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OREGON
ENVIRONMENTAL QUALITY
COMMISSION MEETING
MATERIALS

State of Oregon
Department of Environmental Quality

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GOVERNOR

Environmental Quality Commission

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MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. P, January 30, 1981, EQC Meeting

Approval of the Eugene-Springfield Air Quality Maintenance Area State Implementation Plan for Total Suspended Particulate

Background

The Eugene-Springfield AQMA is designated non-attainment for federal secondary particulate standards. The 1977 Clean Air Act Amendments required states exceeding federal particulate air quality standards to revise their State Implementation Plan (SIP) and obtain EPA approval by July 1, 1979, or incur EPA sanctions. The exception to this requirement was that areas exceeding secondary particulate standards primarily because of non-traditional source impacts (ie. road dust or other area sources) could obtain an 18 month extension. Because of recognition that dust was a major cause of non-attainment in the Eugene-Springfield AQMA and because airshed studies had not been completed as yet, the Department elected to opt for the extension.

The Department, with the assistance of the Lane Regional Air Pollution Authority (LRAPA) spent considerable time and effort developing the data bases necessary to support control strategy selection activities. Extensive work was conducted in the areas of emission inventory improvement, meteorological and air quality data acquisition and airshed model development.

As the control strategy development process proceded, the LRAPA undertook more responsibility by directly coordinating advisory committee activities, and ultimately LRAPA assumed full responsibility for writing the SIP and carrying it through the necessary rule-making processes. This local involvement is allowed and encouraged by state and federal guidelines.

ORS 468.535(2) requires that regional authorities must submit rules related to air quality standards to the EQC for approval prior to implementation. Once this step is followed, the Department can forward the control strategy as a SIP revision to the Environmental Protection Agency.

Alternatives and Evaluation

Existing LRAPA rules, including veneer dryer and charcoal plant rules adopted in 1979, were considered to satisfy the EPA minimum SIP approval requirements of application of Reasonably Available Control Technology (RACT). Further strategies necessary to meet air quality standards were selected by LRAPA in conjunction with a 25 member advisory committee from a list of candidate measures which consisted primarily of area source type control strategies.

A three phase approach which ultimately could achieve compliance with the TSP standard by 1987 was finally selected. Phase I consists of three strategies: paving certain unpaved roads, upgrading the weatherization and insulation of dwellings and more efficient particulate control of industrial air conveying systems (cyclones). These strategies can be initiated early, and were judged to have reasonable cost and would have the greatest benefit in the critical areas of the AQMA. Phase II would consist of a further data base improvement effort including further air monitoring and model validation and more accurate identification of certain source impacts including fugitive dust, wood heating and slash burning. Needed support by LRAPA from the Department to complete this phase has been committed. Phase III would use the data improvements from Phase II and other information developed nationally about effectiveness of area source control measures to select the remaining needed strategies to attain and maintain compliance with TSP air quality standards.

Growth management is expected to be addressed through rules similar to the New Source Review Rules being considered by the Department which would include application of Lowest Achievable Emission Rate (LAER), offsets and limited banking and trading. Some areas will have growth cushions after Phase I strategy implementation and a policy for allocation of these cushions will be established. LRAPA has requested that the Department adopt NSR rules which would require major new sources external to Lane County to apply LAER and mitigate their impact on the AQMA to zero. The Department's proposed NSR rules do not require LAER, but do require mitigation down to insignificant levels which would meet LRAPA's intent of zero impact.

The plan and appendices prepared by LRAPA were adopted by the LRAPA Board of Directors on November 6, 1980 after all necessary SIP public notices and hearings. The plan maps out a schedule of activities, including time frames, for certain rule adoptions, agreement finalizations and study activities. Success of the plan is highly dependent on adherence to this schedule. As with the Portland TSP SIP, the plan is qualified as subject to change due to changes in federal or state rules and results of planned studies.

The Department has been intimately involved in the Eugene-Springfield SIP development process, and it believes the completed project is an exemplary effort of local/regional and state cooperation to develop a plan to address local problems with efforts that are most acceptable to local residents.

The documentation by the LRAPA is to be commended and with this documentation the Department believes a SIP revision has been developed which will be acceptable to the EPA.

Summation

1. The Eugene-Springfield AQMA is designated as non-attainment for the National Secondary Ambient Air Standard for total suspended particulate and a State Implementation Plan revision must be developed which maps out how attainment will be achieved.

2. The LRAPA, in conjunction with the Department, local entities and a broad citizens advisory committee, has developed a SIP revision which could bring the area into compliance by 1987.

3. The SIP revision consists of a three-phase approach consisting of immediate implementation of cost effective strategies including paving certain unpaved roads, weatherization of homes, and control of certain industrial cyclones; a further data base improvement phase to better identify the impact and control effectiveness for certain non-traditional sources including fugitive dust, wood heating and slash burning; and finally an additional strategy selecting process which can result in complete attainment of standards.

4. Growth management will be handled through a rule similar to the Department's New Source Review rule which would require application of LAER, offsets and allow limited banking and trading. Growth cushions would be utilized for small sources and external sources to the area would be required, for all practical purposes, to mitigate to a net zero (insignificant) impact in the non-attainment area.

5. All procedural SIP revision processes have been carried out satisfactorily by LRAPA, and all technical requirements for a SIP to be approvable by EPA appear to have been met other than adoption of a New Source Review rule, which is scheduled to be adopted shortly following the adoption of a NSR rule by the EQC.

Recommendation

The Director recommends the Commission approve the State Implementation Plan for Total Suspended Particulate in the Eugene-Springfield AQMA and direct the Department to formally submit it to EPA.

Bill

William H. Young

Attachments: 1) SIP Revision for Eugene-Springfield AQMA
2) SIP appendices

John F. Kowalczyk:h
229-6459
January 8, 1981

Attachment 1 to the foregoing report is too voluminous to reproduce. It is on file at the Department of Environmental Quality, 522 S. W. Fifth Avenue, Portland, Oregon.

STATE OF OREGON
STATE IMPLEMENTATION PLAN
REVISION
EUGENE-SPRINGFIELD AQMA

Adopted by
Lane Regional Air Pollution Authority
Board of Directors
November 6, 1980

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4.6.0

Eugene-Springfield Air Quality Maintenance Area State Implementation Plan for Suspended Particulates

4.6.1 Introduction

4.6.1.1 General Background

The Clean Air Act of 1970 and the Clean Air Act Amendments of 1977 establish requirements specifying the methods and schedule by which National Ambient Air Quality Standards must be attained. States are required to develop plans for each non-attainment area that demonstrate attainment by December 31, 1982. The air quality in the Eugene-Springfield Air Quality Maintenance Area exceeds the secondary 24-hour standard for Particulate Matter of 150 $\mu g/m^3$. Consequently, it was designated as a non-attainment area by the Environmental Protection Agency on January 10, 1980. FR Vol. 45, page 2044.

4.6.1.2 Summary

The "Eugene-Springfield Air Quality Maintenance Area State Implementation Plan" responds to mandates of Congress, the U. S. Environmental Protection Agency, the Oregon Environmental Quality Commission, and the Oregon Department of Environmental Quality. It also reflects the thinking of a broad spectrum of local opinion and philosophy about the subject of air quality in the Eugene-Springfield urban area.

The Eugene-Springfield Metropolitan Area was designated an Air Quality Maintenance Area for Total Suspended Particulates in 1974. The area was redesignated as being in non-attainment of the Federal Secondary Standard for Total Suspended Particulates in January, 1980. The designations were made because the air quality of the area registered exceedences of the Secondary Standard for TSP and because exceedences were, and still are projected to continue in the forseeable future.

This plan provides a basis for charting the course in air quality management for the next several years, and of ultimately achieving the desired goal of attainment.

The organization of the plan is straightforward. It is divided into sections which discuss in order:

A. Current, or baseline conditions of TSP concentrations, the emissions which produce TSP, and the meteorological and topographical factors which cause the concentration to develop;

B. Future projected, or baseline conditions of TSP emissions with no strategies implemented, and the predicted result on TSP concentrations;

C. The plan and time table to solve the current problem (selected strategies which demonstrate attainment);

D. A plan to avoid future anticipated problems (growth management);

E. Documentation that the required procedure was used in adopting the plan.

Among conclusions reached is that although industrial sources produce a significant amount of TSP within the AQMA, these are decreasing, and the preponderance of increase in particulate emissions for the next several years will occur from a wide variety of non-traditional source categories, such as road dust, other fugitive emissions, and wood-burning stoves.

The AQMA plan of action is called Attainment Demonstration. It is, for convenenience, divided into three levels or phases:

Phase I consists of three strategies which can be initiated early, have a reasonable cost, and have the greatest impact in those areas of the AQMA where the most people would benefit. These strategies are:

1) To reduce emissions through paving of certain existing unpaved roads in the Cities of Eugene and Springfield.
2) Upgrading the weatherization and insulation of dwellings to specified standards to reduce the need to burn wood or use other energy sources to heat those dwellings.
3) More efficient reduction of particulate emission from exhausts of industrial air conveying systems which handle dry materials. These include wood products and mineral aggregate processes.

After implementation of three Phase I strategies there will still be several areas which will not be in attainment. In order to complete the attainment demonstration, a number of other strategies are considered, with emphasis on further controls for non-traditional source categories about which relatively little is understood.

1) Improvement of road dust emission factors to quantify the importance of road dust as a general source of TSP in order to develop appropriate dust reducing strategies.
2) Source testing a variety of traditional and non-traditional sources to determine their emissions of inhalable particulate.
3) Improvement of model validation and calibration by
   a) Modeling on additional days when standard was exceeded, with additional meteorological information.
   b) Improvement of model validation and calibration through monitoring in unmonitored non-attainment areas, with CMB analysis.
   c) Determine how far large particles travel from sources of fugitive dust to establish "decay" factor for these sources.
   d) Improve industrial fugitive emissions factors.

Phase III is the process of determining which additional strategies should be implemented to assure attainment in all areas of the AQMA. This process will utilize the data improvements from Phase II to select the additional strategies. It is likely that during the Phase II effort major emphasis will be directed at inhalable particulate matter.

Technical Support is provided in a series of appendices.

It became clear during the planning process that the problem is very complicated and there is yet much to learn. This is particularly true about the meteorology of the area and the relationships between emission sources and the measured air quality values.

Some typical complications are: The effects of emissions from different kinds of sources are not uniformly distributed throughout the AQMA; the magnitude of exceedences of the standards do not occur evenly throughout the area, or with uniform frequency throughout the year; the exceedences which occur are not caused by the same source types all the time. So, before any specific strategies are contemplated, the complexities of defining the problem become apparent.

In order to help provide the best kind of data, sophisticated analytical and modeling techniques are used to describe the magnitude and extent of the problem. Actual air quality data obtained within the AQMA shows that exceedences of the secondary TSP air quality standards occur at several sites throughout the AQMA. The model, using available emissions data, predicts some additional exceedences at other unmonitored locations. This analysis, coupled with data from chemical analysis of samples, also provided a means to estimate the relative significance of different source types as contributors.

In addition to existing air quality problems, future exceedences of standards must be addressed through growth management. One basic objective of a growth management plan is to accommodate new development with its associated new emissions in an area which exceeds acceptable standards, while reducing overall emissions to levels which will achieve those standards. The concept of "controlled trading" as a growth management tool for new industries is introduced in this section. Creation of growth increments, offsetting and banking are part of the plan to create room in the airshed for future new industries.

The foundation of the growth management plan is adoption of local regulations similar to Oregon's proposed New Source Review rules which include the controlled trading concepts of emissions offset and emissions banking. Some additional provisions expand the area affected by the regulations, and address the effects of sources outside the AQMA.

Finally, the plan briefly describes those strategies considered and not selected. Then it presents a general time table showing Reasonable Further Progress in reducing emissions. There is a discussion of roles of the entities involved in implementing the plan. Public involvement in the process is included, as is the record of hearings and public notice. Following the body of the document are the appendices which provide the technical support for the plan.

The SIP Revision and the strategies contained herein are based on current requirements of the federal Clean Air Act and state and federal air quality standards. There may be amendments to the Clean Air Act, federal or state rules, or ambient air quality standards which may render parts of this plan inapplicable. Such actions may be cause for revising provisions in this AQMA Plan.

4.6.2 Ambient Air Quality

4.6.2.1 <u>Description of the Area of Non-Attainment</u>

The Eugene-Springfield Air Quality Maintenance Area, as depicted in Figure 4.6.2.1--1 encompasses an area covering approximately 300 square kilometers. This roughly corresponds to the Urban Service Area, as defined in the 1990 Metro Area Plan developed by the Lane Council of Governments. This includes the cities of Eugene and Springfield, as well as the urbanized unincorporated areas of River Road - Santa Clara, Bethel, and Glenwood. The population of the AQMA is approximately 185,000.

The Eugene-Springfield AQMA is located at the southern end of the Willamette Valley, surrounded on three sides by mountains (Figure 4.6.2.1--2). This topography plays a significant role in the climatology of the area. In general, the climate is characterized by warm dry summers and cool wet winters. During the summer and fall months, a North Pacific Anticyclone is frequently located off the coast of Oregon, generating northerly wind flows. During the winter and spring months, there is more frequent cyclonic activity with occasional frontal passages through the area from the Pacific Ocean. This activity generates southwesterly wind flows. However, on many occasions, the mesoscale effects generated by the severe topography of the area tend to dominate the wind flow patterns. The numerous slope and valley winds thus generated create an extremely complicated flow regime.

FIGURE 4.6.2.1--.
Eugene-Springfield AQMA
and
Grid Network

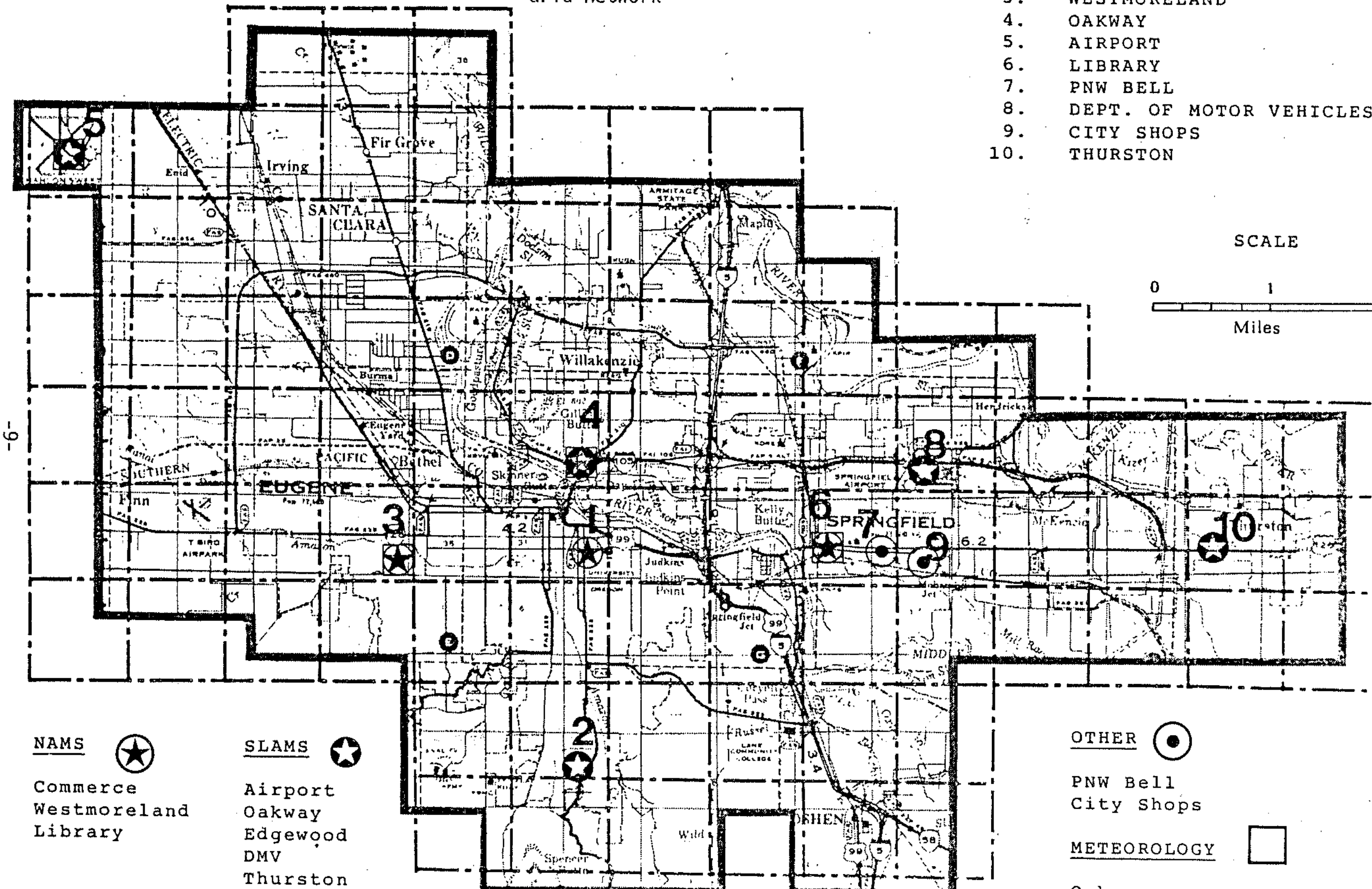
MONITORING SITES

1. COMMERCE (LCC)
2. EDGEWOOD
3. WESTMORELAND
4. OAKWAY
5. AIRPORT
6. LIBRARY
7. PNW BELL
8. DEPT. OF MOTOR VEHICLES
9. CITY SHOPS
10. THURSTON

SCALE

0 1 2

Miles



NAMS

Commerce
Westmoreland
Library

SLAMS

Airport
Oakway
Edgewood
DMV
Thurston

OTHER

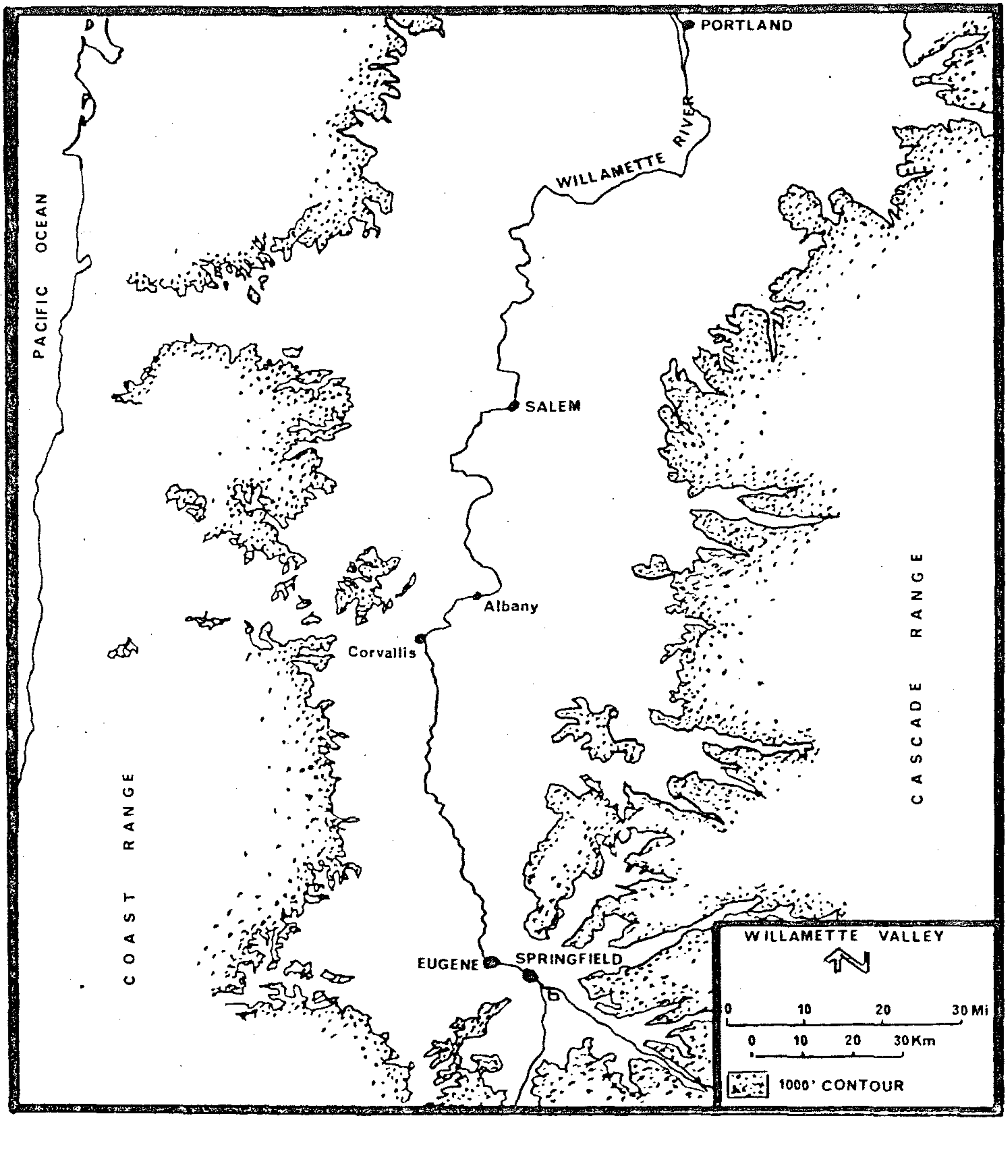
PNW Bell
City Shops

METEOROLOGY

Oakway
Westmoreland
Library
Airport

FIGURE 4.6.2.1--2

Eugene/Springfield AQMA Location in the Willamette Valley



The mountains are also a barrier to horizontal dispersion of pollutants and this effect, combined with the frequent low level inversions over the area, effectively keeps pollutants trapped, allowing levels to build up above the secondary standard.

