abatement of pollution."

4.4 PROBLEM AREA CONSIDERATIONS

4.4.1 The Critical Area Concept

Due to the great number and geographic distribution of wigwam burners in the state, universal and equal application of abatement methods to all burners is difficult to justify. This fact is recognized in the present regulation by means of a provison for granting variances to mills in remote and sparsely populated areas.

In planning the future program, it may be well to consider an approach whereby more stringent requirements are applied to those burners in specified problem areas. By this means, concentrated effort could appropriately be applied to those areas in which meteorological factors, population density, and a multiplicity of emission sources combine to create a more acute air pollution problem.

5.0 SUMMARY AND CONCLUSIONS

The statutory concept governing the role of the Sanitary Authority in the control of air pollution charges it with the responsibility to establish air quality standards, and to promote planning and implementation by industries toward air pollution abatement. The statutes also place the responsibility on industry to develop the means and methods of meeting the air quality standards established by the Authority.

5.0 Continued

The current regulation represents a first step in the control of emissions from the wigwam burner. It is based on the concept that the installation of certain modifications to improve combustion efficiency will reduce emissions to an acceptable level.

Experience in the practical application of the regulation has brought to light several inadequacies. These have to do with its present implementation and its longer range potential.

In implementation, staff opinion is that certain factors are absent which are necessary to achieve effective results:

a) Among mill owners, an adequate acceptance of the necessity for compliance, understanding of the engineering concept involved, and motivation to endeavor to achieve optimum results.

b) Among both mill personnel and installers, sufficient technical capability to design and install the required modifications in accordance with correct engineering design practices.

c) In the regulation, definite criteria governing design and operation, provision for approval of systems designs and of completed installations, penalties for non-compliance, and recognition of the limitations imposed by inadequate fuel quantity and/or quality.

d) In the Sanitary Authority, sufficient capable manpower to properly conduct a program of this scope.

However, correction of the above inhibiting factors would only be effective on the diminishing percentage of those burners with sufficient fuel. Thus, the impact of progressively increasing waste utilization and of curtailed production on the wigwam burner's potential as a satisfactory incineration device are such as to make imperative the development of alternative methods.

A program toward this end will thus require that industry be encouraged and supported in a collective endeavor to develop approved alternative methods of incineration. While it is possible for individual mills to independently develop acceptable alternative methods, a joint effort should produce superior and more economical solutions at less cost for development to each of its participants. The collective endeavor could take the form of a non-profit organization to which individual mills subscribe and contribute, and which would satisfy requirements for a federal air pollution abatement or solid wastes disposal grant.

Upon demonstration and acceptance by the Authority of the abatement methods thus developed, industry will then have available an

5.0 Continued

assured alternative which is acceptable both to itself and to the Sanitary Authority. Utilization can then proceed in the absence of conflict with the needs of improved air quality.

Consideration should be given to the advisability of applying more stringent requirements in areas of greater air pollution potential and concentrations of population. This may best be approached on a critical area basis.

6.0 RECOMMENDATIONS

In view of the foregoing, the staff recommends that:

a) The Authority adopt a program to achieve the orderly phase-out of the wigwam waste burner in critical areas of the state and its replacement by incineration methods capable of satisfying air quality standards.

The program policy should be to require of industry that it develop alternative methods and demonstrate their effectiveness. Upon approval by the Authority of the proposed method or methods, a deadline date should be established by which time they shall have been installed as replacements for the wigwam waste burner in all critical areas of the state.

Staff recommendation is that industries be required by Sept. 30, 1967 to have obtained approval from the Sanitary Authority of a plan and schedule for such a program of development and demonstration. It is further recommended that all replacement installations shall have been completed by December 31, 1968.

b) To effect improved operating practices in the interim, the present regulation should be amended to require a minimum exit temperature of 600° F, and to require that subsequent pyrometer installations be of the recording (in lieu of indicating) type.

c) Variance provisions should be limited to the granting of an automatic variance for one year to all wigwam waste burners not within the critical areas to be established (See Appendix I), such variance and the designation of critical areas to be subject to annual review.

APPENDIX I

Critical Air Pollution Abatement Areas

1.0 INTRODUCTION

This appendix presents a preliminary study of the areas in Oregon most in need of air pollution amelioration. It is anticipated that the boundaries designated may be refined with further study, and that new problem areas will develop with time.

Two cartographic presentations are attached. Figure 1 outlines the principal critical areas of western Oregon. Figure 2 is an enlarged detail of the Rogue area, which includes Grants Pass and Medford.

2.0 METHOD

2.1 CRITERIA

Criteria for designating an area as "critical" include combinations of the following factors, which in concert result in conditions conducive to the accumulation of pollutants:

a) Sources, their number and strength.

b) Meteorological factors such as local winds and inversions.

c) Topography

d) Incidence of complaints.

e) Population and its projected increase.

f) Projected industrial growth.

g) Location relative to an airshed.

2.2 THE AIRSHED CONCEPT

In general, an airshed can be thought of as having limits analagous to those of topographic drainages, but with modifications due to wind and stability considerations.

2.3 USE OF ELEVATION CONTOURS

The general outlines of the three major airsheds between the Cascades and the Coast Range have been indicated on Figure 1, by accentuating the 1000 ft. MSL (above mean sea level) contour, except that in the Rogue airshed the 2500 MSL contour has been used. These outlines are not to be taken as definite boundaries, but as indicators of the general configuration and extent of the airsheds.

The heavy dark lines represent the survey (township) lines which outline those areas most in need of air pollution amelioration.