The areas exceeding the secondary standard called "areas of exceedence" or "non-attainment grids" do not include the entire AQMA, but are confined to only a few square kilometers in Eugene and Springfield, as outlined in Section 4.6.2.2.

4.6.2.2 Monitoring Data

Air quality data for the year 1978 has been chosen to establish current baseline levels. The Lane Regional Air Pollution Authority monitored the levels of particulate matter using High Volume Samplers at ten locations within the AQMA during 1978 (see Figure 4.6.2.1--1). These include three National Air Monitoring Sites (NAMS), or equivalent, five State/Local Air Monitoring Sites (SLAMS), and two Special Purpose Monitoring Sites (SPM's). Nine of these sites met existing sampling criteria. One site, The Springfield Shops (originally intended as the Springfield industrial monitor), does not meet siting criteria and has subsequently been removed from consideration in determining attainment status (see F.R. October 19, 1979, Vol. 44, No. 204, pg. 60341). A second industrial SPM site was established at the Pacific Northwest Bell Building which meets existing siting criteria and is only 900 feet from the Shops site. EPA evaluation of the site found that it did not meet industrial monitor criteria. This site is, however, considered representative of a microscale hot spot and will be used to monitor progress toward attainment in this problem area. It will not, however, be the basis for application of general, area-wide strategies. A new industrial monitor will be established in Grid 53 and, if approved, will be used to design the Phase II strategies for the Springfield area.

Data from the nine qualified sites shows no exceedence of the primary standards during 1978 and only two sites which exceeded the 24-hour secondary standard (see Table 4.6.2.2--1). The measured exceedences of standards during 1978 were confined to two distinct small areas: one in West Eugene (Westmoreland), and the other in East Springfield (PNB). The LRAPA also monitors PM levels outside the AQMA boundaries, but no exceedences of the standards were recorded at these sites.

TABLE 4.6.2.2--1

1978 PM Data - AQMA

Station	Type	Annual Geometric Mean ug/m^3	2nd Highest 24-Hour Average ug/m^3
Eugene Comm. Building	1	52	141
Edgewood School	2	30	89
Westmoreland School	1	51	158
Oakway Mall	2	46	119
Eugene Airport	2	28	99
Springfield Libary	1	59	142
Springfield DMV	2	54	136
Thurston High School	2	45	121
*Springfield Pacific Northwest Bell Building	3	--	164

1=National Air Monitoring Site (NAMS) (or equivalent)

2=State/Local Air Monitoring Site (SLAMS)

3=Special Purpose Monitoring Site (SPM)

*Station did not begin operation until March of 1978; therefore, no annual geometric mean is available.

Annual Primary Std. = 75 ug/m^3 geo. mean

Annual Secondary Std. = 60 ug/m^3 geo. mean

24-Hour Primary Std. = 260 ug/m^3

24-Hour Secondary Std. = 150 ug/m^3

Not to be exceeded more than once per year

Although 1978 was the data base year for the analysis (Table 4.6.2.2--1) the modeling effort also includes 1979 PM data which are presented in Table 4.6.2.2--2. These levels are quite comparable to those recorded in 1978. None of the sites exceeded the primary standards, while only one site exceeded the secondary annual standard and three sites exceeded the secondary 24-hour standard. These included two additional sites (the Oakway Mall in Eugene and the DMV in Springfield) which did not exceed the standards during 1978. The site locations are shown in Figure 4.6.2.1--1. As a result of combining the 1978 and 1979 data, the area of non-attainment was expanded slightly, although the Westmoreland site did not exceed the secondary standard in 1979.

An historical review of when the exceedences occurred (see Figure 4.6.2.2--2) reveals that the exceedences of the 24-hour secondary standard can occur during any time of the year. But there are seasonal variations in the frequency of exceedences. The winter and fall months are the periods recording the most frequent exceedences, with another peak of lesser frequency occurring in the spring.

Further evaluation of the data shows seasonal variations in the magnitude of PM concentrations, as well. This is illustrated in Figure 4.6.2.2--3, which depicts the monthly geometric means for three sites over the past ten years. The Airport Site is located in the northwest corner of the AQMA and is considered a background site. The other two sites represent the respective core areas of

TABLE 4.6.2.2--2

1979 PM Data - AQMA

Station	Type	Annual Geometric Mean ug/m3	2nd Highest 24-Hour Average ug/m3
Eugene Comm. Building	1	51	143
Edgewood School	2	32	103
Westmoreland School	1	48	150
Oakway Mall	2	48	153
Eugene Airport	2	34	133
Springfield Library	1	60	148
Springfield DMV	2	58	157
Thurston High School	2	51	138
Springfield Pacific Northwest Bell Building	3	69	172

1=National Air Monitoring Site (NAMS) (or equivalent)

2=State/Local Air Monitoring Site (SLAMS)

3=Special Purpose Monitoring Site (SPM)

Annual Primary Std. = 75 ug/m^3 geo. mean

Annual Secondary Std. = 60 ug/m^3 geo. mean

24-Hour Primary Std. = 260 ug/m^3

24-Hour Secondary Std. = 150 ug/m^3

} { Not to be exceeded more than once per year

FIGURE 4.6.2.2--2

Historical Review of Exceedences in the Eugene-Springfield AQMA

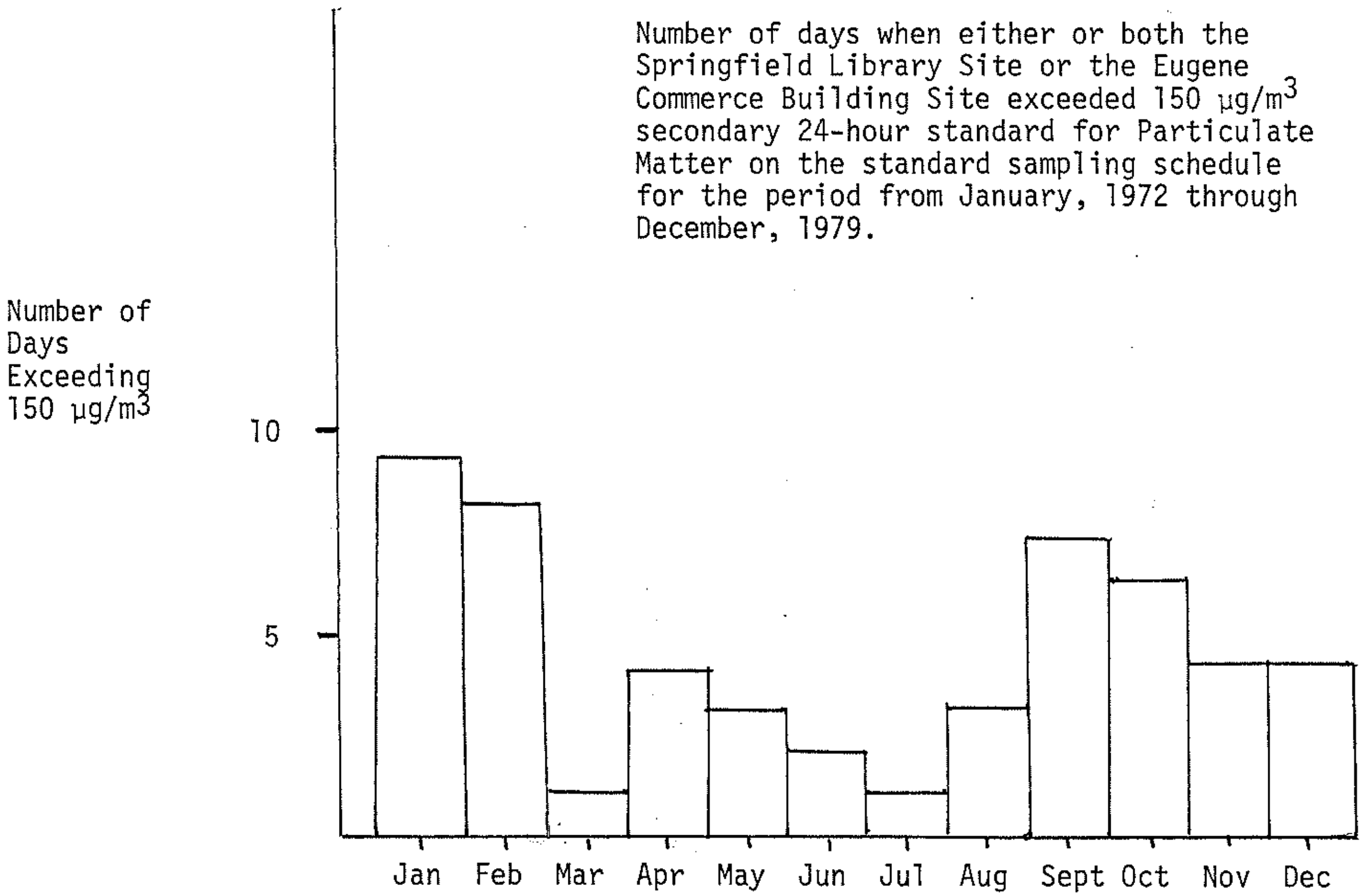
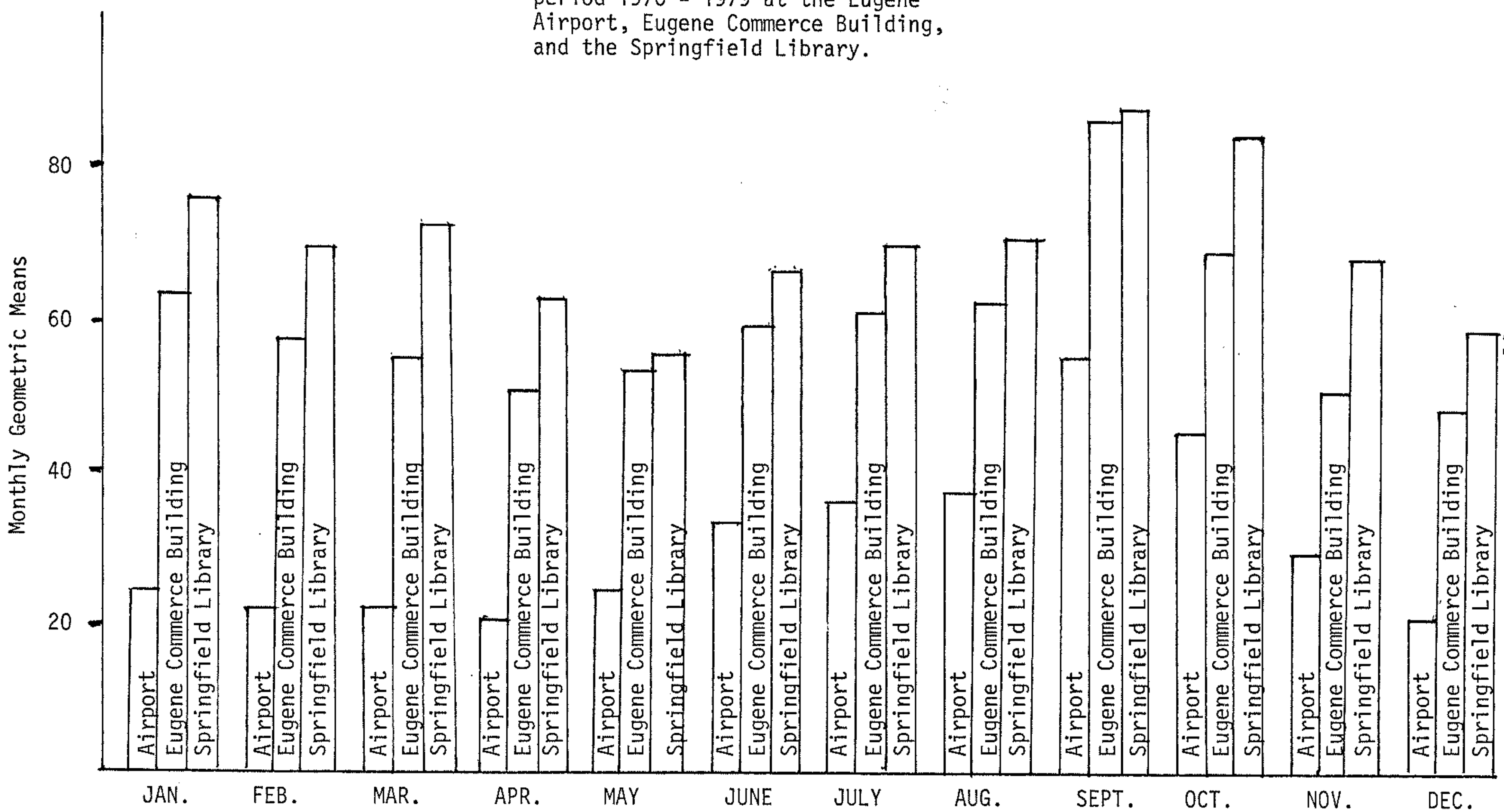


FIGURE 4.6.2.2--3

Monthly Geometric Means for Three Sites Over Ten Years

Monthly geometric means for the period 1970 - 1979 at the Eugene Airport, Eugene Commerce Building, and the Springfield Library.



the two cities. The late summer and fall months, on the average, record the highest PM levels during the year. It also shows that the levels at the background station are over twice as high in September and October than they are in the winter and spring months. Based on an understanding of the cyclic operations of certain source categories, this data may indicate that different sources are affecting the receptors during different times of the year. As a result, the control strategies needed to assure attainment of standards during winter or spring months may be quite different from those needed in the summer or fall months. This problem is addressed in Phase II of the attainment demonstration section and as Workplan 3 A in Appendix 4.6.4.3--1.

4.6.2.3 Meteorological Data Base

The Lane Regional Air Pollution Authority has maintained a network of three continuously recording surface stations measuring wind speed and direction since January 1977 (see Figure 4.6.2.1--1). This data was combined with the hourly surface observations from the National Weather Service Station at the Eugene Airport to provide a minimal data base for surface wind fields. There are no routinely available upper level wind measurements taken in this area.

The DEQ, using this data base in part, developed a series of thirteen daily reigme classifications in an attempt to define the annual meteorology of the area. This analysis is described in Appendix 4.6.2.3--1.

The lack of upper level meteorological data and the need for improved worst case day regime classifications is addressed in Phase II as a workplan in Appendix 4.6.4.3--1.

4.6.3 Emission Inventory

4.6.3.1 Baseline Emissions for Design Year

The baseline year selected for emissions was 1978. The Emissions Inventory for 1978 was developed from the 1976 Emission Inventory report by Seton, Johnson, and Odell. (see Appendix 4.6.3.1--1) This report developed an inventory of point and area sources for a base year of 1976. All of the sources were reviewed and updated based upon the best available information for 1978.

In 1978 all point sources were controlled at RACT except for veneer dryers and the single charcoal manufacturing plant. Most of the emissions from area sources within the AQMA were assumed to be at the levels developed in the SJO report, due to the fact that no appreciable growth had occurred between 1976 and 1978. These included: Agricultural Tilling; Residential Space Heating (oil and gas); Open burning; Orchard Pruning; Railroad and Aircraft; and Small Point Sources. The remaining area sources received significant modifications as follows:

Wood Space Heating. The Department of Environmental Quality commissioned a telephone survey by Talbott, Wong and Assoc., Inc. to determine wood burning during the 1978-1979 season (see Appendix 4.6.3.1--2). The results of this study were used to develop the emission inventory for wood space heating.

Motor Vehicle Exhaust. The State Department of Transportation predicted the increased VMT/Grid using the SAPOLLUT model.

This data was used with exhaust emission factors, developed by EPA to develop the emission inventory for this source. Due to phaseout of lead content in gasoline, overall emissions of particulate from motor vehicle exhaust are declining.

Road Dust. The VMT and speed data for unpaved roads in each grid were developed by the respective public works departments of the cities of Eugene and Springfield and for Lane County; VMT and speed data for paved roads were produced by SAPOLLUT. The emissions were estimated using factors developed by SJO. (See Section 4.6.4.3.1(1)) The DEQ then modified the resultant emissions data based upon model calibration as outlined in Appendix 4.6.4.1--1.

The 1978 AQMA Emissions Inventory is summarized in Table 4.6.3.1--1.

TABLE 4.6.3.1--1

Eugene-Springfield AQMA Emissions Inventory

Source Category	1978 Emissions Tons/Year	% Contribution	1987 Emissions Tons/Year	% Contribution	1978-1987 Growth Tons/Year
Point Sources	8517.5	62	5529.0	44	-2988.5
Area Sources					
Paved Road Dust	2481.0		3090.0		
Unpaved Road Dust	1240.0		(1240.0)		
Wood Space Heating	967.5		2208.7		
Motor Vehicle Exhaust	219.0		105.7		
Small Point Sources	134.6		174.1		
Agricultural Tilling & Off-Road Vehicles	121.5		121.5		
Open Burning & Field Burning	72.5		72.5		
Railroad & Airports	44.7		44.7		
Residential Space Heating (oil)	11.2		11.2		
Residential Space Heating (gas)	5.8		5.8		
Commercial Space Heating (oil)	3.4		3.4		
Commercial Space Heating (gas)	0.5		0.5		
Orchard Pruning	10.0		10.0		
Subtotal Area Sources:	5311.7	38	7088.1	56	+1176.4
TOTAL - Point Sources & Area Sources:	13,829.2		12,617.1		

4.6.3.2 1987 Emission Projections

The year 1987 was selected as the year when attainment can reasonably be achieved. In order to establish the extent of controls needed to meet this goal, it was necessary to project emission rates from the various source categories, assuming that current available growth projections are correct.

The 1987 Emission Projections were based primarily on the techniques outlined in the SJO Data Base Report (see Appendix 4.6.3.1--1).

Point Sources

All point sources were assumed to grow or decline based upon employment and business projections. The decline in point source emissions which is noted in Table 4.6.3.1--1 is due in part to a projected 6% decline in the wood products industry by 1987. In addition, further reductions are achieved when veneer dryers are in compliance with the RACT regulation by 1980, and the charcoal manufacturing facility is controlled to RACT in 1983.

Area Sources

Most of the area sources were assumed to remain the same as estimated in the SJO report. These included the following sources: Agricultural Tilling; Railroads and Aircraft; Residential Space Heating (oil and gas); Commercial Space Heating (oil and gas); Orchard Pruning; and Small Point Sources.

Projections for the other area sources were developed as follows:

Paved road dust. The growth factor was based upon the projected VMT increases per grid as developed by the SAPOLLUT model.

Unpaved road dust. Due to the fact that unpaved roads tend to be in short sections, often dead ends, in already developed areas and that new growth areas are required to have paved streets, it was the opinion of the local transportation planning personnel at L-COG and the Departments of Public Works for Eugene and Springfield that the emissions will remain unchanged.

Motor vehicle exhaust. These emissions were projected based upon VMT changes per grid, as developed by the SAPALLUT model and by the EPA lead in gasoline phase-down, resulting in decreasing emissions in future years.

Wood space heating. These emissions were projected based upon population and household growth projections developed by L-COG.

Open burning/field burning. It was assumed that emissions from field burning and open burning would remain unchanged from 1978 to 1987.

All of these emissions projections are summarized in Table 4.6.3.1--1.

4.6.4 Control Strategy

4.6.4.1 Analysis of Modeling Results

A summary of the PM modeling results is contained in Appendix 4.6.4.1--1. It has been emphasized that the modeling technique has inherent limits on its ability to accurately portray reality under all conditions. A number of questions have been raised regarding several aspects of the technique, and the data used to derive the results. The concerns are discussed in detail in later sections. Nonetheless, the information gained from the modeling effort is considered the best available at this time and, tempered by a good understanding of actual conditions in the area, is sufficient for prudent application here.

As a refinement of the modeling technique, the calibration of the model relied upon adjustment of certain emissions factors used in the model, so that the predicted results would be consistent with the kinds of particulate contained in samples. The particulate composition in the samples were determined chemically. This analytical procedure is called Chemical Mass Balance (CMB) or Chemical Element Balance (CEB).

A number of strategies were selected first for modeling, to obtain the expected benefits in each grid from each of the modeled strategies. The results indicated that attainment, using only additional point source controls would be very difficult. The model was again used to show the benefits of controlling non-traditional sources on an area-wide basis. The results showed that there was a better chance of demonstrating attainment using a mix of strategies and emphasizing the necessity to develop non-traditional source control measures.