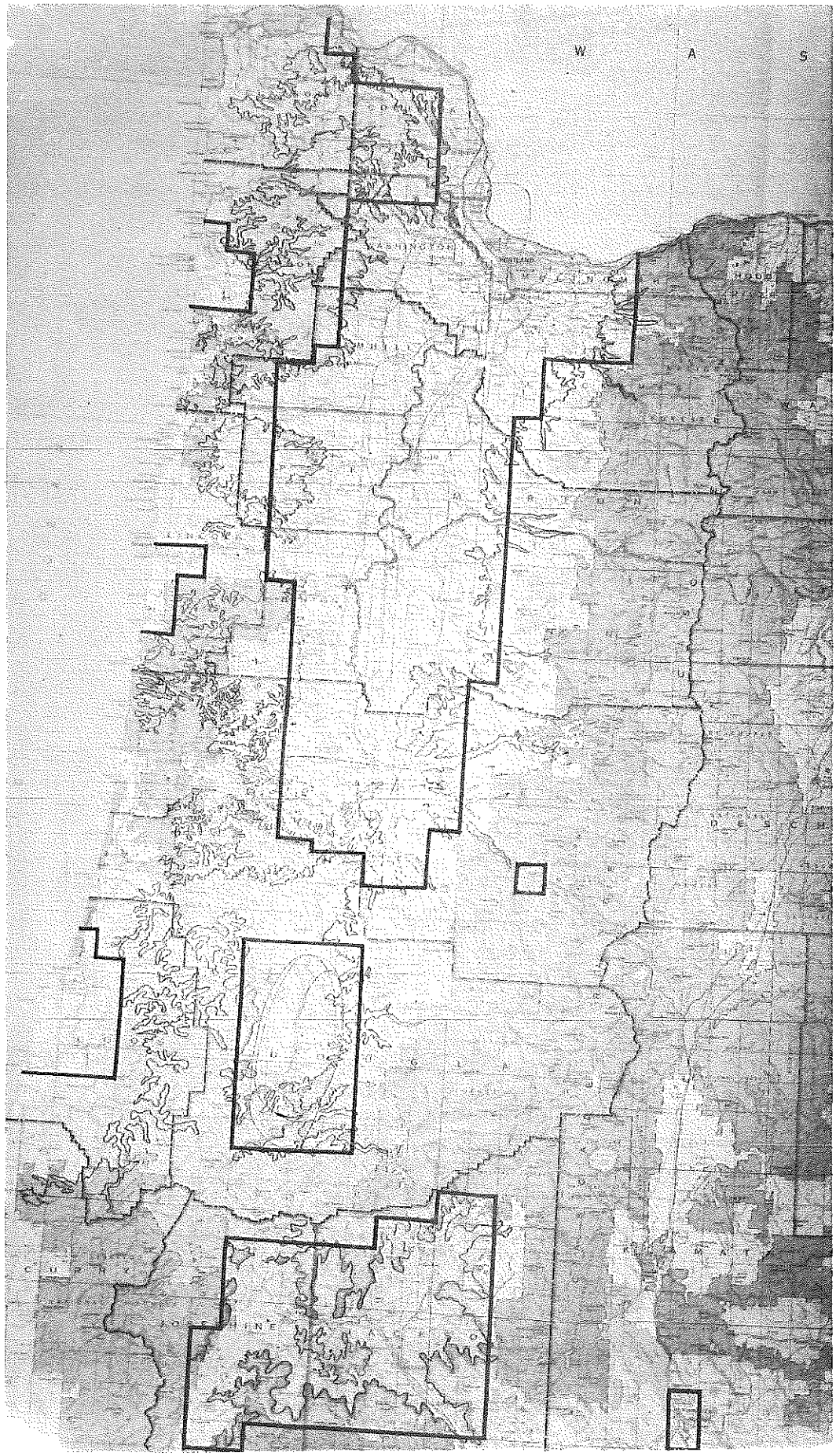

FIGURE 1
Critical Areas of Western Oregon

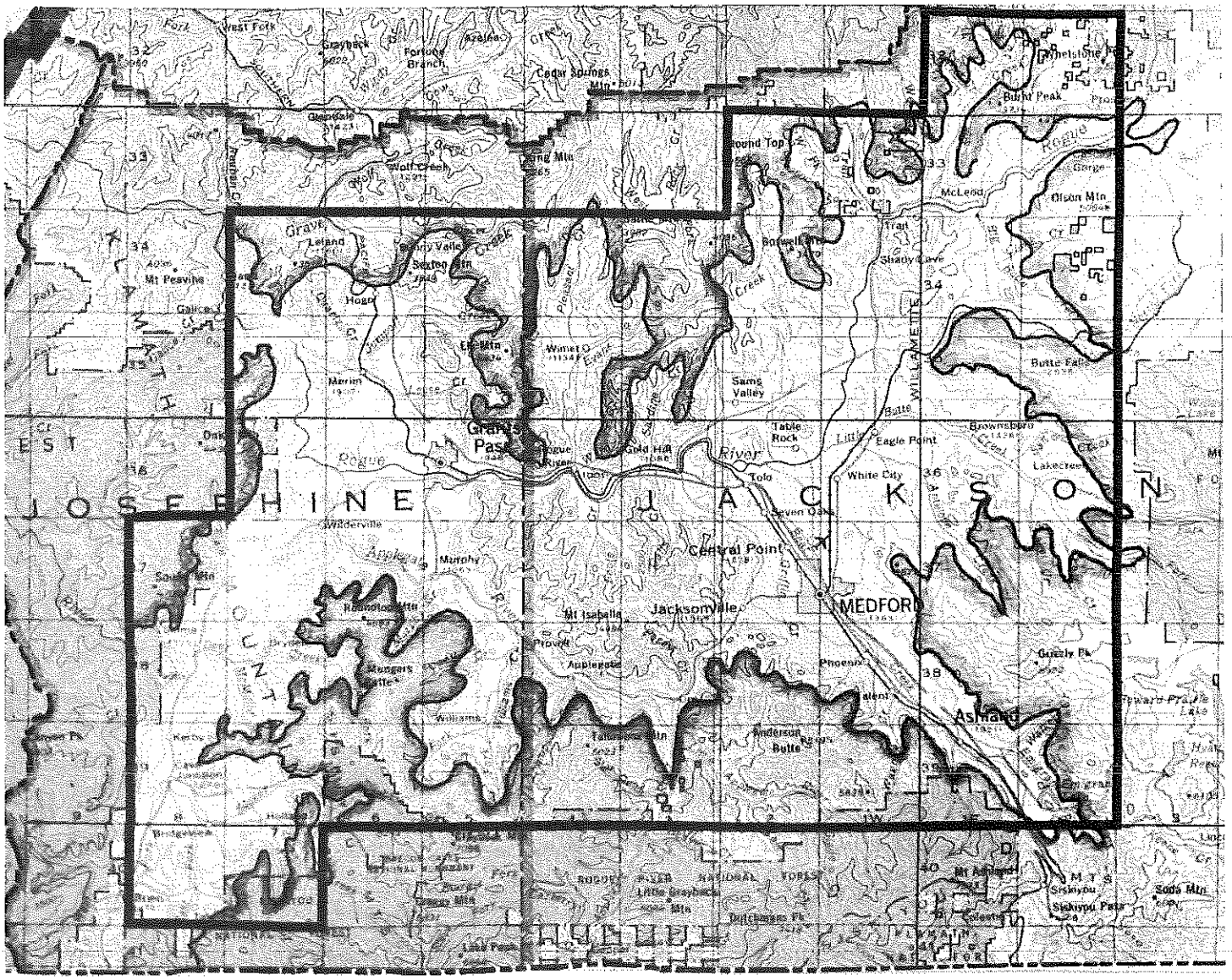

FIGURE 2
The Rogue Airshed Critical Area

OREGON STATE SANITARY AUTHORITY

AIR QUALITY CONTROL

STAFF REPORT

To : Members of the State Sanitary Authority

Subject: Harvey Aluminum (Incorporated)

Date : February 21, 1967

At the December 20, 1966 meeting of the Sanitary Authority, the staff was granted additional time to consider the letter of Maxwell H. Elliott, dated November 11, 1966, advising of Harvey Aluminum's intention to request a formal dismissal of the Order for Continuance of Public Hearing dated April 11, 1961.

A copy of Mr. Elliott's letter is contained in Appendix A of this staff report and reads in part as follows:

Sanitary Authority Order

A copy of the Sanitary Authority Order for Continuance for Public Hearing dated April 14, 1961, is contained in Appendix B of this report and the order reads as follows:

Staff Comment on Conditions in the Order

1. Conditions A, B, C: The conditions set out in paragraphs A, B, and C were the subject of several staff progress reports. A summary of the staff reports pertaining to these conditions follows:

   At the June 28, 1961 meeting, Mr. Hatchard reported on progress gained by fume scrubber removal efficiencies of 95% and the discussion centered on escapement of fluoride from roof monitors.

   At the January 11, 1962 meeting, staff recommendations were adopted which included conditional approval of the system for the remaining 4½ cell buildings with certain considerations pertaining to installation of roof monitor control systems (i.e. (1) maximum technical application to obtain reduction in fluorides, (2) maintain at maximum efficiency and, (3) submission of test data.) Pilot program tests were reported to have obtained a 60-70% removal efficiency.

   At the February 8, 1962 Sanitary Authority meeting a motion was adopted advising Harvey Aluminum (Inc.) that when the installation of roof monitor fluoride removal systems has been completed and field tests show the concentrations of fluorides in the area of The Dalles have been reduced to

an acceptable limit, the Sanitary Authority would entertain a motion to discuss the proceedings after notification to all parties concerned.

At the June 5, 1962 meeting (after tour of orchards and Harvey Aluminum mill), the staff agreed to suspend continuous testing of fume cell scrubbers and that fluoride removal had been higher than the specified 95%.

At the June 21, 1963 meeting of the Sanitary Authority, after review of staff report that (1) fluoride content in air samples were as high as before installation of roof monitor control system (2) alfalfa samples collected in 1963 show excessive levels by other state authorities, and (3) Harvey Aluminum (Inc.) has not submitted requested information, it was moved and carried that Harvey Aluminum (Inc.) be notified that the Sanitary Authority will direct the public hearing in this matter be reconvened.

During July 1963, private litigation was under way in the federal district court, and it was subsequently decided that the hearing would be deferred until the private litigation was resolved.

Reports on Emission

Mr. Elliott included in his recent letter copies of reports on test work conducted by outside test teams in 1966.

R. E. Hatchard and associates tested cell scrubber towers No. 11 and No. 3W on February 20, 21, 22, and 26, 1966. The test results indicated cell scrubber system efficiencies of removal of 68.5% on total dust, 81.1% on fluoride dust and 99.8% on fluoride gas.

Tests conducted by Resources Research Incorporated, Lakeland, Florida, covering the period July 18 through July 31, 1966 for cell scrubber towers and roof monitors were also submitted. The reported efficiencies of removal for the cell scrubber system tested were qualified on total particulate 56% poor accuracy; particulate fluoride 90% fair accuracy; gaseous fluoride 99.4% fair accuracy. The Resources Research report on emissions from the roof monitors: a 70% removal of gaseous fluorides and no reported results of efficiencies for particulate fluorides or total particulates due to fluctuating conditions during test procedures.

In addition, the staff has received from Mr. Joe Byrne, Technical Director of Harvey Aluminum (Inc.), results of emission tests for total fluorides from the roof monitor system conducted on October 20, 1964 (515 lbs.); November 1964 (700 lbs/day); February 1965 (800 lbs/day); March 9, 1965 (550 lbs/day) and April 14, 1965

(540 lbs/day). Emissions prior to any controls are in the range of 2500-3000 lbs/day.

Staff Conclusions:

Within the intent of conditions A, B, and C of the Sanitary Authority Order, information has been made available to characterize the emissions from the cell scrubber and the roof monitor systems. These conditions were modified based upon a staff report to the Sanitary Authority on June 15, 1962, reporting cell scrubber removal efficiencies greater than 95%, and that adoption of analytical procedures as reported in the staff report dated June 19, 1963, attached as Appendix C.

2. Condition D:

An additional laboratory for analyses was established in Hood River.

Staff Conclusion: The staff concludes that Condition D was satisfied.

3. Conditions F and G:

Condition F relative to cooperation and Condition G on continued staff reports were carried out on a cooperative basis within limits until private litigation was initiated.

4. Condition E:

Relative to determining whether additional controls facilities or methods were needed was pursued, but was not concluded. This determination is dependent upon ambient air concentrations and the effect of those levels. The absence of such effects information was essentially the cause of the private litigation and remains an area of investigation and arbitration. Harvey Aluminum (Inc.) has submitted information to support the contention that present control systems more than meet standards of the industry.

The private litigation, R. L. Renken et al v. Harvey Aluminum (Inc.), has resulted in filing of a Consent Decree filed November 3, 1966, a copy of which is contained in Appendix D. The decree in extreme brevity provides (1) arbitrators

to set ppb levels in orchard areas which are not to be exceeded. The same arbitrators are to consider claims of damage if such should be made, and (2) provides for another group of arbitrators to establish the number and location of test stations, methods, apparatus, and personnel employed in test stations to monitor the orchard area during the growing season (March 15 to November 1).

Since the Department of Health, Education and Welfare is charged with the responsibility of establishing air quality criteria, the staff contacted the Public Health Service relative to available fluoride criteria and received the reply contained in Appendix E which indicates such data is sparse. The state of New York has the only complete set of (standards) objectives which lists a 24-hour concentration of 1 ppb in agriculture, timber, and recreational subregions.

The staff has revieved the reports provided by Harvey Aluminum (Inc.) of inspection of the orchards in The Dalles area made during the 1965 and 1966 growing season by five plant pathologists. The reports consider frost, nutrition, disease, as well as fluoride effects. While it is difficult to accurately summarise all these reports, it is believed a reasonable conclusion of the reported observations was that the effects attributed to fluorides were absent, negligible, or insignificant.