Several aspects of the results have implications serious enough to warrant further analysis prior to selecting additional final strategies. For example: Several grids in Springfield may require a greater degree of control to attain the annual geometric mean standard than is available using area-wide strategies which demonstrate attainment of the 24-hour standard. This suggests "hot spot" strategies in these areas if the modeled exceedences are confirmed after monitoring, and model improvements are made;

Paved road dust assumptions in Attachment II of Appendix 4.6.4.1--1 may not be valid. Trackout is believed to be a significant source of soils, but the assumption that a 19:1 emission factor ratio exists in areas of industrial land use is subject to question. This assumption must be validated to justify the implied extreme controls in industrial areas or a substitute strategy for trackout must be developed. An alternate strategy which addresses the same problem may involve trackout controls from unpaved areas in general, rather than just in industrial areas;

Although there is nothing at present to compel reductions in use of motor vehicles to control CO and hydrocarbons, 10% and 20% VMT reduction strategies should be evaluated further before they are completely set aside. Energy-related incentives may result in VMT reductions. If so, there is a significant benefit in lowered road dust emissions. VMT in the AQMA should be monitored, and the data revised periodically during the planning period to be "credit" for the lower emissions;

It appears that non-traditional sources of fine particulate, such as home space heating with wood-fired devices impact several grids significantly and may offer the opportunity for a viable strategy. Other sources of fine particulate are addressed in the work plans described in Phase II.

4.6.4.2 Emission Reduction Necessary for Attainment

Two NAMS/SLAMS monitoring sites and one special monitor are predicted to exceed the secondary annual standard (60 $\mu g/m^3$) through 1987. Five NAMS/SLAMS monitoring sites and one special monitor are predicted to exceed the 24-hour secondary standard through 1987.

In addition, 1987 exceedences are predicted in nine unmonitored grids. These sampling sites and unmonitored grids and the projected 1987 exceedences are provided in Table 4.6.4.2--1.

TABLE 4.6.4.2--1

Eugene-Springfield AQMA Predicted Exceedences

GRIDS WITH MONITORS

Grid	Monitor	Projected 1987 μg/m^3 24-hour Exceedence	Projected 1987 μg/m^3 Annual Exceedence
48	Eugene	8.8	-0-
46	Westmoreland	16.5	-0-
51	Springfield Library	-0-	3.4
51	Pacific N.W. Bell	21.9	11.4

GRIDS WITH NO MONITORS

Grid	Projected 1987 μg/m^3 24-hour Exceedence	Projected 1987 μg/m^3 Annual Exceedence
34	-0-	0.6
47	22.0	-0-
49	6.0	-0-
50	20.0	-0-
53	27.0	11.4
54	-0-	5.6
60	39.0	-0-
65	5.0	-0-

4.6.4.3 Attainment Demonstration

The most reasonable approach for attainment of the secondary standard for particulate matter appears to be a mix of point and non-traditional source strategies. A number of factors support this conclusion: Additional point source control alone will not be able to eliminate the projected exceedences. These source categories are already operating at RACT levels with two exceptions: veneer dryers, which will be at RACT level by the end of 1980 and charcoal manufacturing, which will be at RACT by the end of 1983.

Projections of reasonable reductions of emissions from non-traditional sources, when modeled, strongly suggest that cost effective strategies can be developed for these sources to the extent that they become prominent considerations for additional control measures.

The degree of confidence in the accuracy of the data bases for non-traditional sources used in the model is relatively low, however. Because of this factor, emissions from non-traditional sources were the best candidates for adjustment in order to calibrate the model to the chemical mass balance technique. Much of what is known about non-traditional sources is from data collected in other areas, and this information is much less consistent from area to area than is point source data.

Federal guidelines for TSP SIP revisions have historically emphasized point source controls as acceptable attainment strategies.

This appears to have changed recently, as the magnitude of contribution of non-traditional sources to TSP concentrations has become more apparent. Current EPA SIP guidance now allows a reasonable period to improve the the data bases and design and implement locally developed non-traditional control measures that are more directly applicable for the Eugene-Springfield AQMA.

At the same time, there is a recognized need to implement those reasonable strategies as expeditiously as practicable. Several strategies that were modeled appear to be cost effective, are reasonable, can be implemented early in the schedule, and commitments can be obtained from implementing entities.

The demonstration of attainment is structured in three phases:

Phase I includes those modeled strategies that: (1) can be implemented early in the schedule; (2) can reasonably be expected to provide a majority of the modeled benefit; (3) regulation or municipal commitment can be provided; (4) will demonstate attainment in the urban core areas of Eugene and Springfield, where the most people will benefit; and (5) will provide Phase II design increments, or remaining reductions, which are reasonably attainable (see Table 4.6.4.3--1).

Phase II provides for further strategy development. It includes data base improvement and cost effective strategy development from a mix of fine and coarse particulate source categories, such

Table 4.6.4.3--1

24-hour, annual and total incremental benefits from each Phase I strategy, comparison with design values for each grid.*
*Footnotes follow.

Monitor/ Grid #	Predicted 1987 Exceedence (1)		AQMA Design Valve (1) (3)		Phase I Strategy Benefit: Paving Worst 10 Miles (2)		Phase I Strategy Benefit: 98% Control All Day Cyclones (2)		Phase I Strategy Benefit: Weatherize All Wood Burning Homes (2)		Total Phase II Benefit		Phase II Design Valve (3)(4)	
	Annual	24-hr.	Annual	24-hr.	Annual	24-hr.	Annual	24-hr.	Annual	24-hr.	Annual	24-hr.	Annual	24-hr
Eugene 48	- 2.41	+ 8.8	-0-	+ 8.8	- 0.48	- 1.2	- 0.03	- 1.18	- 1.55	- 4.55	- 2.06	- 6.93	-0-	1.87
Westmoreland 46	- 7.15	+16.5	-0-	+16.5	- 1.52	- 3.2	- 0.05	- 0.62	- 0.78	- 2.9	- 2.35	- 6.72	-0-	9.78
South Eugene 20	-27.72	-51.6	-0-	-0-	- 0.46	- 1.7	- 0.02	- 0.20	- 0.48	- 1.05	- 0.96	- 2.95	-0-	-0-
Oakway 62	- 9.13	- 4.8	-0-	-0-	- 0.16	- 3.6	- 0.06	- 2.02	- 0.88	- 2.5	- 1.1	- 8.12	-0-	-0-
(3) 3, 4 45	- 7.71	- 6.0	-0-	-0-	- 7.47	-28.0	-0-	-0-	- 0.63	- 2.5	- 8.1	-30.5	-0-	-0-
4,5 60	- 1.07	+39.0	-0-	+39.0	- 1.67	- 7.0	-0-	-0-	- 0.63	- 7.75	- 2.3	- 9.75	-0-	29.25
5,4 47	- 3.56	+22.0	-0-	+22.0	- 1.67	- 4.0	-0-	-0-	- 1.25	- 5.0	- 2.92	- 9.0	-0-	13.0
6,3 34	+ 0.6	-10.0	+ 0.6	-0-	-0-	- 2.0	-0-	- 1.0	- 1.88	- 5.25	- 1.88	- 8.25	-0-	-0-
7,4 49	- 3.56	+ 6.0	-0-	+ 6.0	-0-	- 1.0	-0-	- 1.0	- 1.05	- 2.5	- 1.05	- 4.5	-0-	1.5
5,5 61	- 4.39	- 7.0	-0-	-0-	- 0.83	- 4.0	-0-	- 4.0	- 0.83	- 3.25	- 1.66	-11.25	-0-	-0-
3,6 73	---	-16.0	---	-0-	---	- 9.0	---	- 9.0	---	- 2.5	---	-20.5	---	-0-
Spr. Lib. 51	+ 3.4	- 0.2	+ 3.4	-0-	- 1.01	- 6.2	- 0.08	- 9.84	- 0.95	- 2.95	- 2.04	-18.99	1.36	-0-
Thurston 55	- 8.50	- 9.5	-0-	-0-	- 3.76	- 6.6	- 1.2	-10.58	- 0.78	- 1.63	- 5.74	-18.81	-0-	-0-
DMV 66	- 0.12	-1.3	-0-	-0-	- 3.43	-12.0	- 0.18	-13.26	- 1.03	- 2.9	- 4.64	-28.16	-0-	-0-
PNB 51	+11.4	+21.9	+11.4	+21.9	- 2.93	-11.8	- 0.20	-16.94	- 1.03	- 3.25	- 4.16	-31.99	7.24	-0-
11,4 53	+11.4	+27.0	+11.4	+27.0	- 8.3	-24.0	- 1.7	-27.0	- 1.05	- 2.75	-11.05	-53.75	0.35	-0-
8,4 50	- 1.9	+20.0	-0-	+20.0	- 0.83	- 1.0	-0-	- 1.0	- 0.63	- 2.5	- 1.46	- 4.5	-0-	15.5
8,5 64	- 1.9	+ 1.0	-0-	+ 1.0	- 4.15	-14.0	-0-	-14.0	- 1.05	- 2.75	- 5.2	-30.75	-0-	-0-
12,4 54	+ 5.6	- 5.0	+ 5.6	---	- 5.81	---	- 1.7	---	- 0.83	---	- 8.34	---	-0-	---
9,5 65	---	+ 5.0	---	+ 5.0	---	- 7.0	---	- 7.0	---	- 3.25	---	-17.25	---	-0-

*Notes

(1) For exceedence values:

Minus (-) means an amount below applicable standard in μ/m^3
Plus (+) means an amount above applicable standard in μ/m^3

(2) For strategy benefits:

Minus (-) means a strategy benefit which can be added to the predicted exceedence value causing a minus exceedence value (amount below the standard) to be measured.
Plus (+) exceedence value (amount over the standard) to be decreased.

(3) For design values:

Phase I design value is the total benefit from all the Phase I strategies.

(4) Phase II design value is the amount of the remaining exceedence after applying Phase I strategies.

(5) Grid location coordinates: (3,4 means 3 horizontally, 4 vertically)

as paved road dust, slash burning, wood fired boilers, and home space heating. It also includes development of model improvements to enhance its usability for NSR.

Phase III includes the analysis, modeling, selection and implementation of strategies using information developed from Phase II. Public participation is expected during this phase through the Eugene-Springfield AQMA Citizen's Advisory Committee, or similar group.

4.6.4.3.1 Phase I

Phase I consists of three strategies: Reduction of unpaved road dust through paving about 10 miles of selected unpaved roads in the cities of Eugene and Springfield; reduction of dust from cyclones through control of industrial air conveying systems; reduction of wood smoke emissions by reducing the need to use wood or other energy source for residential space heating through weatherization programs.

(1) Pave 10 miles of unpaved road. The impact of dust emissions from unpaved roads is well documented in Appendix 4.6.4.1--1. As a result of this significant impact on PM levels, the paving of streets was chosen as a primary strategy to be instituted in Phase I.

(2) It was determined that the unpaved roads under the jurisdiction of Lane County were generally in the outlying grids of the AQMA and do not heavily impact the non-attainment grids. The unpaved roads within the cities of Eugene and Springfield do, however, heavily impact the non-attainment grids, and it is within these cities that the paving will be done. Both Eugene and Springfield have ongoing programs to pave existing roads as development occurs. In order to maximize the air quality benefit of these programs, the streets with the

highest dust emissions should be paved first, and so on, until the desired emission reductions are achieved.

To determine which streets were to be paved, each unpaved road was prioritized, based upon dust emissions in tons/ mile. It was then determined that by paving a little less than 5 miles of streets in each city, over 85% of the emissions would be eliminated (see Table 4.6.4.3.1--1). As a result, a list of unpaved road sections totaling 4.68 miles for Eugene and 4.70 miles in Springfield was generated. Some of these sections have been paved since the emissions baseline was developed. The desired reductions will be achieved if each city completes paving these streets or alternative streets within the same grid, achieving the equivalent emissions reductions in tons/year by the end of 1987. A listing of these unpaved road sections is found in Table 4.6.4.3.1--2.

(2) Control of All Dry Material Handling Air Conveying Systems (Cyclones). Approximately 340 tons/year of emissions from 53 dry material handling cyclones would be reduced by 98.5% by requiring baghouse control (or equivalent) by 1982.

TABLE 4.6.4.3.1--1

AQMA Unpaved Road Dust Emissions

	Total Miles	Total Emissions Tons/Year	No. Miles To Be Paved in Phase I	Reduction in Emissions From Phase I Paving	% Reduction in Emissions Due to Phase I
Eugene	14.30	620	4.68	527.8	85%
Springfield	8.74	352	4.70	308.1	87%
Lane County	12.94	300	----	-----	---

TABLE 4.6.4.3.1--2

EUGENE PRIORITIZED UNPAVED ROADS

FOR

PHASE I PAVING

Street	From/To	Length (Miles)	Grid No.	Annual Emissions (Tons/Year)
Bailey Hill	Stewart - 11th	0.15	46	30.0
43rd/N. Shasta Loop		1.13	21	211.5
13th	Bertelsen - Ocean	0.05	45	8.9
Stewart	Bertelsen - East	0.51	45	83.5
43rd	N. Shasta Loop - city limits	0.06	21	8.7
Lassen	Haig - Roosevelt	0.16	60	20.2
Kintyre	Bethel - end	0.16	74	16.4
Rikhoff	Bethel - S.P.R.R.	0.07	74	6.5
Martin	Center - Amazon	0.20	6	15.2
Pattison	Waite - Berntzen	0.13	73	10.1
Dove	Taney - end	0.16	73	10.4
Wallis/12th	11th - end	0.47	45	30.4
Jefferson	Clark - end	0.21	61	12.8
Fir Acres	Willagillespie - end	0.18	76	10.6
Ogle	Bethel - Allane	0.13	60	7.6
Allane	Bethel - Ogle	0.10	60	5.6
Fuller	Jay - Echo Hollow	0.13	73	7.0
Berntzen	Pattison - Concord	0.13	74	6.7
Port	Barger Drive - end	0.13	72	6.7
S. Shasta Loop	Barber Drive - city limits	0.18	21	9.3
14th	Hayes - Garfield	0.07	47	3.4
Dove Lane	Ruskin - end	0.04	73	1.7
Highland Oaks	Trillium - Hawkins Lane	0.13	32	4.6

TABLE 4.6.4.3.1--2 (Continued)

SPRINGFIELD PRIORITIZED UNPAVED ROADS

FOR

PHASE I PAVING

Street	From/To	Length (Miles)	Grid No.	Annual Emissions (Tons/Year)
40th	Camellia - Oregon	.09	53	18.3
17th	N of 'Q'	.08	66	11.8
Prescott	Centennial - Fairview	.24	64	34.2
35th	Main - N 'E'	.32	52	40.4
16th	'F' - 'G'	.04	51	4.8
17th	Main - S 'A'	.09	52	10.0
Lawnridge	Debra - Roseblossom	.05	65	5.2
39th	Main to N 'E'	.36	53	33.3
D	49th to 51st	.21	54	19.3
52nd Pl.	Main to Bluebell	.23	54	14.2
S	17th - 'Q'	.14	66	8.3
E	60th - 61st	.04	55	2.2
Oregon	32nd - 40th	.56	52/53	12.5/17.3
Scott Rd.	18th - 21st	.18	66	9.4
Water	Centennial - 'N'	.09	64	4.2
N 'A'	54th - 55th	.08	54	3.6
49th	'C' - 'E'	.12	54	5.1
S 'B'	14th - 16th	.20	51	7.4
W 'N'	Prescott - Laura	.16	64	5.6
47th	Main - Bluebell	.17	53	6.0
Camellia	44th - 46th	.09	53	2.8
C	34th - 35th	.05	52	1.5
S 'A'	18th - 24th	.38	52	10.8
38th	S of Kathryn	.13	53/67	1.8/1.8
39th	S of Kathryn	.13	53/67	1.8/1.8
41st	Main - Centennial	.20	53	5.4
34th	Industrial - Olympic	.27	52/66	1.2/6.1

Because of the relatively low plume rise of these sources, modeled elimination of these emissions provides significant air quality benefits in several locations projected to exceed standards in 1987 (e.g., at Pacific Northwest Bell, and in Grids 52, 53 and 54 in Table 4.6.4.3--1). The anticipated high content of fine particle sizes in these emissions also provides a public health rationale for control. The overall cost of control (approximately $1.0 million) was judged reasonable in relation to other currently feasible control actions.

Section 4.6.6 describes the basis for the rule. Appendix 4.6.6--1 contains the proposed language.

(3) Weatherization of Homes Using Wood Space Heating. This strategy assumes that 50% of all AQMA homes which rely heavily on wood for space heating will be sufficiently weatherized by 1987 to reduce their space heating energy requirements (BTU's) by up to 60%, inducing a corresponding reduction in wood use (and TSP emissions) of at least 30%. This would produce a 15% overall reduction in projected AQMA wood space heating emissions, or 340 tons/year less emissions, by 1987. Appendix 4.6.4.3--1 describes the methods of estimating reduced heating requirements due to weatherization.

Existing and proposed weatherization assistance programs are expected to substantially increase the number of weatherized homes in the next five to ten years. Major factors include: (1) Strong supporting actions by local governments and one of the local electric utilities (EWEB) for weatherization; and (2) the potential to significantly offset rapidly rising homeowner energy costs - especially as low or deferred cost financing opportunities are provided.

Key elements of existing weatherization programs include the availability of (1) weatherization loans from utilities and lending institutions; (2) home energy audits (free of charge from most utility companies and required in Springfield after home purchase); (3) state and federal home tax credits for weatherization projects. Proposed programs which promise substantially increased weatherization impact include: (1) Proposed Eugene ordinance to require home weatherization after 1985; (2) Existing Springfield ordinance requiring energy audits within six months of resale of residences; (3) Lane County's "Community Energy Conservation: program to induce owners to weatherize residential rental units; (4) a low or no interest weatherization loan program proposed by EWEB which is strongly promoting energy conservation as an alternative to expensive new generating facilities and low interest home improvement loans by State DVA. The calculated benefit of weatherization appears in Table 4.6.4.3.1-1. Appendix 4.6.4.3.1--1 documents the status of existing and proposed weatherization programs.

Agency responsibilities and tentative scheduling for Phase I strategies appear in Section 4.6.9.

4.6.4.3.2 Phase II

Phase II can be considered as an effort to make sure we are right before we go ahead beyond Phase I. The goals of Phase II strategies are:

(1) To develop additional strategies to achieve standards in those areas which are predicted to remain in non-attainment after Phase I.

(2) To identify ambient concentrations of fine particulate and develop an emissions data base for fine particulate from point sources and non-traditional sources. This data will be used to determine to what degree future controls, if any, may be needed when a standard is promulgated for inhalable particulate.

(3) To improve the modeling technique so it can be used locally in managing the growth of new sources and to maintain the standards beyond 1987.

These objectives are addressed in the form of work plans, Appendix 4.6.4.3--1.

Work Plan No. 1 quantifies the degree to which road dust is an actual non-traditional source category (road dust emissions were adjusted artifically to calibrate the model), and whether reduction of road dusts will significantly reduce measured concentrations of soils in areas where needed. The objectives of the work plan are:

- To improve the emissions inventory for paved road dust emissions;
- To use modeling techniques to predict the ambient impact of specified road sections so that the number of paved road sections that must be cleaned and maintained to a high level can be identified;
- To trace the sources of the materials that represent the "total loading" so that measures to prevent those deposits can be developed.

Despite some misgivings about the adjustment of road dust emissions (industrial trackout factor) to calibrate the model, fugitive dust emissions from paved roads appears to be the largest single contributor to particulate matter levels in the AQMA (Appendix 4.6.4.1--1). For that reason additional controls of road dust must be considered if attainment is to be assured. The particular strategies for reducing paved road dust have not been selected as yet, but the modeled benefit from the reduction of the industrial trackout adjustment factor is considered a target for equivalent strategies to be developed and implemented during Phase III.

Work Plan No. 2 deals with several contribution source categories which have been deferred for the time being, primarily because they may be significant sources of inhalable particulate. The results of this workplan will provide a basis for determining whether these sources should be again addressed for attainment of the TSP standard or deferred until an ambient fine particulate standard is promulgated. The establishment of an emissions inventory for sources of fine particulate will be accompanied by ambient monitoring for inhalable particulate, on the same schedule as for TSP, to establish the concentrations of inhalable particulate in the TSP AQMA.

Some of the sources of fine particulate that will receive priority attention in this work plan are:

(1) Wood Fired Boilers

(2) Wood Space Heating

(3) Open Burning (Backyard and Non-Agricultural Debris)

(4) Slash Burning

(5) Field Burning

Wood Fired Boilers. Because of the significance of wood fired boilers as a source category (56% of total 1987 point source emissions, 25% of total 1987 emissions from all sources) they are, and will continue to be an obvious prime candidate for controls. However, control of wood fired boilers has been deferred into a Phase II strategy for reasons discussed in Section 4.6.5. The portion of Workplan 2 which involves boilers will be to conduct source testing of a representative sample to determine percentage of fine particulate emissions. In addition, industry representatives have indicated concern about particulate levels in the community and the effects on their potential for growth. The Lane Boiler Owners Association has been formed of those who operate wood fired boilers, for the purpose of collecting, developing, and exchanging operations procedures and data. The stated objective is to achieve lower total tons of emissions from all the boiler facilities located in the AQMA while operating at the levels allowed by the current boiler standard. A general plan is contained in Appendix 4.6.4.3.2--1.