In addition, the staff conferred with Dr. Michael Treshow, Plant Pathologist from the University of Utah on January 24, 1967. Dr. Treshow essentially confirmed his written report regarding personal obaervations.

It has been indicated that growers are concerned about additional so-called invisible effects such as those related to fruit set, and it is reported that the Extension Service will undertake such an effect study during the 1967 growing season.

Staff ambient air sampling at the Klindt and Bailey Stations show 1966 total fluoride levels comparable to 1965 levels and lower than at any time since the December 1962-January 1963 sampling period.

The Special Report 204 of the Agricultural Experiment Station of Oregon State University for the 1964 growing season relates that the average fluoride contents of leaves of cherry and peach trees were about the same in July 1964 as in August 1953, 1957, and June 1958 before the aluminum plant started production. The 1964 leaf fluoride content was shown to vary with distance and direction from the plant.

The private litigation has resulted in a Consent Decree that is not precise in terms of air levels and effects.

Harvey Aluminum (Inc.) contends air levels are currently acceptable.

The staff has reviewed Section 103 of the Clean Air Act which directs the Secretary of the Department of Health, Education and Welfare to establish research and development programs, and under paragraph (3) the Public Health Service may conduct investigations and research and make surveys concerning any specific problem in cooperation with any air pollution control agency if requested to do so by such agency. Since ambient air criteria for fluorides are and will be needed, it appears reasonable that the Public Health Service be requested to conduct such studies and investigations as necessary to determine ambient air levels allowable for various agricultural practices.

RECOMMENDATIONS

1. The staff will continue to monitor in The Dalles area during the [redacted] growing season.

2. The Sanitary Authority dismiss the Order for Continuance of Public Hearing dated April 14, 1961.

3. The Department of Health, Education and Welfare be requested under Section 103 of the Clean Air Act as Amended October 15, 1966, to conduct studies to determine air quality criteria for fluorides, including but not limited to the growth of apricots, cherries, peaches, prunes, alfalfa and pine trees.

APPENDIX

A. Letter dated November 11, 1966 from Maxwell H. Elliott, Counsel for Harvey Aluminum, requesting dismissal of hearing.

B. Order of the Sanitary Authority for Continuance for Public Hearing dated April 14, 1961.

C. Staff progress report dated June 19, 1963.

D. Consent Decree, U. S. District Court, filed November 3, 1966, R. L. Renken et al v. Harvey Aluminum, Inc. (Contains stipulated agreements relative to arbitration.)

E. Letter from Department of Health, Education and Welfare, Public Health Service, dated December 29, 1966 in response to staff request for air quality criteria for fluorides.

F. Clean Air Act As Amended October 15, 1966.

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HARVEY Aluminum (Incorporated)

• GENERAL OFFICES: 19200 South Western Avenue, Torrance, Calif. 90509

November 11, 1966

Mr. Kenneth Spies
Secretary and Chief Engineer
Oregon State Sanitary Authority
State Office Building
1400 S. W. Fifth Avenue
Portland, Oregon

KHSC

Dear Ken:

This will confirm the conference among you and your colleagues, Harold Patterson and John Denman, and me, in your office in Portland on October 11, 1966, regarding the Show-Cause proceeding related to our reduction plant near The Dalles, Oregon, which hearing has been continued indefinitely since April 4, 1961.

At a special meeting held in Portland on February 8, 1962, the Authority adopted a resolution stating that when the roof monitor controls were completed at our said reduction plant and field tests show that the concentration of fluoride in the area of The Dalles has been reduced to acceptable limits, the Authority would entertain a motion that the proceedings be dismissed. Distinguished scientists in every relevant field consider that the fluoride control system at our reduction plant more than meets the standards indicated by the Authority, and in fact, for the control of gaseous fluorides, is as efficient as any in the world and better than any other in Oregon. Under these circumstances, Harvey Aluminum (Incorporated) intends to apply to the State Sanitary Authority for a formal dismissal of said Show-Cause proceeding at the next regular meeting of the Authority, which, I understand, will be convened sometime in December of 1966.

Meanwhile, and for the advance information of the staff of the Authority, I enclose copies of the following:

1. Consent Decree dated November 3, 1966, entered by Judge Kilkenny, providing for the settlement of Renken, et al. vs. Harvey Aluminum (Incorporated), Civil No. 61-207, in the United States District Court for the District of Oregon.

2. Report on Fluoride source tests on scrubbing towers serving the aluminum reduction mill of Harvey Aluminum near The Dalles, Oregon, on February 20, 21, 22, and 26, 1966, made by a team of scientists headed by Richard E. Hatchard, Chief Air Pollution Engineer for the City of Portland.

3. Report on a fluoride collection efficiency survey of the roof monitors and cell scrubbers at said aluminum reduction plant during the period July 18 to July 30, 1966, made by a team of scientists from Resources Research, Inc., headed by Dr. E. R. Hendrickson.

4. Reports of inspections of the orchards in the area of The Dalles, Oregon, made during the growing seasons of 1965 and 1966, by

(a) Dr. Earle C. Blodgett of the Washington State Department of Agriculture, Wenatchee Station;

(b) Dr. Michael Treshow of the University of Utah;

(c) Dr. O. C. Taylor of the University of California at Riverside -- Air Pollution Control Project;

(d) Dr. Robert F. Brewer, also of the University of California at Riverside -- Air Pollution Control Project; and

(e) Dr. Leonard H. Weinstein of Boyce-Thompson Institute.

5. Report on atmospheric fluoride levels in the area of The Dalles during the growing seasons of 1965 and 1966, made by Joseph L. Byrne and his staff.

6. Report on levels of fluoride in cherry leaf samples from the area of The Dalles for 1965 and 1966, prepared by Joseph L. Byrne and staff.

7. Report on fluoride levels in cherry leaf samples in the area of the Reynolds Troutdale plant, prepared by Joseph L. Byrne and staff.

8. Memorandum dated March 15, 1963, from Curtiss M. Everts, then the Director of the State Sanitary Authority, to Warne Nunn, Executive Assistant to the Governor, indicating that the Sanitary Authority was satisfied with the fluoride controls in the Troutdale plant.

We are not requesting that any of the reports and other data submitted herewith be held as confidential.

You will note that the fluoride levels in cherry leaf samples from the area of The Dalles, as shown by Joe Byrne's report (Item 6), and as shown in Dr. Compton's reports, are substantially lower than, and but a fraction of, the fluoride levels in cherry leaf samples from the Troutdale area (Item 7). It is my understanding that you have available to you Dr. Compton's reports on the fluoride levels in the vegetation and in the ambient air in the area of The Dalles.

HARVEY Aluminum

If you desire to inspect our plant or if you desire any of the back-up material for the reports of Joe Byrne, please contact him direct. If you wish to discuss any questions with any of the other experts whose reports are furnished herewith, please contact me and I will make the necessary arrangements. Similarly, let me know if there is any other material that you need.

It is my understanding from our discussions that the application to the Sanitary Authority for dismissal of the Show-Cause proceeding may be in the form of a letter and that you will advise me of the date and place of the meeting of the Authority at which such application will be considered and also whether or not the Authority desires oral testimony from any of the independent consulting scientists, allowing timely notice for those who are located considerable distances from Portland.

Sincerely yours,

HARVEY ALUMINUM (Incorporated)

Max

Maxwell H. Elliott
Counsel

MHE:jp

Encls.

cc: Mr. Joseph L. Byrne

BEFORE THE

SANITARY AUTHORITY OF THE STATE OF OREGON

In the Matter of: HARVEY ALUMINUM, a corporation, concerning air pollution in Wasco County, Oregon	ORDER FOR CONTINUANCE OF PUBLIC HEARING

This matter came on regularly for hearing before the State Sanitary Authority on April 4, 1961, consisting of H. F. Wendell, Chairman, Lewis A. Stanley, B. A. McPhillips, Edward C. Harms, Jr., members, and Curtiss M. Everts, Secretary, and their attorney Cecil H. Quesseth. Harvey Aluminum, by its attorneys, presented a motion for continuance of the public hearing in the matter, the said Harvey Aluminum appearing and represented by Maxwell Elliott, Charles A. Phipps, George Rhoten and Samuel F. Speerstra, the Intervenor, Wasco County Fruit and Produce League being represented by its attorneys, James W. Morrell and Lamar Tooze. And the Authority having heard the proposal submitted by the Company's attorneys, and having heard arguments of the Intervenor, and having heard all persons and parties with respect to said motion for continuance, thereupon a motion was duly made, seconded and passed by the members of the Authority that the Authority enter an order continuing the hearing in the above entitled matter conditioned upon compliance by Harvey Aluminum of the proposals submitted by their counsel which are hereinafter enumerated. Now therefore, based upon said action by the Authority,

IT IS HEREBY ORDERED BY THE AUTHORITY as follows:

(1) That the public hearing in the above entitled matter scheduled to begin on April 6, 1961, in the City of Portland, Oregon,

be and the same hereby is continued indefinitely until further direction or order of this Authority, provided, that the following actions and activities are done and performed by the Harvey Aluminum, a corporation, to wit:

(A) That by April 20, 1961, Harvey Aluminum will submit to the staff of the Authority the stack sampling measurements of the fume scrubber effluents and the influent concentrations entering the multi-clone, describing the fluoride concentrations and including determination of the particulate and gaseous state of the total fluoride found, for the months of January, February and March, 1961;

(B) That the stack sampling measurements in Item A will be performed and submitted to the Authority at least monthly and that the respective fume towers sampled will follow a rotation plan in a manner satisfactory to the staff of the Sanitary Authority;

(C) That by April 20, 1961, the Company will initiate measurement of the fluoride concentrations and the volume there being emitted into the atmosphere from the space ventilations in the cell buildings; and that the sampling method, frequency and locations, and analytical procedures shall be developed cooperatively with the Authority staff;

(D) That an additional laboratory will be established in the Hood River vicinity to provide a fluoride-free environment for tho analysis of samples and that in the interim the samples will be analyzed by an adequate private laboratory;

(E) That by May 10, 1961, the data collected by the Harvey Aluminum and the Sanitary Authority will be evaluated by Harvey Aluminum and the Authority staff to determine whether or not additional control facilities or methods are required;

(F) That there will be continued cooperation between the technical staffs of the Harvey Aluminum Company and the Sanitary Authority to provide free exchange of information on the fluoride emissions, and analytical methods, control feasibility and similar matters.

(G) That the staff of the Authority shall submit to the Authority at its next regular meeting to be held in May, 1961, a report of the progress made and accomplished in this matter.

(2) IT IS FURTHER ORDERED that petitions for intervention presented to the Sanitary Authority shall be referred to the hearings officer for action upon resumption of any such hearing and that any further hearing in this matter shall not be conducted without at least 20 days prior written notice to all parties concerned.

Dated this 14th, day of April 1961.

OREGON STATE SANITARY AUTHORITY

By _____
Chairman

ATTEST:

_____
Secretary

OREGON STATE SANITARY AUTHORITY
AIR QUALITY CONTROL

TO : Oregon State Sanitary Authority Members

SUBJECT : Progress Report of Staff Activities since the January 4, 1963 Sanitary Authority meeting pertaining Harvey Aluminum (Inc.)

DATE : June 19, 1963

The following summarizes the staff activities regarding the control of air pollution from the Harvey Aluminum mill in The Dalles since the January 4, 1963 Sanitary Authority meeting:

(1) Mill surveys were made on dates 7, April 4, and April 23, 1963. The purposes of the surveys were as follows:

(a) To observe the air pollution aspects of the operation and maintenance of the aluminum production cells;

(b) To inspect the roof monitor fluoride control installations;

(c) To participate with Harvey Aluminum staff members in test measurements to determine the fluoride removal efficiency of the roof monitor control installation.

(2) Test measurements were made on April 4 and 23 for the cell building "A" roof monitor control system. Two stations were established at locations which are each representative of one half of cell building "A". Four sampling points were used at each station--to obtain the influent and two effluent samples, during a continuous four-hour period. The observations of Air Quality staff members indicated that the mill operating conditions during the test runs were representative.

(3) The Harvey Aluminum staff provided the Authority staff with representative portions from each sample collected during the two test runs. (Four samples from the April 4 test for the East-half building station were lost in the Harvey Aluminum laboratory.

The Air Quality Control analyses of the fluoride content found in the samples were generally comparable with concentrations found by the Harvey Aluminum laboratory. The test measurements showed an average of 67% fluoride removal efficiency by the roof monitor controls based upon the Harvey laboratory analyses and 64% based upon the Authority laboratory analyses.