Wood Space Heating. In addition to the Phase I weatherization strategy, a strategy called "Burning Drier Wood," will be addressed in the Phase II effort in the form of a public information program. It is believed that a public information program, in addition to weatherization, appears to be the most feasible means to help minimize woodstove emissions until more affirmative controls are deemed necessary to protect public health.

Open Burning. Emissions from open burning of yard trimmings and non-agricultural debris clearing is probably not significant in terms of the TSP standard. The data base will be upgraded for the purpose of assessing the impact of that category in terms of fine particulate as part of Workplan 2.

Outside Sources: Field and Slash Burning. The Willamette Valley Field and Slash Burning study conducted by the Department of Environmental Quality (DEQ) in 1978 was a major effort to measure the contribution of vegetative burning and other sources to particulate concentrations in the lower Willamette Valley, and especially in the Eugene-Springfield AQMA. DEQ conclusions from this study included the following:

- Slash burning had a 35-55 $\mu g/m^3$ impact on total particulate air quality in Eugene on August 3, 1978 when the total suspended particulate secondary standard was exceeded.
- During the May to mid-November 1978 study period vegetative burning sources accounted for 21 $\mu g/m^3$ or 38% of the total particulate in Eugene and 14 $\mu g/m^3$ or 21% of the total particulate in Springfield.
- During the study period at the 10 monitoring sites in the Willamette Valley vegetative burning sources accounted for an average of 11 $\mu g/m^3$ or 27% of the total particulate. It is the largest contributor to the fine particle fraction and the second largest source class contributing to the total particulate mass.

Field Burning. Open burning of grass seed fields following harvest has caused major smoke intrusions in the AQMA. It is likely that the conclusions above may no longer be applicable, because in April, 1980, based upon an agreement negotiated between the City of Eugene and the Oregon Seed Council, the Oregon Environmental Quality Commission (EQC) adopted by rule a "performance standard," designed to require more restrictive controls of field burning as the accumulative smoke intrusions exceed this standard. Analysis approved by EPA indicated that adherence to the performance standard should insure that field burning would not contribute significantly to attainment and maintenance of the PM standards within the Eugene-Springfield AQMA. Past smoke management performance indicated that the performance standard could be met, and still allow all fields to be burned, as needed. Appendix 4.6.6--7 contains the performance standard rule (OAR 340-26-015) adopted by the EQC, and Operational Guidelines, which explain how key elements of the rule will be implemented. As experience is gained, field burning should not hinder attainment and maintenance of PM standards in the future. Some intrusions are inevitable, however, and smoke from field burning may remain as a significant source of inhalable particulate.

Slash Burning. As with the DEQ field burning smoke management plan, the State Department of Forestry's smoke management planning has greatly lessened the incidence of slash intrusions in recent years, but more work needs to be done.

Controlling slash burning impacts helps control overall background PM levels. Growth in background PM levels reduces or cancels the beneficial effects of control strategies which reduce emissions inside the AQMA. Also, the relatively high percentage of fine particulate in slash smoke suggests it has a correspondingly high health and visibility effect. (See Appendix 4.6.6--7)

Regulation of field and slash burning is solely the province of State agencies. Phase II will include the following LRAPA efforts toward better quantification and control of field and slash burning impacts:

(1) Monitor field and slash burning impacts, including aircraft tracking on smoke intrusion days, to document the source of the intrusion.

(2) Closely monitor a follow-up study planned by DEQ to further analyze data collected during the 1978 Field and Slash Burning Study, and subsequent monitoring data, to determine the contribution of slash burning and other sources to Eugene-Springfield PM levels.

(3) Participate in key discussions among DEQ, DOF, key federal agencies and local groups about smoke management plan effectiveness.

(4) Analysis of the feasibility of establishing "performance standards" for slash burning smoke intrusions, similar to those recently established for open field burning.

Work Plan No. 3 addresses several of the areas of model improvement identified by the Modeling Subcommittee of the CAC. This effort is particularly important because of the intended future use of modeling in growth management. Specifically, Work Plan No. 3 calls for:

(1) Acquiring additional surface and upper air meteorological data on worst-case days occuring at other times of the year in addition to the single February day analyzed.

(2) Routine ambient sampling in a manner which anticipates CMB analysis in order to increase the opportunity to obtain complete data sets (PM, IP, CMB, Met) on worst-case days.

(3) Additional CMB analysis at two sites which are currently monitored and predicted to be in non-attainment, but for which no chemical analysis exists. Additional samples suitable for chemical analysis will be collected at these two sites.

(4) Before additional strategies are adopted based on predicted non-attainment in unmonitored grids, monitoring is needed to confirm the modeling results. Monitoring in presently unmonitored grids is scheduled for September, 1980 - August, 1981.

(5) A "decay factor" may be needed in order to more accurately account for fallout of fugitive dust emissions from roads. The model currently does not account for any fallout occurring between the source and the sampler. An attempt will be made to identify a reasonable "decay factor" to apply to future modeling efforts.

(6) Ongoing improvements in background emissions inventory will include outside and non-inventoried sources.

(7) Grid model transfer: The DEQ will transfer the grid model to the LRAPA staff, providing the necessary technical assistance to insure its proper operation.

4.6.4.3.3 Phase III

As discussed earlier, Phase I strategies will not, by themselves, demonstrate attainment of the secondary PM standards. In all areas of the AQMA several additional strategies hold promise to be effective, but because of the relative lack of data and potential high cost, a higher level of confidence is needed prior to implementation. Two of the Phase II Work Plans are designed to improve the data base of sources likely to be affected by additional strategies.

Phase III can be described as a process similar to that used for this SIP revision. At the time Phase III is begun (mid-1983) it is anticipated that much of the essential additional information from the Phase II studies will be available. This includes, in particular, evaluation of non-traditional sources as significant contributors to the PM problem, and importance of a number of traditional and non-traditional sources of inhalable particulates.

A critical precondition to initiation of Phase III is the successful transfer of the modeling programs from DEQ to LRAPA. This depends, in turn, on a commitment from DEQ to provide personnel and training to assure that the model is up and running in Lane County. A DEQ commitment to provide the necessary assistance is provided in Appendix 4.6.6--5.

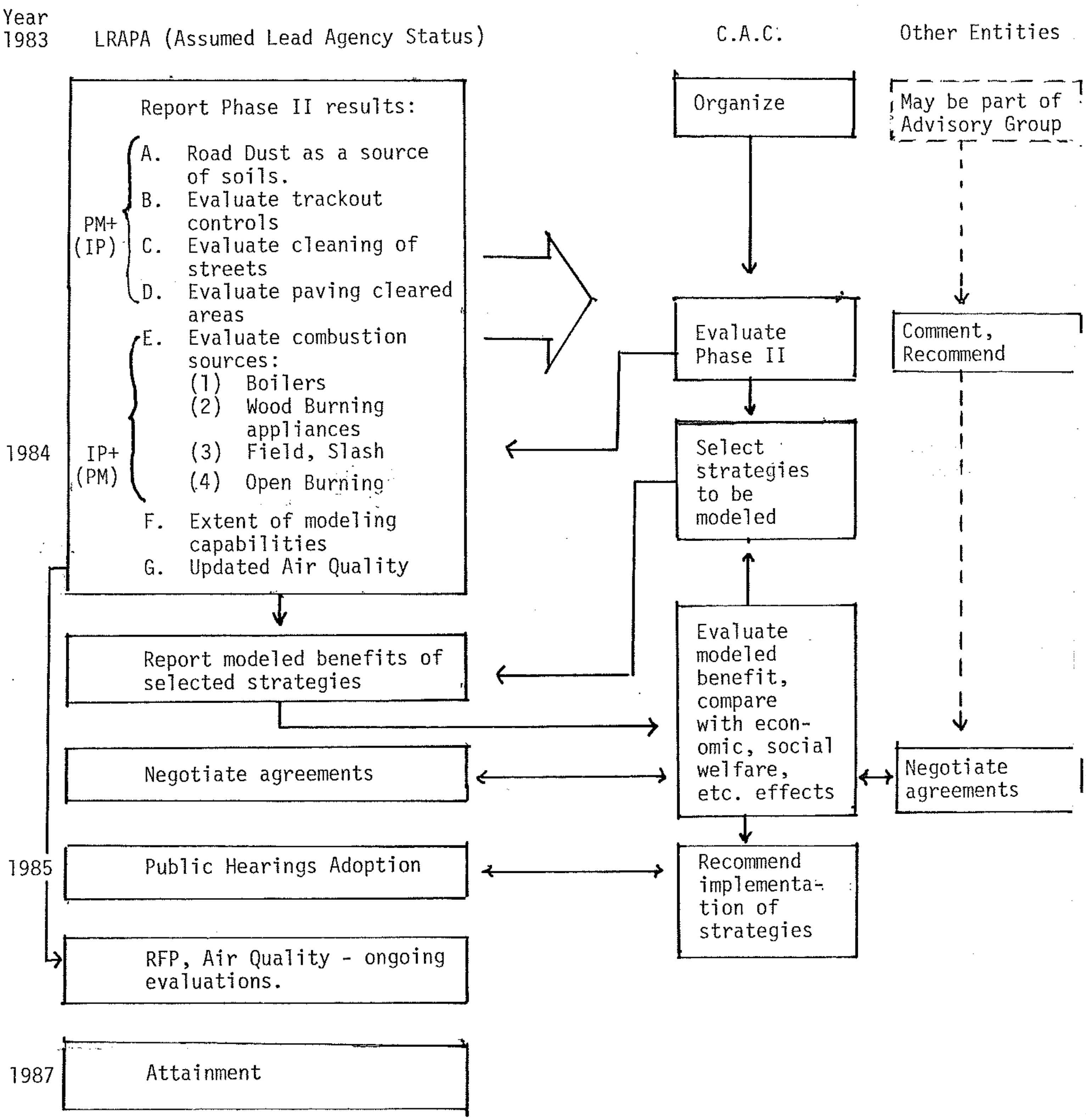
A set of strategies utilizing the improved data base will be developed for presentation to a citizen's group, such as the AQMA - CAC or the LRAPA Advisory Committee. Modeling of selected strategies will be performed by LRAPA, to indicate reductions of concentrations resulting from the selected candidate strategies.

As an adjunct effort, air quality data analysis will be performed to provide an evaluation of the effectiveness of the Phase I strategies and to confirm the Phase II design value. The CAC will provide recommendations to the implementing entities (LRAPA, Eugene, Springfield, Lane County) which, in turn, adopt necessary regulations, ordinances, or agreements. Figure 4.6.4.3.3--1 describes the Phase III process, as well as tentative times, and responsibile entities.

The proposed time line of Phase III is highly speculative presently, since none of the prospective planning or implementing entities can legally commit funds to implement strategies which have not been determined and which are several years away.

Figure 4.6.4.3.3--1

Phase III STRATEGY DEVELOPMENT

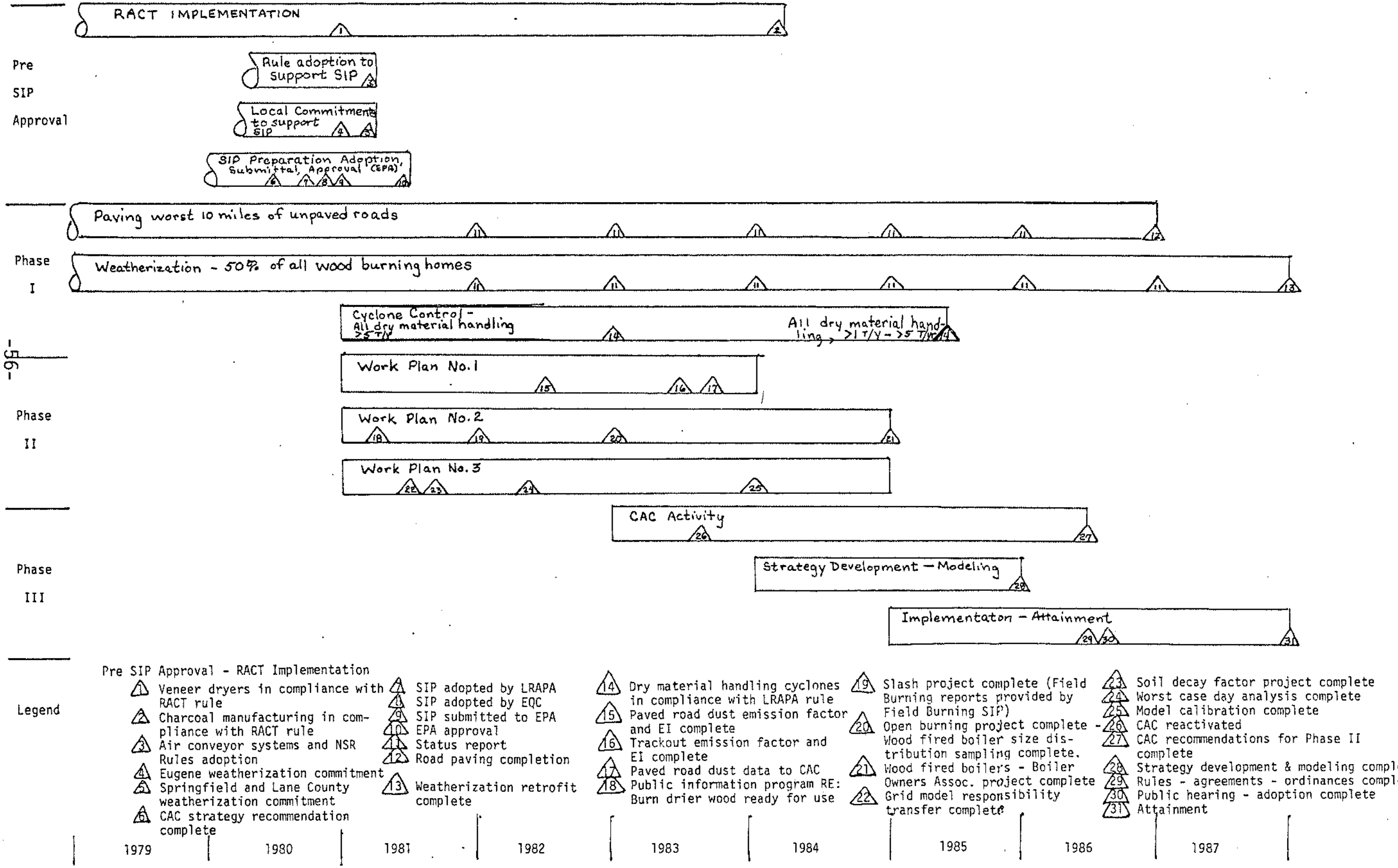


4.6.4.3.4 SIP Implementation Schedule

Figure 4.6.4.3.4--1 reflects the best estimates available for implementation of strategies and work plans. As programs develop and data is collected, some of the programs or program elements and their implementation schedules may change depending upon resources and priorities. The Clean Air Act or new ambient air quality standards will also cause such re-evaluation and possible changes.

FIGURE 4.6.4.3.4--1

SIP Implementation Schedule



4.6.4.4 Impact of Strategies:

Air Quality

24-hour Air Quality standards for Particulate Matter will be attained throughout the AQMA. There should be gradual improvement in most areas as the Phase I strategies are implemented.

Health Effects

The EPA established 75 $\mu g/m^3$ Annual Geometric Mean and 260 $\mu g/m^3$ 24-hour (second highest) as the health standard for particulate matter. The Eugene-Springfield AQMA has attained those standards. New concerns about fine particulate may result in new health-related standards. The Phase I strategies partially address this concern through the wood space heating strategy. The inhalable particulate matter work plan is Phase II. Implementation of the inhalable particulate strategy and/or strategies developed in the Phase II effort may not satisfy all the requirements of an Inhalable Particulate Standard, but should provide the basis for additional strategy development, if necessary.

Welfare Effects

The EPA established 60 $\mu g/m^3$ Annual Geometric Mean and 150 $\mu g/m^3$ 24-hour (second highest) as the secondary standards. This level provides for protection from those concerns for which the secondary standard was developed, such as soiling, fallout, and visibility impairment. Attainment of the secondary standard is expected to provide adequate protection to the welfare of the Community.

Economic Effects

The attainment strategy, Phase I, is designed to minimize the economic impact of air pollution control. The cost of new paving and house insulation is eventually returned in terms of reduced maintenance cost of motor vehicles and reduced energy cost for individual home owners. Phase III strategies will depend upon analyses of relative cost effectiveness.

Energy Considerations

Phase I strategies will reduce energy consumption overall. Individual source controls such as control of air conveying systems will, in most cases, consume additional energy. Weatherization strategy is expected to reduce energy consumption in those homes by approximately 60%, although air quality benefits are lower. As more homes are insulated, additional energy benefits will accrue.

Social Considerations

There will be conscious evaluation of quality of wood used as fuel. No other new constraints are anticipated other than monitoring costs already identified.

VOC-CO Considerations

The implementation of RACT on veneer dryers and the wood space heating strategy is expected to reduce the VOC.

Phase III strategy development and selection must be completed before impact can be assessed. If paved road dust strategies are selected, the impact will probably be minimal. If vegetative burning sources are selected, then additional reduction VOC and CO emissions could occur.

4.6.4.5 Growth Management Plan

One of the practical problems which occurs during the process of reducing emissions to attain standards in an AQMA is dealing with growth of emissions from new and modified point sources and from area sources associated with general population growth. A growth management plan must therefore be implemented at the same time as attainment strategies.

The purpose of a growth management plan is three-fold:

(1) To preserve the effectiveness of the currently adopted and implemented strategies;

(2) To avoid or minimize additional control expense for existing sources during the attainment period; and

(3) To assure maintenance of standards, once attained, by the prescribed date (1987).

The major elements of this growth management plan are:

(1) Controlled growth of emissions from major new and modified sources by applying New Source Review rules, which require emissions off-set;

(2) Development of a growth increment allocation policy for minor sources; and

(3) Provide assurance that growth increments which accrue because of reduced emissions within the AQMA are not used up by sources outside the AQMA.

1. <u>New Source Review of Major New and Modified Sources</u>. The State of Oregon has recently proposed a statewide NSR rule which governs the extent to which major new and modified sources are reviewed and are allowed to add new emissions into an area. These proposals appear in Appendix 4.6.6--6 They are scheduled for adoption in 1981. Similar rules will be proposed by LRAPA, which will be generally equivalent to the proposed State rules, except that total off-setting will be required of new emissions from major sources locating within the AQMA, and off-setting to the extent there is at least a net zero impact within the AQMA from major sources locating outside its boundaries. "Zero Impact" may be at some calculated level above zero, but below detectable limits of the model, or a sampler located at the point of highest impact inside the AQMA. Fugitive sources may be eligible as potential offsets for point sources, but only after LAER is applied to the new or modified facility, and to the other point sources within the plant site, and other potential point source offsets are shown to be not feasible.

LRAPA will request that the EQC incorporate this provision into its NSR Rules for new and modified major sources locating outside Lane County. The particular offsets for each source would be based on allowed emissions after application of Lowest Achievable Emission Rate for sources locating outside the AQMA. All other provisions of the State-proposed New Source Review rules, including Banking and Plant Site Emission Limits, are proposed to be included in LRAPA's rules.

2. Growth Increment Allocation for Minor New and Modified Sources. The AQMA grid model predicts that, as there is application of Phase I attainment strategies, and as Phase III strategies are implemented, growth increments, or "cushions" will develop throughout the AQMA (See Table 4.6.4.5--1). These cushions will vary, grid by grid. In theory, the model can be used to estimate the effect of new emissions within each grid. Under the proposed New Source Review Rules, major point sources will obtain full offsets and will not affect these growth increments. It is assumed that within the AQMA there will effectively be no increase of ambient air TSP concentrations from major point sources. Thus, the growth increments accumulated as the attainment strategies are implemented can be allocated to minor sources and area sources (population increase).

However, the ability of the AQMA grid model to measure the impact of a small change in emissions (due to an individual minor source) on a grid-by-grid basis has not been demonstrated, and should be evaluated prior to using this model to establish off-set requirements for individual minor sources. If the model is determined to be usable for relatively small, individual point sources, the available growth increment in each grid can be allocated, on a percentage basis, to each minor source locating within that grid, on a first-come, first-served basis, until the total growth increment is used up (by both direct emissions from the minor sources and the increases from population-induced area sources).