(4) A sampling station was re-established at the Elliott Ave. located approximately 2000 feet East of the aluminum mill during both the April 4 and April 23 mill roof monitor tests. Analyses of the samples collected are as follows:

Date	Time	Fluoride Concentration in Parts Per Billion (ppb)
4/4/63	10:20 a.m. to 3:04 p.m.	7.3
4/23/63	10:57 a.m. to 2:34 p.m.	20.0

(5) Additional samples for six-hour periods have been collected at the Klindt farm and analyzed in the Air Quality Laboratory since the January 4, 1963 Authority meeting. A summary of the fluoride content found in the samples, including a 1960 series for comparison, is included in Table I.

TABLE I FLUORIDE CONTENT
In Parts Per Billion (ppb)

Sampling Periods	No. Samples	Maximum	Minimum	Median	Average
8/29/60 to 10/17/60	98	96.4 ppb	5.9 ppb	25.7 ppb	22.0 ppb
12/19/62 to 1/9/63	81	15.1	0.9	3.1	4.4
3/7/63 to 3/21/63	46	57.0	7.6	23.1	26.3
6/6/63 to 6/11/63	20	67.0	14.0	38.0	36.2

The March and June, 1963, series of sample data and information obtained during recent mill surveys indicate that operational and/or maintenance problems are still continuing after approximately seven months operation of the roof monitor controls.

(6) In a letter dated June 7, 1963, the Authority requested Harvey Aluminum (Inc.) to submit a summary of the daily operational records for the fume control installations to establish the times

that day when any part of the controls were not in complete operation.

Mr. H.H. Elliot, Counsel for Harvey Aluminum, replied in a letter dated June 13, 1963, no routine operational records are maintained by the plant personnel; however, certain information has been gathered at the request of Counsel, in preparation for trial in the case R. L. Reuben, et al versus Harvey Aluminum, Civil No. 41-407 now pending in the Federal Court for the District of Oregon, with a firm date scheduled for trial commencing on July 29, 1963.

(7) Harvey Aluminum has not provided the staff with the monthly test measurements showing the fluoride removal efficiency, which were requested during the January 4, 1963, Authority meeting. Harvey Aluminum representatives indicate that higher priority field sampling activities have used the available staff time and that the previous test data already identifies the operational range of the twenty fume scrubber systems.

(8) Representatives of Harvey Aluminum have advised that the project to study and develop additional measures to reduce the quantity of fluoride leaving the production cells, which does not enter the cell collection ducts, is continuing. Several operational changes have been studied in individual cell lines; however, no written reports have been submitted to the Authority in compliance with the January 4, 1963 Authority recommendation. (It is understood that the pending private litigation in Federal Court prevents the Counsel of Harvey Aluminum from authorizing the preparation and submission of progress reports to the Authority for review.)

(9) Arrangements were made with the Oregon State University Agricultural Experiment Station through Dr. O.C. Compton to establish alfalfa test stations in the Dalles to show fluoride concentrations early in the 1963 growing season. Four series of samples were collected at two week intervals. The fluoride content of these samples are tabulated in Table II with the available data for previous year's samples.

The States of California and Florida have established rules governing the allowable quantity of fluoride contained in forage for cattle. The "Adverse" level set by the California State Board of Health is 30-50 ppm fluoride (dry weight basis), and Florida State Board of Health rule limits the fluoride to 40 ppm (dry weight basis).

(10) Three air sampling stations were established on March 28, 1963, at locations in the Dalles where herbiculture field studies are being conducted by the Oregon State University Agricultural Station. Manual type impingers are operating at the Gilbert, Alton, and Hendricks Orchards. An automatic impinger began operation at a

Hood River site on June 13, 1962, [illegible] conditions.

Conclusions

(1) The fluoride content found in air samples collected in June, 1962, are as high as the fluoride content of samples collected before the installation of the roof monitor control system. These high values may be caused by operational and/or maintenance problems of the roof monitor controls, or by the discharge of higher amounts of fluoride from the aluminum production cells.

(2) The fluoride content of alfalfa samples collected during 1962, are at levels considered excessive by other State authorities.

(3) Harvey Aluminum (Inc.) has not submitted requested information regarding the fume scrubber tests, the control system operational experience, and the progress reports of projects intended to reduce the fluorides released at the individual cells.

TABLE II

ALFALFA FLUORIDE CONTENT
(PPM - Dry Weight Basis)

Farm	Before Mill Operation		Start Operating	Mill Operating			Mill Operating Monitor Controls Operating		
	July 1-2, 1957	Oct. 2, 1957	June 31 - July 1, 1958	Oct. 7-8, 1958	July 8, 1960	Sept. 20-21, 27, 1960	April 12, 1963	April 25, 1963	May 10, 1963
[illegible] (East of House)							27.0	27.5	17.0
[illegible] (West of House)	5.9*	9.3*	2.7*	49.9*	97.6*	98.3*	63.7	61.2	43.4
[illegible]	5.2	4.3	1.2	59.1	98.4	136.0	64.7	39.2	28.3
[illegible]nebaugh	5.1	3.7	7.6	93.2	40.2	152.0	55.9	38.2	35.8
[illegible]	7.1	4.0	9.6	29.4	61.0	98.9	28.5	53.8	25.6
[illegible] (Background)	3.3	3.0	4.9	7.8	5.0	22.4	15.6	11.0	20.0

* Sample collection location unknown.

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UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF OREGON

R. L. RENKEN, et al,

Plaintiffs.

v.

HARVEY ALUMINUM (INCORPORATED),

Defendant.

Civil No. 61-207

CONSENT DECREE

The above named parties having entered into a Settlement Stipulation on the 13th day of September, 1966, which was recommended and approved by this court and filed herein on the 27th day of September, 1966, and

The Decree of this Court dated February 7, 1964, having been vacated by the Court of Appeals, the Appeal herein having been dismissed, and this cause remanded with instructions to enter a Consent Decree in conformity with and giving effect to said Settlement Stipulation, and

It appearing that this action has now been pending in the courts for over five years with a supplementary trial previously having been ordered by the Court of Appeals; and

It appearing that plaintiffs are contending that fluorides from defendant's plant have been causing damage in their orchards in the years 1964, 1965 and 1966, and will continue to cause damage in the future; and

It appearing that defendant is contending that no such damage has been or will be caused; and

It appearing that the parties desire to provide for an amicable and practical resolution of their differences; now, therefore,

IT IS ORDERED AND DECREED as follows:

1. Definitions. The following terms used herein are defined:

(a) "Growing Season": The period March 15 to November 1, inclusive.