TABLE 4.6.4.5--1

Phase I Growth Increments

(μg/m³)

Monitor/Grids	Annual Standard 60 μg/m³	24-Hour Standard 150 μg/m³
Eugene	4.47	(1.87)*
Westmoreland	9.50	(9.78)
S. Eugene	28.68	54.55
Oakway	10.23	12.92
3,4	15.81	36.50
4,5	3.37	(29.25)
5,4	6.48	(13.00)
6,3	1.28	18.25
7,4	4.61	1.5
5,5	6.05	18.25
3,6	---	36.50
Springfield Library	1.36	19.19
Thurston	14.24	28.31
Springfield DMV	4.76	29.46
Pacific NW Bell	(7.24)	10.09
11,4	(0.35)	26.75
8,4	3.36	(15.50)
8,5	7.10	29.75
12,4	2.74	---
9,5	---	12.25

*Number in parenthesis ( ) indicates grid is predicted to be over the applicable standard after implementation of Phase I strategies.

Ten percent of the available growth increment, at the time a permit application is filed, is suggested as a reasonable allocation for each minor point source.

The development of a growth allocation policy will occur in two steps:

Step 1.
LRAPA will, after the grid model is transferred from DEQ to LRAPA, run the model on an annual basis to determine its sensitivity to individual and accumulated emissions from new and modified minor sources. LRAPA will determine whether or not the grid model is a usable tool in determining specific emission control and off-setting requirements for each subsequent new and modified minor source. The annual model run will also serve to adjust the growth increments as needed.

Step 2.
If it is, LRAPA will develop a grid-by-grid growth increment allocation policy for minor point sources in 1983. If not, a substitute policy which will accommodate growth of minor sources will be developed.

It is unlikely that minor sources will completely use up available growth increments prior to the time a policy is established. There is additional protection from sudden unexpected impact from new and modified minor sources because of the annual evaluation in Step 1 and existing rules which require "Highest and Best Practicable Treatment" of emissions.

3. Background or Outside Sources. On any given day, background PM levels are the largest single fraction of the Suspended Particulates (40 $\mu m/m^3$ AGM, 56 - 63 $\mu m/m^3$ 24-hour average). Major sources of background TSP are thought to be slash burning, field burning, agricultural operations (such as field plowing), major point sources, and up-wind urban development. Significant growth is not likely in the first three categories - slash, field burning and agricultural operations. These have been assumed to remain constant or to decrease in importance through the attainment period. The Growth Management Plan must then consider growth of major point sources and up-wind urban development.

The purpose of addressing growth in emissions from outside sources now is to prevent the undermining of controls established inside the AQMA by allowing excessive increases of emissions from sources outside the AQMA and outside the jurisdiction of Lane County agencies. The New Source Review rules to be adopted by LRAPA will require demonstration of Zero Impact inside the AQMA from major point sources locating outside the AQMA, but within Lane County. LRAPA, however, does not have New Source Review and permit jurisdiction for sources locating outside of Lane County.

LRAPA will request EQC to include in its New Source Review rule proposal the requirement that major new and modified sources locating outside Lane County which may impact the Eugene-Springfield AQMA must demonstrate net Zero increase at the point of highest impact. (Proposed State rules use a 1 $\mu m/m^3$ AGM or 5 $\mu m/m^3$ 24-hour average "Significant Impact" as the requirement.)

Minor sources locating outside the AQMA which impact inside will be allowed 5% of the available growth increment after "Highest and Best Practicable Treatment" is applied. Minor sources are less likely to have major impact within the AQMA, particularly those which are outside Lane County.

It is not planned in this SIP Revision to directly manage growth of up-wind urban development in the form of enforceable rules or regulations. However, there are several other cognizant entities which should be mindful of the effects of new urban development on air quality. LRAPA has worked with Lane County, and the cities in Lane County in developing their respective growth plans. This activity will continue. In addition, LRAPA conducts monitoring at several sites outside the AQMA (Mahlon Sweet Airport, Coburg, Saginaw, Oakridge and Cottage Grove). Data from these sites will indicate trends and signal whether there is a future need for revision of the AQMA Boundary.

4.6.5 Strategy Alternatives

A number of strategies other than those selected for Phase I implementation and Phase II study were considered. The following are the significant strategies which are deferred or considered unfeasible or unpractical at this time.

Asphaltic Concrete Batch Plants

There are four (4) plants operating at RACT level in the AQMA with combined total emissions of forty (40) T/Y. Because of the relatively low emissions and the location, this category of source was not selected to be modeled.

Wood Fired Boilers

Control of boilers has been deferred for several reasons. The economic and social consequences are judged to be an unacceptable exchange for the modeled benefit of reductions in TSP (as opposed to inhalable particulate). It is believed that the degree of control needed to achieve the desired emission reduction may be prohibitive to some operations. It is generally believed that it will be more difficult as time goes on for some mill operators to remain in business. Deferring the control of boilers will not necessarily eliminate mill closures (which can occur for a number of reasons), but it may allow a more orderly review. by each operator of all the factors necessary to remaining in business.

Imposing these costs to achieve a TSP standard may not be justified while there is much uncertainty about whether Lowest Achievable

Emission Rates established today will be adequate when the IP standard is promulgated.

The modeled boiler control strategy does show substantial gains in some grids. The grids which benefit the most, however, are not the grids which require such benefit. The strategy provides comparatively little benefit in those grids predicted to exceed the standard after implementation of Phase I strategies. For example, the special purpose monitor in Grid 51 (PNB) is predicted to exceed the annual standard. The modeled benefit from the boiler strategy is 0.91 $\mu g/m^3$ (AGM). Grid 60, which is not monitored, is predicted to exceed the 24-hour standard. The modeled benefit from the boiler strategy is 2.0 $\mu g/m^3$ (24-hour). Implementation of Phase III developed strategies is expected to eliminate the predicted 1987 exceedences without the need for the boiler control increments.

Cyclones

Six (6) alternatives, including RACT (current regulations) have been considered. Those alternatives are: (1) 0.20 gr/scf for systems installed prior to June 1, 1970 and 0.10 gr/scf for systems installed after June 1, 1970 (current regulations); (2) 98.5% control of all cyclones >10 T/Y; (3) 98.5% control of all cyclones <10 >5 T/Y; (4) 98.5% control of all cyclones <5 >1 T/Y; (5) 98.5% control of all cyclones >1 T/Y; and (6) 98.5% control of all dry material handling cyclones. There are some 340 T/Y emissions from all cyclones located throughout the AQMA. Fabric filtration, or equivalent, control of strategies (1) through (4), and (6) above have not been selected. Strategy (5) is included in Phase I.

Charcoal Manufacturing

One strategy alternative was considered in addition to the RACT regulation. That alternative was 172#/hr - 20#/Ton which would have provided a 1974 T/Y emission reduction. It was not selected because it was less stringent than the current regulation which is 10#/Ton of char produced.

Particle Board Dryers

There are two (2) plants utilizing nine dryers located, one on the east and one on the west side of the AQMA, with a combined emission loss of 381 T/Y. Two strategy alternatives have been modeled. Those are: (1) 1#/1000 ft.^{2} of board produced (158 T/Y reduction). Model results show very low impacts ($\mu g/m^3$) in those grids where additional reduction will be needed after Phase I implementation. Therefore, particle board dryer strategies have not been selected. These operations are considered marginal, however, and additional control may be required to assure that the 20% opacity standard (RACT) is met.

Pulp Mill

One strategy alternative has been considered for the single pulp operation in addition to current regulations. BACT on furnace #4 which would provide a 200 T/Y reduction in emissions was modeled. Model results show very low impact (in $\mu g/m^3$) in those grids where additional reduction will be needed after implementation of Phase I strategies. Therefore, that strategy has not been selected.

The trackout strategy(s) evolved from data base adjustments that became necessary to calibrate the model with CEB. Linear changes to the paved road dust data base failed to justify the CEB results for soils. The analyst used "industrial land use" as an assumption for purposes of adjusting the soil data base for a better CEB fit.

The LRAPA staff believes that the industrial land use trackout assumption is not valid for the Eugene-Springfield AQMA. The Seattle study referenced by the DEQ found total street loadings in the industrial areas higher than commercial or residential land used. A similar study conducted by the Lane Regional Air Pollution Authority and members of the DEQ in both Eugene and Springfield found that total loading on the "industrial" streets selected was lowest. For this reason alone, the LRAPA staff believes that the modeled trackout strategy should be reconsidered.

It is likely, despite doubts about where the significant problem areas are, that road dust is a significant factor contributing to the soils fraction in the samples. It is also likely that attainment of the secondary standard in Eugene-Springfield may depend heavily upon control of paved road dust. Phase II work will attempt to identify preventive, as well as corrective, strategies that will most likely include more sources of trackout than industrial yards.

Residual Oil Burners

There are some eighty (80) units operating throughout the AQMA with a combined loss of 69 T/Y. One alternative, 0.050 gr/scf, was considered, but was not selected for modeling because of the very low emissions scattered over several grids.

Rock Crushers

Six (6) plants/sites operate in the AQMA with a combined loss of 191 T/Y. One strategy, 10% maximum opacity, and an 88 T/Y emission reduction, was considered and modeled. Model results show very low impact from these sources. Therefore, that strategy alternative has not been selected.

Veneer Dryers

One strategy alternative was considered for this class in addition to the existing RACT regulation. That strategy was 20% maximum opacity. It was not selected because it was less stringent than the state-wide rule.

Paved Road Dust

Four strategies were considered to be modeled by the Department of Environmental Quality. Two dealt with VMT reduction (10% and 20% reduction) and two with a trackout surcharge limited to industrial land use (50% reduction of surcharge, and 100% reduction of surcharge).

If VMT reduction occurs, it will most likely occur because of energy related motives, but transportation planners for Lane County indicate that reductions of 10% or 20% are not yet practical.

4.6.6 Rules and Regulations

In addition to the planning documents, several rules, regulations, ordinances are needed to implement the SIP. These are:

1. Dry Material Handling Systems Control. LRAPA has proposed a regulation to require additional controls on systems which convey, by air pressure, dry dust materials such as sanderdust, shavings, dry cement, etc. Many of these systems have a cyclone attached as a device to separate the material from the airstream. The remaining dust, usually the finest fraction, is discharged to atmosphere. The proposed regulation, Appendix 4.6.6--1, will require that efficient emission control devices be installed on systems discharging 1 T/Y or more, to reduce those emissions by 98.5%.

2. Weatherization. City of Springfield Ordinance No. 4509, requires an energy analysis on each residential and commercial building within six months of resale. This ordinance is intended to encourage voluntary weatherization by making the owner/occupant aware of energy conservation. (Appendix 4.6.6--2)

3. Eugene draft ordinance requires weatherization to specified standards of all residential buildings by January 1, 1985, and provides for low or no interest loans through EWEB to aid financing. (Appendix 4.6.6--3)

4. Resolution adopted by EWEB establishing a program to encourage energy conservation measures and renewable resource measures, and an information bulletin explaining the status of EWEB's financing program commitment. (Appendix 4.6.6--4)

5. Road Paving. Draft resolution to be presented to the cities of Eugene and Springfield which support the SIP and to pave roads through 1987. (Appendix 4.6.6--5)

6. Growth Management. Draft regulation adapted from state NSR proposal (Appendix 4.6.6--6) which governs the extent to which major new sources are subject to analysis and control and in establishing emission offsets. Sources inside the AQMA must apply LAER, and provide full offsets. Sources outside the AQMA must apply BACT and offset to Zero Impact. Plant site emission limits are provided for, as is banking.

7. Field Burning. Oregon DEQ rule regulating agricultural burning of grass seed fields, including the performance standard for Eugene-Springfield. (Appendix 4.6.6--7)

8. Slash Burning. Oregon Department of Forestry Smoke Management Plan, including designated areas. (Appendix 4.6.6--8)

(Plant Site Emission Limits. To be included in the NSR rules.)

4.6.7 Reasonable Further Progress

The Clean Air Act Amendments of 1977 require states to submit to the Environmental Protection Agency (EPA) documentation that "Reasonable Further Progress" (RFP) is being made toward the attainment of National Ambient Air Quality Standards (NAAQS) in currently designated non-attainment areas. RFP is a projection of the incremental emission reductions that will be provided by the practical application of the various control measures described in the SIP demonstration of attainment.

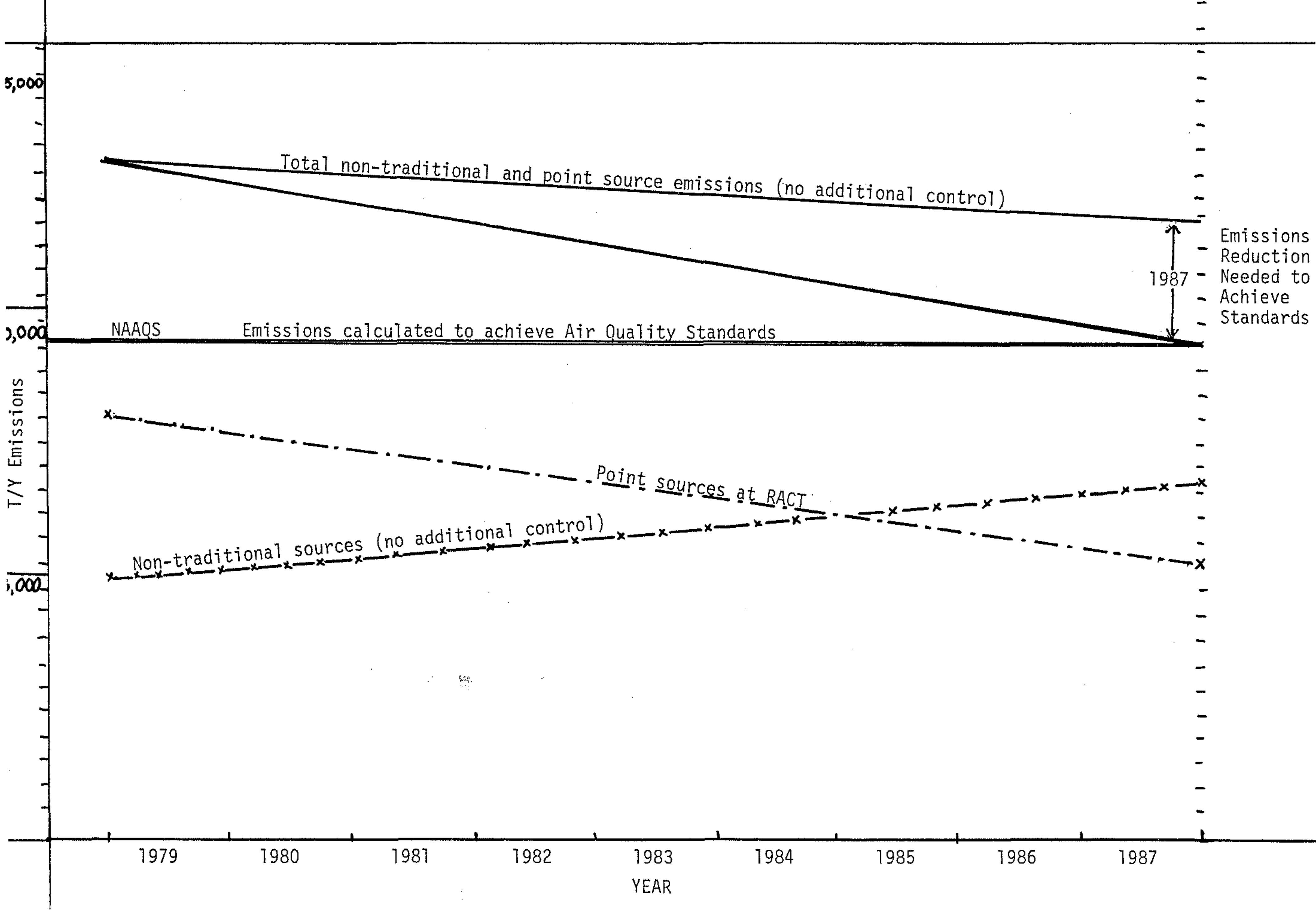
EPA guidelines suggest that the impact of non-traditional sources be provided with the 1979 SIP submittal. Modeled paved road dust strategies such as "Industrial Trackout Surcharge" and "VMT Reduction" and home heating strategies such as "weatherization" and "Burn Drier Wood" respond to that requirement. The benefit, in $\mu g/m^3$, from Industrial Trackout and VMT Reduction is considered a design target for paved street dust strategies (see Section 4.6.5) and Phase II strategies will be developed to provide equivalent benefit in $\mu g/m^3$ in each grid.

Therefore, the RFP line for the Eugene-Springfield AQMA is based on the control measures and implementation schedule described in Section 4.6.4.3. Figure 4.6.7.1--1 shows the pre- and post- SIP estimates of total emissions in the AQMA, and indicates that amount is 2300 Ton/year (T/Y).

The emission inventory values (in T/Y) for the attainment demonstration control strategies are:

FIGURE 4.6.7.1--1

RFP Schedule



1.	Paving the "worst 10 miles"	836 T/Y
2.	98.5% control of all Dry Material Handling Cyclones	340 T/Y
3.	Weatherization of wood burning homes	240 T/Y
4.	Paved Road Dust	750 T/Y
	(Strategy(s) equivalent to Industrial Trackout)	2266 T/Y

Those emissions subtracted from the 12,617 T/Y total predicted emissions provide the level of control at which attainment of the NAAQS can be ordered. Those emission reductions are designed to take place primarily in those grids in the AQMA that are projected to exceed the standard.

Tables 4.6.7.1--1 and 4.6.7.1--2 show the status of these grids, and several grids contiguous to them, in relation to the respective air quality standard. It shows also, that after application of the above listed strategies, all the grids predicted to exceed the standard will comply with the exception of the PNB. A program of "local" controls, primarily street dust control, will be designed in Phase II to eliminate the predicted exceedence.

The RFP Chart, the implementation schedule and submittal of an annual report constitute compliance with the RFP requirement of the 1977 amendments.

TABLE 4.6.7.1--1

Accumulative Effect of Selected Modeled Strategies: Phases I, II and III

Annual Standard

Monitor	Grid	Predicted Exceedence 1987 Annual Std.	856 T/Y Pave Worst 10 Miles	340 T/Y 98.5% Control Dry Cyclones	340 T/Y Weatherize All Wood Burning Homes	750 T/Y 75% Control - Industrial Trackout Surcharge	500 T/Y 10% Reduction of VMT	288 T/Y Burn Drier Wood	2330 T/Y Wood-Fired Boilers 0.05 gr/scf >35 x 10^6 0.1 gr/scf <35 x 10^6
Eugene	48	- 2.41	- 2.89	- 2.92	- 4.47	- 7.32	- 9.22	-10.57	-11.42
Westmore-land	46	- 7.15	- 8.67	- 8.72	- 9.50	-11.3	-12.2	-12.85	-13.0
So. Eugene	20	-27.71	-28.17	-28.19	-28.67	-29.05	-29.55	-29.95	-30.29
Oakway	62	- 9.13	- 9.29	- 9.35	-10.23	-11.36	-12.56	-13.31	-14.10
3,4	45	- 7.71	-15.18	-15.18	-15.81	-19.56	-21.66	-22.21	-22.21
4,5	60	- 1.01	- 2.74	- 2.74	- 3.37	-10.20	-12.30	-12.85	-13.65
5,4	47	- 3.56	- 5.23	- 5.23	- 6.48	- 8.96	-10.16	-11.26	-11.26
6,3	34	- 0.6	- 0.6	- 0.6	- 2.48	- 3.76	- 4.96	- 6.56	- 6.56
7,4	49	- 3.56	- 3.56	- 3.56	- 4.61	- 5.21	- 6.41	- 7.31	- 9.81
5,5	61	- 4.39	- 5.22	- 5.22	- 6.05	- 9.8	-11.0	-11.7	-11.7
3,6	73	---	---	---	---	---	---	---	---
Spr. Lib.	51	+ 3.4	+ 2.39	+ 2.31	+ 1.36	- 1.94	- 3.54	- 4.34	- 5.49
Thurston	55	- 8.50	-12.26	-13.46	-14.24	-17.99	-19.49	-20.14	-22.89
DMV	66	- 0.12	- 3.55	- 3.73	- 4.76	- 8.44	-10.24	-11.46	-12.09
PNB	51	+11.4	+ 8.47	+ 8.27	+ 7.24	+ 2.59	+ 0.79	- 0.11	- 1.02
11,4	53	+11.4	+ 3.1	+ 1.4	+ 0.33	- 2.13	- 3.83	- 4.73	- 9.73
8,4	50	- 1.9	- 2.73	- 2.73	- 3.36	- 3.36	- 5.06	- 5.61	- 6.41
8,5	64	- 1.9	- 6.05	- 6.05	- 7.10	-10.85	-12.95	-13.85	-13.85
12,4	54	+ 5.6	- 0.21	- 1.91	- 2.74	- 4.62	- 6.32	- 7.02	-10.32
9,5	65	---	---	---	---	---	---	---	---

Notes:

For Exceedence Values:

(1) Minus (-) means an amount below the applicable standard in μ/m^3.

Plus (+) means an amount above the applicable standard in μ/m^3.

For RFP Target:

(2) -Strategies are prioritized according to expected implementation.

-Tons per strategy is indicated in the column head.

-The modeled benefit of each strategy is added to the predicted exceedence.

-The grid(s) still exceeding the standard after application of a strategy is shown by plus (+) value and underlined.

-Industrial trackout and 10% VMT reduction are included as modeled to show the impact of paved road dust. Other strategies will be developed in Phase II that have equivalent benefit.