(b) "HF": Means the total amount of HF which could be formed from the F content of any gaseous F compounds, including, but not limited to, HF, silicon tetrafluoride, and fluorides of carbon, but not including particulate or other solid matter containing fluorine.

(c) "ppb": Parts per billion, by weight.

2. Defendant shall pay each of the plaintiff peach orchard owners the then prevailing market price of his peach fruit which has been or is made unmarketable by soft suture caused by fluorides emmitted from defendant's plant; provided, however, that the defendant will have no such obligation for any soft suture occurring in the future unless the orchard owner involved sprays his peach orchards with a calcium chloride or lime spray or other spray, as designated from time to time by defendant, in accordance with methods prescribed by defendant, for which spraying defendant agrees to pay the reasonable cost. The matters covered by this paragraph 2 shall be subject to arbitration

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pursuant to paragraph 10, hereof.

3. Defendant shall pay to the respective plaintiffs such amounts as may be necessary to compensate them for past or future economic damage (other than soft suture in peaches,) in their respective orchards, caused by fluorides emitted from defendant's plant; subject, however, to the terms and conditions herein stated including arbitration pursuant to paragraph 10.

4. Defendant shall not be liable to any plaintiff for the damage referred to in paragraphs 2 and 3, (a) occurring in any growing season unless that plaintiff (i) gives defendant prompt written notice of any condition in his orchards on which he may base a claim for damage and permits representatives of defendant to inspect said condition and to take appropriate samples with which to make appropriate tests, and (ii) also permits said representatives to inspect his orchards once a month during said growing season and to take appropriate samples with which to make appropriate tests; or (b) if the claims for such damage are barred by the statute of limitations; it being determined that the period when the statute of limitations shall have run as regards the plaintiffs who have instituted actions in the Oregon state court shall be the same as in those state court actions; or (c) if the claims are barred by res judicata; this question of law shall be determined, as of September 13, 1966, by the District Court upon an appropriate application therefor, and it is determined that the defense of res judicata by the defendant is preserved and that the defendant has the right to apply to this court for a ruling on the defense of res judicata as of September 13, 1966.

5. Defendant shall undertake to see to it that commencing March 15, 1967, and continuing thereafter the atmospheric level (concentration) of HF emitted from defendant's plant shall not exceed certain ppb levels in plaintiffs' orchards, said levels

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6. A number of said test stations shall be established and in operation before the commencement of the 1967 growing season and shall be in continuous operation throughout the 1967 growing season and, at the option of the plaintiffs, subsequent growing seasons. The location of the test stations shall be in or immediately adjacent to orchards owned by plaintiffs where the exposure to HF will be fairly representative of the exposure to HF of plaintiffs' orchards. The number and location of said test stations and the methods, apparatus and personnel employed in the operation of the test stations and in the sampling and analysis procedures involved, shall be determined by arbitration. The arbitrators for this purpose shall be three persons qualified by education and experience in the field of air-pollution analytical testing method apparatus and procedures. The plaintiffs and the defendant shall respectively each nominate one arbitrator so qualified, and the two nominees shall select an independent arbitrator so qualified. The expenses of said independent arbitrator shall be divided equally between the plaintiffs and the defendant.

7. The said ppb levels which are not to be exceeded at said test stations shall likewise be determined by arbitration. The arbitrators for this purpose shall be those provided for in paragraph 10. The said ppb levels shall not be fixed any higher or any lower than is reasonably required to protect the plaintiffs, or any of them, from substantial economic damage as described in paragraph 3 above. No arbitration concerning the determination of said ppb levels shall be had more than once with respect to any growing season.

8. The arbitrators referred to in paragraph 6 shall determine on an appropriate application whether there has been any significant violation of the ppb levels and in so doing shall give due consideration to the possibility of a given reading

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being based upon an erroneous result of any one sample test and also give due weight to whether any such readings which might be above the said levels are so extraordinary that no significant duration or repetition is probable by taking into consideration an appropriate number of sample tests made over an appropriate period of time.

9. Defendant shall pay for the expenses pertaining to the establishment and operation of such test stations up to the end of the 1967 growing season. Unless the said ppb levels of HF shall have been exceeded during the growing season of 1967, said expenses shall be borne during subsequent growing seasons equally by the defendant and the plaintiffs except (a) as regards any subsequent growing season in which it is established that said ppb levels have been exceeded, in which case defendant shall pay for said expenses, or (b) if such ppb levels shall have been maintained for two consecutive growing seasons, then the plaintiffs shall bear all said expenses for the next ensuing growing season.

10. Any claims or other matters hereinbefore provided for which are not agreed to or adjusted by the parties shall be arbitrated by a panel of three arbitrators to consist of persons qualified, by graduate education with advanced degrees and by experience, in the fields of plant pathology, plant physiology or horticulture. The orchard owner or owners involved shall nominate one (1) arbitrator, the defendant shall nominate one (1) arbitrator, and the two (2) nominees shall select an independent qualified plant pathologist, plant physiologist or horticulturist who is familiar with the area in which plaintiffs' orchards are located and who has no pecuniary interest in either (a) the growing, processing or marketing of stone fruits, or (b) the production of aluminum. The expenses of said arbitrators shall be borne by the party which does not prevail in any arbitration; and the

arbitrators shall award to the prevailing party the reasonable expenses caused to it by the arbitration proceedings including attorneys' and experts' fees in the event the arbitrators find that the other party instituted or defended the claim involved in bad faith or without reasonable justification. All matters respecting arbitration shall be governed by Sections 33.210 to 33.340, entitled "Arbitration and Award" of the Oregon Revised Statutes.

11. The first requirement of any party who desires to present any claim for arbitration as hereinabove provided for in paragraphs 8 and 10 shall be to serve on the opposing party and submit to the arbitrators a complaint in which shall be stated the facts on which the claim is based and the nature or amount of the relief sought; and the said arbitrators shall appoint an attorney to advise them with respect to questions of procedure and law.

12. Pursuant to the orders of the Court of Appeals, the defendant shall pay to the plaintiffs an amount of money on account of their attorneys fees and costs. The parties shall make a good faith effort to agree upon the amount thereof but if they fail to do so, then the amount shall be determined by the District Court in accordance with the relevant orders of the Court of Appeals.

13. Each of the plaintiffs who has an action pending in the Oregon state courts against the defendant herein shall cause such action to be dismissed with prejudice; but such dismissal shall not affect any rights which such plaintiffs have under this Decree.

14. In the event any provision of the settlement stipulation of the parties dated September 13, 1966, and filed herein, shall be violated by either side, the other side shall have the appropriate remedies as provided for by the above-cited sections of

the Oregon Revised Statutes, and the District Court shall retain continuing jurisdiction to enforce this Consent Decree, and the said settlement stipulation.