-The "Weatherize All Wood Burning Homes" strategy is included at 25% of the modeled benefit.

-The "Burn Drier Wood" strategy is included at 50% of the modeled benefit.

-The industrial "trackout" surcharge is included at 75% of the modeled benefit.

TABLE 4.6.7.1--2

Accumulative Effect of Selected Modeled Strategies: Phases I, II and III

24-Hour Standard

Monitor	Grid	Predicted Exceedence 1987 24-Hr. Std.	856 T/Y Pave Worst 10 Miles	340 T/Y 98.5% Control Dry Cyclones	340 T/Y Weatherize All Wood Burning Homes	750 T/Y 75% Control - Industrial Trackout Surcharge	500 T/Y 10% Reduction of VMT	288 T/Y Burn Drier Wood	2330 T/Y Wood-Fired Boilers 0.05 gr/scf >35 x 10^6 0.1 gr/scf <35 x 10^6
Eugene	48	+ 8.8	+ 7.6	+ 6.42	+ 1.87	- 6.53	-11.8	-15.78	-20.78
Westmore-land	46	+16.5	+13.3	-12.68	+ 9.78	+ 2.95	- 0.35	- 2.85	- 7.95
So. Eugene	20	-51.6	-53.3	-53.5	-54.55	-55.45	-56.55	-57.45	-59.75
Oakway	62	- 4.8	- 8.4	-10.42	-12.92	-17.57	-22.07	-24.22	-25.42
3,4	45	- 6.0	-34.0	-34.0	-36.5	-48.5	-56.0	-58.15	-59.15
4,5	60	+39.0	+32.0	+32.0	+20.25	+ 6.7	- 0.8	- 3.2	- 5.2
5,4	47	+22.0	+18.0	+18.0	+13.0	+ 2.5	- 3.5	- 7.85	-13.85
6,3	34	-10.0	-12.0	-13.0	-18.25	-20.5	-24.5	-29.05	-26.05
7,4	49	+ 6.0	+ 5.0	+ 4.0	+ 1.5	- 4.5	- 9.5	-11.65	-16.65
5,5	61	- 7.0	-11.0	-15.0	-18.25	-27.25	-31.75	-34.55	-35.55
3,6	73	-16.0	-25.0	-34.0	-36.5	-47.0	-52.0	-54.15	-56.15
Spr. Lib.	51	- 0.2	- 6.4	-16.24	-19.19	-34.09	-38.99	-41.24	-47.44
Thurston	55	- 9.5	-16.10	-26.68	-28.31	-38.29	-41.59	-42.99	-43.29
DMV	66	- 1.3	-13.3	-26.56	-29.46	-40.76	-45.76	-49.26	-51.86
PNB	51	+21.9	+10.10	- 6.84	-10.09	-24.39	-29.99	-32.79	-39.19
11,4	53	+27.0	+ 3.0	-24.0	-26.75	-34.25	-39.75	-42.15	-45.15
8,4	50	+20.0	+19.0	+18.0	+15.5	+ 3.5	- 2.5	- 4.65	- 8.65
8,5	64	+ 1.0	-13.0	-27.0	-29.75	-34.25	-39.25	-41.65	-42.65
12,4	54	- 5.0	---	---	---	---	---	---	---
9,5	65	+ 5.0	- 2.0	- 9.0	-12.25	-16.0	-19.5	-22.3	-24.3

Notes:

For Exceedence Values:

(1) Minus (-) means an amount below the applicable standard in μ/m^3.

Plus (+) means an amount above the applicable standard in μ/m^3.

For RFP Target:

(2) -Strategies are prioritized according to expected implementation.

-Tons per strategy is indicated in the column head.

-The modeled benefit of ecach strategy is added to the predicted exceedence.

-The grid(s) still exceeding the standard after application of a strategy is shown by plus (+) value and underlined

-Industrial trackout and 10% VMT reduction are included as modeled to show the impact of paved road dust. Other strategies will be developed in Phase II that have equivalent benefit.

-The "Weatherize All Wood Burning Homes" strategy is included at 25% of the modeled benefit.

-The "Burn Drier Wood" strategy is included at 50% of the modeled benefit.

-The industrial "trackout" surcharge is included at 75% of the modeled benefit.

4.6.8 Annual Report

The Lane Regional Air Pollution Authority will submit, through the Department of Environmental Quality, a report to the Environmental Protection Agency concerning the following:

1. Status of implementation of Phase I strategies.
2. Identification of growth of major new or modified existing sources, and minor new sources (less than 100 Tons/Year).
3. Reduction in emissions from existing sources.
4. Update of Emissions Inventory.
5. Conclusions of Phase II studies.

4.6.9 Resource Commitment

Table 4.6.9--1 defines the agency responisibilities to implement Phase I, II and III strategies. It is assumed that most, if not all, the resources needed by agencies for the current fiscal year are included in their respective budgets. Where it is not, it is so noted - current commitments are made, therefor. Legal constraints prevent local entities from funding programs beyond the current, or the following fiscal year, and the agreements or commitments must be qualified accordingly.

Table 4.6.9--1

Phase I

Agency Responsibility

1. Paving approximately 10 miles of existing unpaved roads.

Agency	Responsibility
City of Eugene City of Springfield	Schedule, on an annual basis, the paving of selected existing unpaved streets within the city limits. The criteria for the selection of streets to be paved will include the relative quantities of traffic-related dust. Where possible, the streets selected to be paved each year will include those determined to contribute most to non-attainment. The cities will furnish to LRAPA upon request a list of selected streets for paving, accompanied by an estimate of actual count of vehicle traffic per day.
LRAPA	Furnish to the cities, upon request, a priority listing of unpaved streets according to quantities of traffic-related dust emissions.

Table 4.6.9--1 (Continued)

Phase I

Agency Responsibility

2. Control of dry material handling systems.

Agency	Responsibility
LRAPA	-Adopt a regulation which requires 98.5% reduction of dust emissions from dry material handling systems by June, 1982. -Conduct surveillance of affected sources to ensure compliance by the adopted schedule, and maintenance of compliance thereafter.

3. Weatherization of houses using wood space heating.

Lane County	Upon award of a Department of Energy grant, implement a county-wide community energy conservation program to non-resident landlords in upgrading the weatherization of their rental properties to specified standards.
City of Eugene	Consider the adoption of a mandatory weatherization ordinance which, after 1985, requires residences to be insulated and weatherized to prescribed standards.

Table 4.6.9--1 (Continued)

Phase I

Agency Responsibility

Agency	Responsibility
EWEB	-Defend a lawsuit challenging EWEB's constitutional power to make deferred repayment loans to its customers. -Upon obtaining voter approval and financing, initiate the proposed lending program.
City of Springfield	Enforce its ordinance requiring energy audits of residences at six months after the time of sale to new owner.
LRAPA	Support efforts to reduce energy use in general. Compile and tabulate the effects of the above programs. Estimate Corresponding emissions reductions.

Table 4.6.9--1 (Continued)

Phase II

Agency Responsibility

2. Transfer modeling capability to LRAPA

Agency	Responsibility
LRAPA	-Provide necessary personnel, financial requirements, software, to re-program, and provide data into model once it is transferred. -Work with DEQ staff to effect a transfer. -Continue to provide pertinent air quality information to other entities.
Department of Environmental Quality	-Provide the necessary personnel to assist LRAPA in transferring the model. -Respond, as needed, to requests from LRAPA for assistance on special problems.

Table 4.6.9--1 (Continued)

Phase II

Agency Responsibility

1. Workplans 1 - 3

Agency	Responsibility
LRAPA	-Finalize detailed workplans. -Include elements of workplans in planned program budget as funding permits. -Secure, as necessary, supplemental funding from state and federal sources. -Provide project direction for Phase II studies. -Report conclusions to state, CAC, entities.
Department of Environmental Quality	-Provide technical assistance to LRAPA as requested to finalize workplans. -Provide financial assistance to LRAPA as direct grants, or as pass-through federal grants approving LRAPA requests for same. -Provide comment on reports of Phase II strategies.

Table 4.6.9--1 (Continued)

Phase III

Agency Responsibility

1. Analyze and develop additional strategies.

Agency	Responsibility
LRAPA	-Assist in organizing CAC. -Provide staffing to CAC for Administrative needs. -Provide technical staff support to CAC.
Department of Environmental Quality	-Assist as needed.

4.6.10 Public Involvement

4.6.10.1 Lead Agency and LRAPA Responsibilities

The Department of Environmental Quality (DEQ), in the Executive - Administrative Branch of State Government under the Environmental Quality Commission, has the primary responsibility for Air Quality Planning by Authority of Oregon Revised Statutes, Chapter 468. The Lane Regional Air Pollution Authority is a local agency formed by order of the Commission to carry out the same air quality control function in Lane County in the same manner provided for the Commission and the Department.

In order to provide the highest possible efficiency in the development of an attainment and maintenance strategy for the Eugene-Springfield AQMA, the DEQ and the LRAPA entered into an agreement in 1977 (see Appendix 4.6.10.1--1) which specified the responsibilities of each agency. The intent of the agreement and those responsibilities have continued essentially unchanged.

4.6.10.2 Citizen Participation

The Federal Register of May 3, 1976 states that the development of an Air Quality Maintenance Plan should include input from other government agencies, relevant special interest groups and the citizens of the affected communities.

EPA guidelines indicated that, at a minimum, the following groups or individuals be included in the AQMA development process through direct participation in the AQMA Citizen's Advisory Committee or through other consultation and review procedures:

1. Oregon Department of Transportation (ODOT).
2. Oregon Land Conservation & Development Commission (LCDC).
3. Lane Council of Governments (L-COG).
   (208 FWPCA)
   (701 HUDA)
   (FHA)
   (UMTA)
   (A-95)
4. Elected officials of affected local governments.
5. Representatives from the relevant special interest groups and citizens of the affected communities.

The Eugene-Springfield Air Quality Maintenance Area Citizen's Advisory Committee for Particulate Matter membership was drawn from these entities (Appendix 4.6.10.2--1).

Three initial members, representing the local governments of Lane County and the Cities of Eugene and Springfield were appointed to the committee by their respective Boards and City Councils. (Because particulate matter control strategies and the next SIP revision must be adopted in legally enforceable terms, participation by elected officials from local governments becomes increasingly important. Elected officials on the Citizen's Advisory Committee and the Lane Regional Air Pollution Authority Board of Directors will continue to provide the general input in the SIP revision process and it is recognized that adoption of control strategies, in the end, should be accompanied by the concurrence of local governments who will like to play a role in implementing some of the chosen strategies.) The three began meeting in early 1978 to fill the remaining positions on the committee. When completed, the full 25-member committee included representatives from such entities as the above-mentioned local and state government agencies, the wood products, utility/chemical/metal and aggregate and paving industries, labor, agriculture, the local fire chief's association, chamber of commerce, the League of Woemn Voters, the Oregon Department of Forestry, the Oregon Lung Association, the University of Oregon and a local clean air committee. Final committee membership was approved in the form of a joint resolution (Appendix 4.6.10.2--1) signed by the mayors of Eugene and Springfield, the chairman of the Lane County Board of Commissioners and a representative of the Director of the Oregon Department of Environmental Quality.

4.6.10.3 Intergovernmental Consultation

Intergovernmental consultation was very much a part of the selection of the remainder of the Citizen's Advisory Committee by the representatives of the three local governments. Each government entity agreed on the makeup of the full committee.

All committee meetings were open to the public and advertised prior to the meeting date.

Finally, a public hearing on the proposed SIP, preceded by required public notice, was conducted by the LRAPA Board of Directors and the Environmental Quality Commission prior to adoption. Opportunities were provided for subsequent comment, as necessary.

4.6.11 Public Notice and Hearings

4.6.11.1 Public Notice

Federal requirements include public hearings and opportunity for public comment prior to adoption. Notice was published by prominent advertisement in the Eugene Register-Guard on September 24, 1980 and October 8, 1980; and notices were filed with regional and state A-95 clearing houses (see Appendix 4.6.11.1).

4.6.11.2 Media Coverage

The media coverage included public service announcements by radio and several news features on television (see Appendix 4.6.11.2).

4.6.11.3 Public Hearing

A public hearing was held on November 6, 1980, and testimony and comments were received by a number of individuals (see Appendix 4.6.11.3).

STATE OF OREGON

STATE IMPLEMENTATION PLAN

REVISION

EUGENE-SPRINGFIELD AQMA

APPENDICES

Adopted by
Lane Regional Air Pollution Authority
Board of Directors
November 6, 1980

Appendix 4.6.2.3--1

Meteorological Regime Analysis, 1977

RLG File

To: Ralph Johnston
From: RLGay
June 11, 1980

EUGENE - SPRINGFIELD

AIR QUALITY MAINTENANCE AREA

Meteorological Regime Analysis
1977

September, 1978

STATE OF OREGON

ROUTE SLIP

Date 12/19

TO: LDB

FROM: JEC

CHECK ___ Approval ___ Investigate

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY CONTROL DIVISION
P. O. Box 1760
Portland, Oregon 97207

___ Necessary Action	___ Confer
___ Prepare Reply	✓ Per Telephone Conversation
___ For My Signature	___ For Your Information
___ Your Signature	___ As Requested
___ Comment	___ Note and File
___ Initial and Return	___ Return With More Details

COMMENTS: this is sort of an "interim" final report we'll use until you update it.

Eugene - Springfield AQMA
Meteorological Regime Analysis
1977
Table of Contents

Appendices

EUGENE - SPRINGFIELD AQMA
METEOROLOGICAL REGIME ANALYSIS

1.0 Introduction

Control strategy development for the Eugene - Springfield AQMA requires the adaptation of an appropriate airshed model. Because of the complex topography of the AQMA and subsequent need to simulate dispersion, horizontal and vertical winds by non-uniform wind fields, the Department of Environmental Quality (DEQ) has fit a conservation of mass, 2 km Grid Model to the area. Constraints of time and fiscal budgeting required the inputs to the annual model to be constructed in a manner suitable for economic model application.

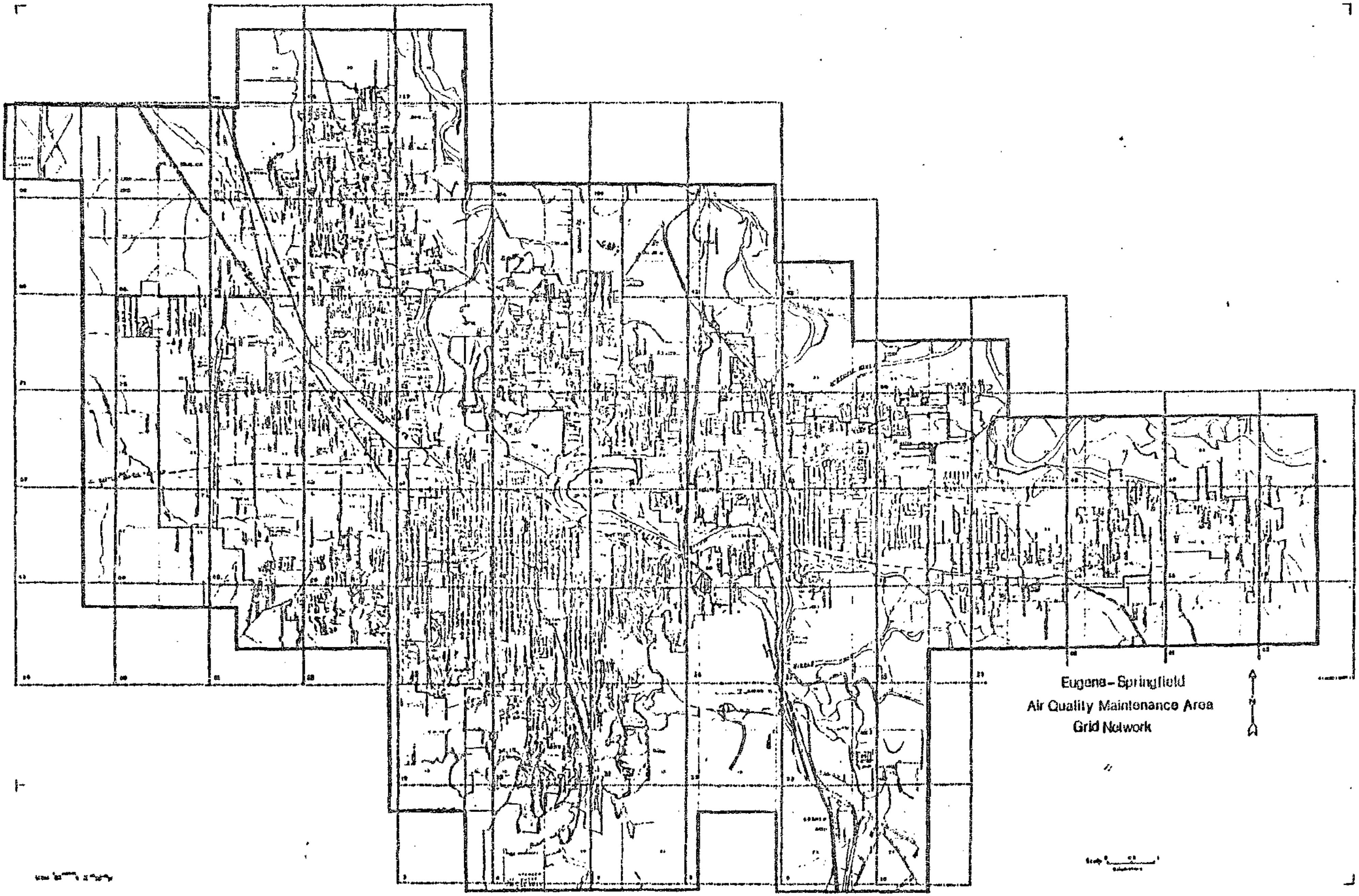
Since an hour-by-hour annual model simulation would be extremely costly, a meteorological classification scheme was devised which would (1) group prevailing meteorological patterns into a small number of classifications (regimes) representative of annual meteorology and (2) hopefully reflect observed air quality within the AQMA. Once wind fields are constructed for each regime and the annual frequency of occurrence is known, an annual airshed simulation can be obtained by simulating each regime and weighting the output in accordance with its frequency of occurrence.

Regime analysis requires a large data base of surface wind observations. During 1977, a field program was undertaken to collect surface meteorological data from several sites to insure that adequate data was available to develop the regimes.

There is no consistant source of upper air data from the Eugene area although an occasional PIBAL is available in the summer. Rawinsondes are taken twice a day by the National Weather Service at Salem. Differences in winds and thermal structures are common between Salem and Eugene, especially in the lower 3 to 4,000 feet. An estimate of the wind and thermal structure near the surface at Eugene was made by using Eugene surface observation to modify the Salem sounding. The degree to which the 1977 meteorology is representative of the "average annual conditions" within the AQMA is critical to interpretation of air quality simulations performed based on 1977 data.

2.0 Regime Analysis Methodology

The regime classification scheme was based on surface meteorological data (wind speed and direction) collected by Lane Regional Air Pollution Authority during 1977 at 5 sites; Westmoreland School, Amazon Park, Oakway Mall, Springfield Library and the Creswell Airport. Data for Westmoreland School, Amazon Park and Creswell were missing much of the time. Eugene and Salem Airport 1977 hourly observations collected by the Nation Weather Service (NWS) as well as Salem NWS upper air soundings (0000 GMT and 1200 GMT) for 1977 were used.


Eugene - Springfield
Air Quality Maintenance Area
Grid Network

Wind speed and directions were plotted for every odd hours (LST) for the five Eugene sites (when available) and Eugene Airport for the 61 Hi-Vol sampling days of 1977. The wind fields were analyzed (with special consideration given Amazon Park and Springfield Library) for any down valley component during relatively low wind days as a sign of drainage flow occurring. Each odd hour of each day was categorized into one of 33 flow types which were determined using the following criteria:

Criteria 1	a general overview of the hourly surface wind flow pattern;
Criteria 2	consideration was given to the direction of the strongest measured wind if it appeared not to be unduly influenced by channeling. Eugene Airport data was most used for this purpose.

The hourly pattern analysis was used as a first level of analysis which was modified by Criteria 2 findings in borderline cases. Since 33 wind flow patterns are too large a number to simulate in the Grid Model, an annual frequency distribution for all the hourly types was developed showing both speed and directional variations. In the process of combining or eliminating hourly wind flow patterns, only the direction and type of flow (up valley, drainage or neither) were used. No speed differentiation was used in determining the hourly wind flow types. At the end of this process there were 13 hourly categories.

Using the 13 hourly regimes, every other hour of the 61 Hi-Vol sampling days were classified into the appropriate class. All odd hours were listed sequentially by day (using the classification code noted in Appendix 1) to assist in the classification process.

Once listed by odd hours, all the days were compared to each other. The days which displayed similar timing and progression of their hourly wind speeds and direction were then grouped together. Finally all the grouped days were reviewed for consistency by actual comparison of the days in each group, on an every other hour basis, with the original plotted and analyzed flow fields.