15. Either the plaintiffs or the defendant may at their respective option terminate the said settlement stipulation at any time after the end of four years from the date of the entry of this Consent Decree by giving written notice to the other side, three months before the commencement of the next growing season. If the settlement stipulation is so terminated, then the rights of plaintiffs and defendant accruing after the date of such termination shall be determined by appropriate litigation in the courts.

Dated this 9th day of November, 1966.

John F. Kilkenny
United States District Judge
for the District of Oregon

Consented to:

Robert M. Kerr

Lamar Tooze Jr.
Of Attorneys for Plaintiffs

Sam F. Speerstra

W. H. Morrison
Of Attorneys for Defendant

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A TRUE COPY
Donal D. Sullivan, Clerk
By E. Merrill

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

DIRECTOR
ROBERT A. TAFT SANITARY ENGINEERING CENTER
4676 COLUMBIA PARKWAY
CINCINNATI, OHIO 45226

December 29, 1966

Mr. H. M. Patterson, Chief
Air Quality Control
State of Oregon
Oregon State Sanitary Authority
1400 S. W. 5th Avenue
Portland, Oregon 97201

Dear Mr. Patterson:

In reply to your request of November 18 for air quality criteria relating to fluorides, we have gathered what data are available and present these herewith for your information. We admit that such data are sparse. What we present here relates to emissions and effects on vegetation and animals.

The State of New York probably has the only complete set of standards on air quality for fluorides at the present time. Their objectives, which include different values for different land use, are listed as follows for fluorides (as HF) in air:

24-hour concentration	Subregion
1 ppb (parts per	1. Agricultural, timber, recreational land
1 ppb billion)	2. Single-and 2-family residential land
3 ppb	3. Densely populated, primarily commercial, light industry
4 ppb	4. Primarily heavy industry area

The standard for soluble fluorides in forage for livestock consumption shall not exceed 35 ppm (parts per million) on an average over four consecutive months (on a dry weight basis) for subregions 1 and 2.

The State of Florida has air quality objectives for protection of cattle and vegetation. According to their objective, grasses containing more than 40 ppm on a dry weight basis are unacceptable as forage for consumption by cattle. The objective for protection of gladioli is that the foliage shall not contain any more than 35 ppm fluorides on a dry weight basis. Gladioli are recognized as the most susceptible of commercial row crops to fluoride damage. In terms of ambient air concentrations, gladiolus plants incur appreciable injury in a few days when exposed to 1 to 2 ppb of fluoride (Air Pollution Handbook - Magill, Holden, Ackley - 1956). The above air quality objectives for New York and Florida are described in the enclosed report, "A Compilation of Ambient Air Quality Standards and Objectives."

The State of California has suggested air quality criteria for fluorides although the state has not adopted any standards. Frequent, accumulated concentrations in forage crops of 30-50 ppm of fluoride measured on a dry weight basis may constitute an "adverse" level if sustained over a long period of time. A level of 2-5 ppm of hydrogen fluoride in the ambient air may be considered "serious". At this level irritating properties of hydrogen fluoride have resulted in desquamation of the skin in experimental human exposures.

As for fluoride emission standards, Florida probably has the only emission standard anywhere. Being the world's largest processor of phosphate rock for fertilizer, Florida had to reduce fluoride emissions to protect the cattle, citrus, and gladiolus industry. The Florida Air Pollution Control Commission adopted regulations for reducing emissions to acceptable and tolerable limits. Each operating complex was allowed to emit no more than 0.6 lbs. of fluoride per ton of phosphoric acid as P_2O_5 multiplied by the maximum sustained in a 24-hour production capacity, provided that a maximum of 30 lbs. of fluorides was not exceeded per operating day. New plants are required to emit only 0.4 lbs. fluoride per ton of P_2O_5.

We hope this information will be helpful to you in your program. If you have any more questions, please call on us.

Sincerely yours,

Francis L. Bunyard

Francis L. Bunyard
Chemical Engineer
Survey and Consultation Section
Technical Assistance Branch, DAP

Enclosure

The Clean AIR Act

DECEMBER 17, 1963

(Public Law 88-206)

As Amended

OCTOBER 20, 1965

(Public Law 89-272)

OCTOBER 15, 1966

(Public Law 89-675)

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service

CLEAN AIR ACT

Public Law 88-206 [1/]

Approved December 17, 1963.

An Act

To improve, strengthen, and accelerate programs for the prevention and abatement of air pollution.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act of July 14, 1955, as amended (42 U.S.C. 1857–1857g), is hereby amended to read as follows: Clean Air Act. 69 Stat. 322; 73 Stat. 646.

TITLE I—AIR POLLUTION PREVENTION AND CONTROL [1/]

FINDINGS AND PURPOSES

SEC. 101. (a) The Congress finds—

(1) that the predominant part of the Nation's population is located in its rapidly expanding metropolitan and other urban areas, which generally cross the boundary lines of local jurisdictions and often extend into two or more States;

(2) that the growth in the amount and complexity of air pollution brought about by urbanization, industrial development, and the increasing use of motor vehicles, has resulted in mounting dangers to the public health and welfare, including injury to agricultural crops and livestock, damage to and the deterioration of property, and hazards to air and ground transportation; 77 STAT. 392. 77 STAT. 393.

(3) that the prevention and control of air pollution at its source is the primary responsibility of States and local governments; and

(4) that Federal financial assistance and leadership is essential for the development of cooperative Federal, State, regional, and local programs to prevent and control air pollution.

(b) The purposes of this title are—

(1) to protect the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population;

(2) to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution;

(3) to provide technical and financial assistance to State and local governments in connection with the development and execution of their air pollution prevention and control programs; and

(4) to encourage and assist the development and operation of regional air pollution control programs.

COOPERATIVE ACTIVITIES AND UNIFORM LAWS

SEC. 102. (a) The Secretary shall encourage cooperative activities by the States and local governments for the prevention and control of air pollution; encourage the enactment of improved and, so far as practicable in the light of varying conditions and needs, uniform State and local laws relating to the prevention and control of air pollution; and encourage the making of agreements and compacts between States for the prevention and control of air pollution.

[1/] This Act was amended by section 101 of PL 89-272, 10/20/65, to add the heading for Title I, to change the words "this Act" wherever they appear in sections 1 through 7 to "this title" and to redesignate sections 1 through 7 and references thereto as sections 101 through 107.