Once all the 61 days were categorized into groups, a composite was made up of each of the 13 daily flow types with wind speed calculated by actual averaging of the winds for all six data sites, and the flow patterns determined by taking an overview of all the days in a particular category, then hour by hour make a composite by mentally averaging the flow patterns for each hour. Table 1 gives a brief description of each composite regime.

After the composite flow regimes were generated for all 13 daily regimes, all the composite hourly flow patterns were categorized into one of the 13 directional categories as before. (Appendix 5 - A) Then comparing all the hourly patterns of one type, a flow pattern was chosen which best represented that particular group. This flow

TABLE 1
Eugene - Springfield AQMA
Regime Descriptions

Regime Class	Wind Direction & Patterns	Wind Speeds	Mixing Heights	Annual Frequency	Notes
1.	Northerly all day.	Light morning, 5 - 8 mph in afternoon.	300' morning to 3300' afternoon.	18.0%	High pollution potential regime under high pressure.
2.	Light SW in morning; Northerly rest of the day.	Light morning winds; moderate in afternoon.	150' morning to 3400' afternoon.	9.8%	Poor morning mixing -- high pollution potential regime.
3.	Southerly flow in morning and late night, SW rest of the day.	Moderate to strong winds all day.	500' morning to 4300' afternoon.	14.8%	Good ventilation regime typical of low pressure dominance.
4.	Westerly flow all day.	Light morning, moderate in the afternoon.	200' morning to 4400' afternoon.	6.6%	
5.	Southeast to SW flow all day.	Light morning and moderate afternoon.	150' morning to 2850' afternoon.	9.8%	
6.	SE to S in morning, Northerly rest of day.	Light morning, moderate afternoon.	300' morning to 4000' afternoon.	6.6%	
7.	Northerly all day swifting to SW in evening.	Light all day.	300' to 1650' mixing.	6.6%	
8.	SW in the morning to W in afternoon.	Moderate winds most of the day.	250' morning to 3150' afternoon.	6.6%	
9.	Drainage winds morning Northerly midday to S at night.	Very light to calm morning to moderate in afternoon.	Poor mixing most of the day. 150 to 1200'	3.3%	High pollution potential -- winter months.
10.	Easterly flow all day.	Light morning and evening.	Low mixing, 150' to 1150' afternoon.	3.3%	
11.	South to northerly in AM and PM, Westerly in evening.	Light morning and moderate afternoon.	Very good afternoon, mixing to 3800'.	3.3%	
12.	Southeast to southwest thru the day.	Light morning and moderate afternoon.	Good afternoon, mixing to 4400'.	6.6%	
13.	Southeasterly flow all day.	Moderate to light winds all day.	650' morning to 2000' afternoon.	4.9%	

pattern was then converted to vectors for all 126 grid squares. This was then repeated for the other 12 hourly flow regimes. A table containing all the daily flow regimes was then set up with each hour given a generalized hourly flow type (one of the 13 that had been transformed to vector notation). Also included in this table were places for the hourly differentiation of wind speed (via use of a multiplier), average mixing heights, and stability classes.

A multiplier is a non-negative number used to change the speed of a particular standard wind field so that the wind speeds of a particular flow regime can be varied on an hour-by-hour basis. They were used for both surface winds (varying every other hour) and upper level winds (varying every 12 hours).

This table has been subsequently modified by combining the hourly mixing heights with the hourly stability indexes to get the hourly stability classification for levels 1 - 5 (see Appendix 4 and 4-B).

This classification can change from hour to hour. This change was made to put the two former categories into a classification which is more readily usable for Grid Model input.

2.1 Mixing Height and Stability Index Development

The mixing heights for each odd hour of the 13 composite daily regimes were determined by analyzing the Salem sounding on the days involved in each daily category. Salem hourly data was also compared to Eugene hourly data to see if the days matched in temperatures and weather types to assess the degree of validity in using the Salem sounding to represent the Eugene area. Using the 1200 GMT sounding for the morning hours and the 0000 GMT sounding for afternoon hours, and with some degree of interpolation for the hours in between, the mixing heights were determined as follows: the hourly temperature was moved up the dry adiabat line in unsaturated conditions and the moist adiabat in saturated conditions until reaching the sounding curve, then across horizontally on the pseudo-adiabatic chart and interpolated at that height as the top of the mixed layer or mixing height. Then for each of the 13 daily flow regimes, the mixing heights were averaged for each hour and this value was inserted in the table. (Appendix 7)

The stability indexes were determined using Eugene's hourly observations criteria originally set up by Dr. F. Pasquill of the British Meteorological Office modified by D. Bruce Turner as printed in the Journal of Applied Meteorology, February 1964. The stability classes are based on percent cloud cover, wind speed and incoming solar radiation. Having determined the classification for all the odd hours of the 61 sampling days, stability classes were averaged hour by hour according to their daily regime group and placed in the table. (Appendix 8)

2.2 Upper Air Analysis

For determination of the upper level air flow, the Salem sounding data of upper level winds up to 3000 feet was used. All the sounding for the days in each daily regime were reviewed and their directions averaged in both height (for levels 2 - 5) and time (AM from 1200 GMT sounding and PM from 0000 GMT sounding with AM to cover hours 1 - 11 and PM to cover hours 13 → 23). From this data it was determined that there were six basic flow directions for levels 2 - 5, which can change from level to level or AM to PM.

When converting the upper level fields into vector form, each level was assigned an arbitrary wind speed (2.5 mps for level 2, 5.0 mps for level 3 and 7.5 mps for levels 4 & 5). The reasoning for this increase of wind speed with height is from 1) general observation of the soundings, and 2) the knowledge that as one gets further away from frictional effects wind speeds increase. This was done to control the maximum wind speeds at the top of the Grid Model. If the power law relationship were used (basically an extrapolation upwards of surface winds and stability), as WEST does, there would be no control of upper level wind speeds which are not always related to the surface winds. note

? The numerical value given each layer appears to be a good median value that could be later modified if necessary by use of a multiplier. Next the wind speed observed in the neighborhood of level 5 (about 2500 ft) were averaged according to their daily flow regime to obtain two maximum upper level wind for that regime day (AM and PM) and then that speed was reduced downward according to the 7.5 - 5.0 - 3.5 ratio for the other layers 2 - 4. Thus there are two multipliers used; one for AM and the other for PM (Appendix 6).

3.0 Wind Field Development

Following development of the regime classification system, surface and upper air wind field vectors were constructed using the WEST[1] (Winds Extrapolated from Stability and Terrian) wind field model. WEST employs meteorological and topographical data to develop non-divergent wind fields consistent with observed winds, stability and regional terrain. The code requires the imput of terrain conditions and observed wind flow to predict wind vectors in each of the grid cells.

Surface and upper air observations for each regime classification were coded for WEST input, and the plot output checked for validity. Example wind field for the surface grid are found in Appendix 10.

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[1] Environmental Research Associates, 1978 "Users Guide to WEST",

During the model calibration phase, each regime wind field is simulated using particulate emission suitable for the associated regime and checked against observed particulate air quality stratified by regime.

4.0 AQMA Particulate Air Quality by Regime

A regime classification scheme which can be considered reflective of the airshed meteorology should be indicative of the observed particulate air quality. The data shown in detail in Appendix 9 is summarized below for Eugene and Springfield Air Quality by regime class.

TABLE 2
Average Regime Particulate Air Quality
by Regime (1977)

Regime	Springfield Library	Eugene Commerce Bldg.	No. Samples > 150 ug/m^3
1	103.6(11)*	92.5(11)	3
2	114.7(6)	109.8(6)	2
3	43.3(9)	32.3(9)	0
4	87.3(4)	97.0(3)	0
5	53.7(6)	57.0(3)	0
6	91.8(4)	71.0(3)	0
7	95.3(3)	72.3(3)	0
8	86.8(4)	69.0(4)	0
9	142.0(3)	120.0(2)	1
10	82.5(2)	85.0(2)	0
11	76.5(2)	60.5(2)	0
12	51.3(4)	37.5(4)	0
13	97.0(3)	53.7(3)	1

*( ) number of 24 hour observations included in the Regime tsp average.

Table 2 indicates that during 1977, the highest particulate levels were measured during regime classes 1, 2, 9 and 13, although there are insufficient records to fully characterize type 9 and 13 regimes at this time. Nevertheless, the class 1, 2 and 9 regimes meteorology reflects poor ventilation condition and high pollution potential. The class 13 regime, however, represents southerly flow periods typical of low pressure domination and relatively clean particulate air quality.

5.0 24 Hour Airshed Model Meteorological Inputs

Whereas the annual airshed model requires development of the regime classification scheme to reduce model simulation time to a reasonable level, operation of the same model to develop a 24 hour simulation requires only the direct input of WEST generated wind field based on actual surface and upper air observations for the day being simulated. To construct wind fields for the two days selected (August 11 and January 25, 1977), observed data was used as a basis for the WEST simulation. Special efforts were made during the summer of 1977 to obtain upper air data to support these modeling efforts.

6.0 1977 Meteorological Analysis Relative to the Norm

To determine if 1977 was a normal year, a comparison was made between 1977's monthly and yearly rainfall amounts, days of measurable rainfall, average monthly and yearly temperatures, average monthly and yearly wind speeds, resultant monthly and yearly wind directions to the 10 and 40 year averages in all the categories except the last one.

1977 was slightly wetter than the 40 year mean but it was drier than the last ten year average (1967 - 1976). Its distribution was far from normal with the first six months receiving a below average amount of precipitation (16.00 inches instead of 23.62 inches) and the second half received an amount much in excess of the 40 year average (30.91 inches compared to 20.91 inches). Even though the distribution of the rainfall is abnormal, 1977 did have a normal number of days with measurable precipitation.

1977 was slightly cooler than 40 year average and significantly cooler (about one degree Fahrenheit) than the ten year average. Months of 1977 that are notable exceptions to the 40 year monthly means are: May - 4° F too cold; July - 2° F + too cold, August - 3.5° F too warm; and September - 2.5° F too cold.

The 1977 average wind speeds for individual months were normal when compared to the 40 year mean and only January deviated substantially (5.8 mph instead of 8.3 mph).

Although the comparison of resultant wind directions is of somewhat dubious value, 1977 resultant wind pattern does generally follow the typical S(winter) - SW(spring) - NW(summer) - SW(fall) regime. The minor exceptions on a monthly basis were: January (more easterly than usual); April (westerly instead of SSW); May (more southerly than usual); June and July (more northerly than usual) and August (southwesterly instead of northwesterly).

Normal or usual is being defined in this paper to mean a range of values not too far removed from the mean value, for the time frame considered, such that the general trend of the mean is preserved. But one must bear in mind that there is no absolutly average year, all years in some manner, produce an exception to the mean. 1977 was no different and should be considered a normal year with the possible exception being the abnormally low rainfall amounts in the first half of the year. + abnormally high in second half

Appendix 1
Regime Classifications for 1977

KEY TO WIND FIELD CATEGORIZATION

DIRECTIONS		SPEEDS
1 - SE	5 - NW	A - Light
2 - S	6 - N	B - Light to Moderate
3 - SW	7 - NE	C - Moderate to Light
4 - W	8 - E	D - Moderate
		E - Strong to Light
		F - Strong to Moderate

SPECIAL CHARACTERISTICS

LV	Denotes	Light and Variable Winds
-	Denotes	Drainage Flow
+	Denotes	Up Valley Flow
W	Denotes	A Weakening of Wind Speeds Near Orographic Obstructions
o	Denotes	Up Valley Calm
PB	Denotes	A Problem with the Data (Example: Two adjacent wind sites 180° out of phase)
M	Denotes	Insufficient DAta with Two or Less Data Sites Available

Light	Ranges	From 0 - 2.7 mps
Moderate	Ranges	From 2.8 - 4.7 mps
Strong	Ranges	From 4.8 mps and greater

Note: When speed are given as a range (ex. MODERATE TO LIGHT), 1st term pertains to Valley Center Winds and the 2nd term applies to Up Valley Winds. M = Missing Data; Pb = Inconsistent Data.

Appendix 1 - A

Wind Speed and Direction Categorization of the 61 LRAPA Sampling Days by hour

DATE		HOUR 1	3	5	7	9	11	13	15	17	19	21	23	DAILY REGIME NO.
Jan	1	M-	M-	M-	M	M	M-	M	M	M+	M+	M	M	2
	7	3A-	3A-	3A-	Calm	Calm	6A-	6A-	6A-	6A-	5A+	Calm	-	2
	13	1C-	1C-	1C-	1C-	1C-	1C-	1C+	1C+	1C+	1C°	1C-	1C-	13
	19	4A-	-	2A°	2A°	1C°	7C	6D	6D	6A	3A	1A	2A	9
	25	Calm	Calm	6C°	6C°	1A°	6E	6E	6E	6E+	6C	6A	6A	1
	31	1C-	1C-	1C-	1C-	1A-	1C-	2C	2C	3A+	1C	1C	1A	13
Feb	6	7A-	5A-	5A-	7A-	6A°	5A+	6B+	6B+	3A+	3A	3A-	-	7
	12	2A-	1C-	1C-	1D	1A	2D+	2D+	3D+	4A+	2A°	3A-	3A-	5
	18	-	5A-	-	Calm	Calm	6A+	7A+	5A+	7A+	2A°	3A°	1A°	9
	24	2F	2C	2C	3C	2E	2C	3D	3C	3C	2A	1A°	2A°	3
Mar	2	M	M	M	M	M	M	M	M	M	M	M	M	3*
	8	M-	M-	M-	M-	M	M	M	M	M	M+	M	M-	3*
	14	3A-	1A-	1A-	1A-	1C	2C	2C	2C+	3C	3A+	5A	1C-	5
	20	3A-	3A-	8A-	1A-	1C	1A	1A	5A+	6A+	6A+	5A+	1C+	6
	26	2A	2C	1A	1A	1C	3C	3D	3C+	3C+	3C+	3C+	3C+	5
April	1	3A+	3C+	3C+	3C+	3C+	4D+	5C+	5F+	5D+	5C+	4C+	4A+	4
	7	3A-	2C-	3C+	3C	4C+	3C+	3C+	4D+	5D	5C	6A	3A	8
	13	2C+	4C+	1A	3C-	5C+	4C+	5D+	4D+	5D+	5D+	5C+	5A+	4
	19	6A+	5C+	7A-	6A-	6C-	5C+	5C+	6D	6D-	6C	5A+	6D-	1
	25	2A	1A	1A	1A	8C-	5B+	2C-	8C-	8C-	1C	1A	1C	10
May	1	LV-	6a-	3A-	2A-	1A	2C+	2C	4C+	3C+	3A+	1C-	1A-	5
	7	8A+	8A	8A	1A-	PB+	4B+	5C+	3D+	3C+	2C+	1A+	3A+	12
	13	6A-	PB-	PB-	3A-	3A+	5A+	5C+	4C+	4C+	4C+	4C+	4A+	4
	19	1A-	2A-	2A-	2A-	3A-	6A+	7A+	5A+	7C+	7C+	7A+	1A-	11
	25	2A-	1A-	2A-	-	1D	PB	2C	3C	4B+	2C+	1C+	1A+	3
	31	2A-	1A-	1A-	-	1A	PB	4C	3C	4B+	4C+	3C+	3C+	12
June	6	3A-	PB	PB-	2A-	3A+	4A+	5B+	6B+	7D+	7D+	3A+	4A	11
	12	-	-	3A+	PB	5A+	5A+	6C+	6C+	7C+	7C+	6C+	PB+	2
	18	3C+	3C+	3C-	3C°	5A+	5A+	5B+	3A+	3A+	3A+	3A+	3A+	8
	24	5A+	1A-	3A+	1A+	-	5A+	6C+	6C+	6C+	6D+	7C+	7C-	2
	30	6C+	6C+	6C+	6C+	6C+	6C+	6C+	6C+	6C+	6C+	4A+	3D-	1
July	6	3A+	3A+	PB+	5C+	5D+	6D+	6D+	6D+	6D+	6D+	6A	PB-	2
	12	4B+	4B+	6A	7A+	5C+	5B+	5C+	6C+	6C+	6C+	PB	6A+	1
	18	6A+	1A-	PB-	6C-	6C+	6C+	6C+	5C+	6A+	6C+	PB	5A+	1
	24	-	1A-	1A	1A-	5A+	7A+	PB+	3F+	3F+	3C+	3C+	2C+	8
	30	6D-	6D-	-	7D	7C+	6D+	6D+	7D+	6D+	6C+	6A+	6A+	1

Appendix 1 - A (cont.)

DATE		HOUR 1	3	5	7	9	11	13	15	17	19	21	23	DAILY REGIME NO.
Aug	5	$3C^{+}$	$3C^{+}$	$4C^{+}$	$3A^{+}$	$3A^{+}$	$5A^{+}$	6D	$5D^{+}$	$5C^{+}$	$5D^{+}$	$4C^{+}$	$3C^{+}$	8
	11	6C	-	-	-	$6C^{+}$	$5D^{+}$	$5D^{+}$	$5D^{+}$	$6F^{+}$	$6C^{+}$	$5C^{+}$	$5A^{-}$	1
	17	$3A^{-}$	$3A^{-}$	$2A^{-}$	$2D^{-}$	$4C^{+}$	$4D^{+}$	$4D^{+}$	$4F^{+}$	$4D^{+}$	$4C^{+}$	$3C^{+}$	$3C^{+}$	4
	23	$1A^{-}$	$1A^{-}$	$2A^{-}$	$2C^{-}$	$1A^{-}$	$3A^{+}$	$4C^{+}$	$4D^{+}$	$4D^{+}$	$6D^{+}$	$6C^{+}$	$5A^{+}$	6
	29	$3C^{+}$	$4C^{+}$	$3C^{+}$	$3C^{+}$	$3D^{+}$	$3D^{+}$	$3D^{+}$	$3D^{+}$	$3F^{+}$	$3F^{+}$	$3C^{+}$	$3C^{+}$	3
Sept	4	2C	2C	1C	1C	2C	$3D^{+}$	$4D^{+}$	$4C^{+}$	$4C^{+}$	$4C^{+}$	$5A^{+}$	$6A^{+}$	12
	10	$5A^{o}$	-	$4A^{-}$	-	$4A^{-}$	$6C^{+}$	6D	6D	6C	5C	M	Calm	2
	16	1C	1A	1C	2A	1A	2C	$3C^{+}$	$4D^{+}$	$5C^{+}$	$4A^{+}$	$2A^{-}$	$1A^{-}$	12
	21	$1A^{-}$	$2A^{-}$	$1A^{-}$	$3A^{-}$	$3A^{-}$	$6A^{+}$	$5C^{+}$	$5C^{+}$	5C	$6C^{+}$	$5A^{+}$	$3A^{+}$	6
	28	$5A^{+}$	$5A^{+}$	$5A^{+}$	$5A^{+}$	$5A^{+}$	$5C^{+}$	$6C^{+}$	$6A^{+}$	PB	PB	2A	$1A^{-}$	7
Oct	4	$6A^{-}$	PB	$6A^{-}$	$6A^{-}$	$6C^{o}$	6C	6C	6C	6C	5A	$3A^{o}$	$3A^{+}$	1
	10	1A	-	3A	-	PB	PB	$6C^{-}$	$6C^{-}$	$6C^{-}$	$5C^{-}$	6A	1A	6
	14	$6A^{-}$	$6A^{-}$	$6A^{-}$	$6A^{-}$	$6A^{-}$	LV	5A	$6A^{+}$	$7A^{+}$	$3A^{+}$	$3A^{-}$	$2A^{-}$	7
	22	$5A^{-}$	$3A^{-}$	$2C^{-}$	2A	2A	$1C^{-}$	$1C^{-}$	$2C^{-}$	$3A^{-}$	$3B^{-}$	$1C^{-}$	$1C^{-}$	5
	28	$3A^{-}$	$2A^{-}$	$1C^{-}$	$8B^{-}$	$8B^{-}$	$8B^{-}$	$8A^{-}$	$8A^{-}$	$1A^{-}$	3D	3C	1A	10
Nov	3	$7C^{-}$	$7C^{-}$	$6C^{+}$	$7A^{+}$	$6A^{+}$	$3A^{+}$	$3C^{+}$	2A	$1A^{-}$	$1\bar{C}$	$1\bar{C}$	$2\bar{A}$	7
	9	2C–	2C–	2C–	2C–	2C–	1D	1C	1C	1C	1A	1A	1A	13
	15	2C	2C	2C	2C	3D	$3C^{+}$	$3C^{+}$	$3C^{+}$	$4A^{+}$	$3A^{+}$	$2A^{+}$	$2A^{-}$	3
	21	M	M	M	M	M	M	M	M	M	M	M	M	1*
	27	M	M	M	M	M	M	M	M	M	M	M	M	3*
Dec	3	2D	2C	2C	$3B^{+}$	$3C^{+}$	$3C^{+}$	$3B^{+}$	$3C^{+}$	$3C^{+}$	$3A^{+}$	3C	3C	3
	9	$7A^{-}$	$3A^{-}$	$1A^{-}$	3C	2C	2C	3A	1A	2DW	2DW	2DW	2DW	5
	15	2DW	2F	$3F^{+}$	$3F^{+}$	$3F^{+}$	$3F^{+}$	$3F^{+}$	$3D^{+}$	$3B^{+}$	$2D^{+}$	2DW	2C	3
	21	$6A^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6A^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$7A^{+}$	$7A^{+}$	$6C^{+}$	1
	27	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6A^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$7A^{+}$	$6A^{+}$	$6C^{+}$	$6C^{+}$	1

* Based on limited data

Appendix 1 - B

The re-grouping of the 61 LRAPA sampling days by daily flow regimes to come up with each regimes composite flow pattern

Regime	1	1	3	5	7	9	11	13	15	17	19	21	23
Jan	25	Calm	Calm	$6C^{\circ}$	$6C^{\circ}$	$1A^{\circ}$	6E	6E	6E	6E	6C	6A	6A
April	19	$6A^{+}$	$5C^{+}$	$7A^{-}$	$6A^{-}$	$6C^{+}$	$5C^{+}$	$5C^{+}$	6D	6D	6C	$5A^{+}$	$6D^{-}$
June	30	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$4A^{+}$	$3D^{-}$
July	12	$4B^{+}$	$4B^{+}$	$6A^{+}$	$7A^{+}$	$5C^{+}$	$5B^{+}$	$5C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	PB	$6A^{-}$
	18	$6A^{+}$	$1A^{=}$	PB	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$5C^{+}$	$6A^{+}$	$6C^{+}$	PB	$5A^{+}$
	30	$6D^{-}$	$6D^{-}$	-	$7D^{-}$	$7C^{+}$	$6D^{+}$	$6D^{+}$	$7D^{+}$	$6D^{+}$	$6C^{+}$	$6A^{+}$	$6A^{+}$
Aug	11	6C	-	-	-	$6C^{+}$	$5D^{+}$	$5D^{+}$	$5D^{+}$	$6F^{+}$	$6C^{+}$	$5C^{+}$	$6A^{-}$
Oct	4	$6A^{-}$	PB	$6A^{-}$	$6A^{-}$	$6C^{\circ}$	6C	6C	6C	6C	5A	$3A^{\circ}$	$3A^{+}$
Nov	21	M	M	M	M	M	M	M	M	M	M	M	M
Dec	21	$6A^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6A^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$7A^{+}$	$7A^{+}$	$6C^{+}$
	27	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$6A^{+}$	$6C^{+}$	$6C^{+}$	$6C^{+}$	$7A^{+}$	$6A^{+}$	$6C^{+}$	$6C^{+}$
COMPOSITE		5-6	6	6	6	6	6	6	6	6	6	5-6	6

Regime	2	1	3	5	7	9	11	13	15	17	19	21	23
Jan	1	M	M	M	M	M	M	M	M	M	M	M	M
	7	$3A^{-}$	$3A^{-}$	$3A^{-}$	Calm	Calm	$6A^{-}$	6A	6A	$6A^{+}$	$5A^{+}$	Calm	-
June	12	-	-	$3A^{-}$	PB	$5A^{+}$	$5A^{+}$	$6C^{+}$	$6C^{+}$	$7C^{+}$	$7C^{+}$	$6C^{+}$	PB
	24	$5A^{+}$	$1A^{-}$	$3A^{-}$	$1A^{-}$	-	$5A^{+}$	6C	6C	6C	$6D^{+}$	7C	7C
July	6	$3A^{+}$	$3A^{+}$	PB	5C	$5D^{+}$	$6D^{+}$	$6D^{+}$	$6D^{+}$	$6D^{+}$	$6D^{+}$	6A	PB
Sept	10	$5A^{\circ}$	-	$4A^{-}$	-	$4A^{-}$	$6C^{+}$	6D	6D	6C	5C	M	Calm
COMPOSITE		3	3	3	?	5	6	6	6	6	6	6	?

Appendix 1. - B (cont).

Regime	3	1	3	5	7	9	11	13	15	17	19	21	23
Feb	24	2F	2C	2C	3C	2E	2C	3D	3C	3C	2A	1A$^{\circ}$	2A$^{\circ}$
March	2	M	M	M	M	M	M	M	M	M	M	M	M
	8	M	M	M	M	M	M	M	M	M	M	M	M
May	25	2A	1A^{-}	2A^{-}	-	1D^{-}	PB	2C	3C	4B	2C	1C	1A
Aug	29	3C^{+}	4C^{+}	3C^{+}	3C^{+}	3D^{+}	3D^{+}	3D^{+}	3D^{+}	3F^{+}	3F^{+}	3C^{+}	3C^{+}
Nov	15	2C	2C	2C	2C	3D	3C^{+}	3C^{+}	3C^{+}	4A^{+}	3A^{+}	2A^{+}	2A^{-}
	27	M	M	M	M	M	M	M	M	M	M	M	M
Dec	3	2D	2C	2C	3B^{+}	3C^{+}	3C^{+}	3B^{+}	3C^{+}	3C^{+}	3A^{+}	3C	3C
	15	2Dw	2F	3F^{+}	3F^{+}	3F^{+}	3F^{+}	3F^{+}	3D^{+}	3B^{+}	2D^{+}	2Dw	2C
COMPOSITE		2	2	2	3	3	3	3	3	3	3	2	2

Regime	4	1	3	5	7	9	11	13	15	17	19	21	23
April	1	3A^{+}	3C^{+}	3C^{+}	3C^{+}	3C^{+}	4D^{+}	5C^{+}	5F^{+}	5D^{+}	5C^{+}	4C^{+}	4A^{+}
	13	2C	4C	1A	3C	5C^{+}	4C^{+}	5D^{+}	4D^{+}	5D^{+}	5D^{+}	5C^{+}	5A^{+}
May	13	6A^{+}	PB	PB	3A^{-}	3A^{+}	5A^{+}	5C^{+}	4C^{+}	4C^{+}	4C^{+}	4C^{+}	4A^{+}
Aug	17	3A^{-}	3A^{-}	2A^{-}	2D^{-}	4C^{+}	4D^{+}	4D^{+}	4F^{+}	4D^{+}	4C^{+}	3C^{+}	3C^{+}
COMPOSITE		3	3	2	3	3	4	5	4	4	4	4	4

Regime	5	1	3	5	7	9	11	13	15	17	19	21	23
Feb	12	2A^{-}	1C^{-}	1C^{-}	1D	1A	2D	2D	3D	4A	2A$^{\circ}$	3A^{-}	3A^{-}
March	14	3A^{-}	1A^{-}	1A^{-}	1A^{-}	1C	2C	2C	2C	3C	3A^{+}	5A	1C^{-}
	26	2A	2C	1A	1A	1C	3C	3D	3C^{+}	3C^{+}	3C^{+}	3C^{+}	3C^{+}
May	1	LV^{-}	6A^{-}	3A^{-}	2A^{-}	1A	2C	2C	4C^{+}	3C	3A	1C	1A
Oct	22	5A^{-}	3A^{-}	2C^{-}	2A	2A	1C^{-}	1C^{-}	2C^{-}	3A^{-}	3B^{-}	1C^{-}	1C^{-}
Dec	9	7A^{-}	3A^{-}	1A^{-}	3C	2B	2C	3A	1A	2Dw	2Dw	2Dw	2Dw
COMPOSITE		3	3	1	1	1	2	2	3	3	3	3	1

Appendix 1 - B (cont.)

Regime	6	1	3	5	7	9	11	13	15	17	19	21	23
March	20	$3A^-$	$3A^-$	$8A^-$	$1A^-$	1C	1A	1A	$5A^+$	$6A^+$	$6A^+$	5A	1C
Aug	23	$1A^-$	$1A^-$	$2A^-$	$2C^-$	$1A^-$	$3A^+$	$4C^+$	$4D^+$	$4D^+$	$6D^+$	$6C^+$	$5A^+$
Sept	21	$1A^-$	$2A^-$	$1A^-$	$3A^-$	$3A^-$	$6A^+$	5C	5C	5C	$6C^+$	$5A^+$	$3A^+$
Oct	10	1A	-	3A	-	PB	PB	$6C^-$	$6C^-$	$6C^-$	$5C^-$	6A	1A
COMPOSITE		1	2	1	2	1-2	3	4-5	5	5	6	6	1

Regime	7	1	3	5	7	9	11	13	15	17	19	21	23
Feb	6	$7A^-$	$5A^-$	$5A^-$	$7A^-$	$6A^{\circ}$	$5A^+$	$6B^+$	$6B^+$	$3A^+$	3A	$3A^-$	-
Sept	28	$5A^+$	$5A^+$	$5A^+$	$5A^+$	$5A^+$	$5C^+$	$6C^+$	$6A^+$	PB	PB	2A	$1A^-$
Oct	14	6A	$6A^-$	$6A^-$	$6A^-$	$6A^-$	LV	5A	$6A^+$	$7A^+$	$3A^+$	$3A^-$	$2A^-$
Nov	3	$7C^-$	$7C^-$	$6C^+$	$7A^+$	$6A^+$	$3A^+$	$3C^+$	2A	$1A^-$	$1C^-$	$1C^-$	$2A^-$
COMPOSITE		6	6	6	6	6	5	6	6	3	3	3	2

Regime	8	1	3	5	7	9	11	13	15	17	19	21	23
April	7	$3A^-$	$2C^-$	$3C^+$	3C	$4C^+$	$3C^+$	$3C^+$	$4D^+$	5D	5C	6A	3A
June	18	$3C^+$	$3C^+$	$3C^+$	$3C^{\circ+}$	$5A^+$	$5A^+$	$5B^+$	$3A^+$	$3a^+$	$3A^+$	$3A^+$	$3A^+$
July	24	-	$1A^-$	$1A^-$	$1A^-$	$5A^+$	$7A^+$	6B	$3F^+$	$3F^+$	$3C^+$	$3C^+$	$3C^+$
Aug	5	$3C^+$	$3C^+$	$4C^+$	$3A^+$	$3A^+$	$5A^+$	6D	$5D^+$	$5C^+$	$5D^+$	$4C^+$	$3C^+$
COMPOSITE		3	3	3	3	4	5	6	4	4	4	4	3

Regime	9	1	3	5	7	9	11	13	15	17	19	21	23
Jan	19	$4A^-$	-	$2A^-$	$2A^-$	$1C^-$	7C	$6D^+$	$6D^+$	$6A^+$	$3A^{\circ}$	$1A^-$	2A
Feb	18	-	$5A^-$	-	Calm	Calm	$6A^+$	$7A^+$	$5A^+$	$7A^+$	$2A^{\circ}$	$3A^-$	$1A^-$
COMPOSITE		4	5	2	2	1	7	7	6	7	2	2	1

Appendix 1 - B (cont.)

Regime	10	1	3	5	7	9	11	13	15	17	19	21	23
April	25	2A	1A$^-$	1A$^-$	1A$^-$	8C$^-$	5B$^+$	2C$^-$	8C$^-$	8C$^-$	1C	1A	1C
Oct	28	3A$^-$	2A$^-$	1C	8B$^-$	8B$^-$	8B$^-$	8A$^-$	8A$^-$	1A$^-$	3D	3C	1A
COMPOSITE		3	2	1	1	8	8	1	8	1	2	4	1

Regime	11	1	3	5	7	9	11	13	15	17	19	21	23
May	19	1A$^-$	2A$^-$	2A$^-$	2A$^-$	3A$^-$	6A$^+$	7A$^+$	5A$^+$	7C$^+$	7C$^+$	7A$^+$	1A$^-$
June	6	3A$^-$	PB	- PB	2A$^-$	3A$^+$	4A$^+$	5B	6B	7D	7D	3A$^+$	4A
COMPOSITE		2	2	2	2	3	5	6	5	7	7	5	?

Regime	12	1	3	5	7	9	11	13	15	17	19	21	23
May	7	8A$^-$	8A$^-$	8A$^-$	1A	PB	4B$^+$	5C	3D$^+$	3C$^+$	2C$^+$	1A$^-$	3A$^-$
	31	2A$^-$	1A$^-$	1A$^-$	-	1A	PB	4C	3C	4B$^+$	4C$^+$	3C$^+$	3C$^+$
Sept	4	2C	2C	1C	1C	2C	3D$^+$	4D$^+$	4D$^+$	4C$^+$	4C$^+$	5A$^+$	6A$^+$
	16	1C	1A	1C	2A	1A	2C	3C$^+$	4D$^+$	5C$^+$	4A$^+$	2A$^-$	1A$^-$
COMPOSITE		1	1	1	1	1	3	4	3	4	4	2	3

Regime	13	1	3	5	7	9	11	13	15	17	19	21	23
Jan	13	1C$^-$	1C$^-$	1C$^-$	1C$^-$	1C$^-$	1C$^-$	1C$^-$	1C$^-$	1C$^-$	1C$^-$	1C$^-$	1C$^-$
	31	1C$^-$	1C$^-$	1C$^-$	1C$^-$	1A$^-$	1C$^-$	2C	2C	3A$^+$	1C	1C	1A
Nov	9	2C$^-$	2C$^-$	2C$^-$	2C$^-$	2C$^-$	1D	1C	1C	1C	1A	1A	1A
COMPOSITE		1	1	1	1	1	1	1	1	1	1	1	1

Appendix 2
SPEED AND DIRECTION FREQUENCIES FOR 57 of the 61 HV SAMPLING DAYS

DIRECTION

Wind Speed Class	1	2	3	4	5	6	7	8	TOTAL	
A	22	13	5	1	4	7	1	0	53	)
A^+	0	1	23	7	25	20	10	0	86	)
A^-	32	18	26	3	5	12	4	6	106	) 256
A^o	2	3	2	0	1	1	0	0	9	)
A^2	1	0	1	0	0	0	0	0	2	)
B	0	1	0	1	1	2	0	0	5	)
B^+	0	0	3	5	3	2	0	0	13	) 22
B^-	0	0	1	0	0	0	0	3	4	)
C	14	25	12	3	7	10	3	0	74	)
C^+	0	2	40	16	13	46	5	0	122	) 247
C^-	28	10	0	0	1	3	2	3	47	)
C^o	0	0	1	0	0	3	0	0	4	)
D	2	3	5	0	1	6	2	0	19	)
D^+	0	1	7	11	10	11	1	0	41	) 73
D^-	1	1	1	0	0	3	1	0	7	)
Dw	0	6	0	0	0	0	0	0	6	)
E	0	1	0	0	0	4	0	0	5	)
E^+	0	0	0	0	0	0	0	0	0	) 5
E^-	0	0	0	0	0	0	0	0	0	)
F	0	2	0	0	0	0	0	0	2	)
F^+	0	0	9	1	1	1	0	0	12	) 14
F^-	0	0	0	0	0	0	0	0	0	)
TOTAL	102	88	135	48	72	131	29	12	617	

Calm — 8

Drainage only — 18

Light & Variable — 1

Light & Variable with Drainage — 1

Plain Hours — 158

Up Valley Hours - 274

Drainage Hours — 164

Appendix 3
Regime Class Descriptions and Days

13 Daily surface flow regimes with a general description of each regime along with the 1977 days that belong to each regime

Regime 1 - Northerly flow all day

1/25	7/18	11/21	
4/19	7/30	12/21	contains 11 days or 18.0% of
6/30	8/11	12/27	61 HV sampling days
7/12	10/4		

Regime 2 - Light SW flow in early morning, northerly flow rest of day

1/1	6/12	7/6	contains 6 days or 9.8% of
1/7	6/24	9/10	61 LRAPA sampling days

Regime 3 - Southerly winds early morning and late at night, SW flow rest of time

2/24	5/25	11/27	
3/2	8/29	12/3*	contains 9 days or 14.8%
3/8	11/15	12/15	*in high mixing height case

Regime 4 - Westerly flow

4/1	5/13	contains 4 days or 6.6%
4/13	8/17	

Regime 5 - SE to S to SW flow progession through the day

2/12	3/26	10/22	contains 6 days or 9.8%
3/14	5/1	12/9	

Regime 6 - SE to S in morning, Northerly rest of day

3/20	9/21	contains 4 days or 6.6%
8/23	10/10	

Regime 7 - Northerly all day until evening when SW dominate

2/6	10/14	contains 4 days or 6.6%
9/28	11/3	

Appendix 3 (cont.)

Regime 8 - SW in morning changing to Westerly in afternoon

4/7	7/24	contains 4 days or 6.6%
6/18	8/5	

Regime 9 - Drainage winds in morning, Northerly flow midday, becoming Southerly at night

1/19	2/18	contains 2 days or 3.3%

Regime 10 - From a generally Easterly direction all day

4/25	10/28	contains 2 days or 3.3%

Regime 11 - S to SW to NW to N back to W flow progression through day

5/19	6/6	contains 2 days or 3.3%

Regime 12 - SE to S to W to SW progession through the day

5/7	9/16	contains 4 days or 6.6%
5/31	9/4	

Regime 13 - SE flow all day

1/13	11/9	contains 3 days or 4.9%
1/31		

Appendix 4

HOURLY REGIME SCHEDULE FOR EACH DAILY FLOW REGIME ALONG EACH HOUR'S STABILITY CLASSIFICATION

DAILY FLOW REGIME NO.	HOUR 1	3	5	7	9	11	13	15	17	19	21	23
1	9 5	8 5	9 1	8 4	9 7	9 3	9 11	9 11	9 11	9 10	10 8	10 5
2	7 2	6 2	6 1	10 1	8 3	9 3	11 3	11 3	11 11	11 12	11 8	11 5
3	4 4-11	4 4-11	5 4-11	5 7-11	5 9-11	5 11-11	5 11-11	7 11-11	5 11-11	5 11-11	5 9-11	2 9-11
4	5 4	2 2	5 1	5 4	7 3	7 11	7 11	7 11	7 11	7 10	7 4	8 5
5	3 2	1 1	1 1	1 4	4 7	4 9	4 11	5 11	5 11	5 11	4 9	1 7
6	1 5	1 5	3 5	3 4	3 3	5 3	7 3	8 11	8 11	9 9	8 8	7 5
7	10 5	10 4	9 4	9 4	9 4	8 7	8 7	9 3	7 9	5 8	6 5	3 5
8	7 5	5 5	2 1	5 4	7 3	9 6	8 6	7 3	7 11	7 9	7 8	5 4
9	13 2	13 1	3 1	3 1	1 1	9 4	11 3	9 3	9 7	3 4	3 5	3 4
10	3 2	3 2	1 1	1 1	12 3	12 3	1 4	12 4	12 7	3 4	3 5	3 2
11	3 2	3 2	3 1	3 3	5 6	8 6	9 6	9 3	9 3	11 12	8 12	7 10
12	1 5	1 5	1 4	1 3	12 6	4 3	7 11	5 3	7 11	7 7	3 4	3 4
13	1 4	1 4	1 4	3 4	1 7	1 7	3 7	1 9	1 9	1 7	1 7	3 5

1st number of each column is the hourly flow regime number, 2nd number is the stability classification number, for daily flow regime No. 3 the first stability classification is the low mixing height case, and the 2nd stability classification is for the high mixing height case.

KEY TO RELABELING HOURLY WIND FIELD CATEGORIES for the Above Table

1 1^-	4 2	7 4^+	10 6^-	13 –
2 2^+	5 3^+	8 5^+	11 6	
3 2^-	6 3^-	9 6^+	12 8^-	

Circled numbers are the new classifications

Appendix 3 A
Regime Class Descriptions and Days

13 Daily surface flow regimes with a general description of each regime along with the 61 Sample days of 1978 that belong to each regime

<u>Regime 1</u> -Northerly flow all day

1/2	6/1	8/6	11/4	contains 17 days or 27.9% of 61 HV sampling days
1/14	6/19	9/5	11/10	
1/26	7/7	9/17		
3/3	7/19	10/5		
5/8	7/31	10/17		

<u>Regime 2</u> -Light SW flow in early morning, northerly flow rest of day

4/8 contains 5 days or 8.2% of 61 LRAPA sampling days
4/14
5/2
6/7
10/11

<u>Regime 3</u> -Southerly winds early morning and late at night, SW flow rest of time

2/1	5/14	12/22	contains 11 days or 18.0% *in high mixing height case
2/7	5/26		
2/25	8/12		
4/20	8/30		
4/26	12/4		

<u>Regime 4</u> -Westerly flow

6/13 contains 1 day or 1.6%

<u>Regime 5</u> -SE to S to SW flow progression through the day

10/29 contains 2 days or 3.3%
12/16

<u>Regime 6</u> -SE to S in morning, Northerly rest of day

3/9 contains 4 days or 6.6%
6/25
8/18
9/11

<u>Regime 7</u> -Northerly all day until evening when SW dominate

7/1 contains 3 days or 4.9%
7/25
9/29

<u>Regime 8</u> -SW in morning changing to Westerly in afternoon

contains 0 days or 0%

<u>Regime 9</u> -Drainage winds in morning, Northerly flow midday, becoming Southerly at night.

2/13 contains 4 days or 6.6%
3/15
7/13
9/23

<u>Regime 10</u> -From a generally Easterly direction all day

11/22 contains 2 days or 3.3%
11/28

<u>Regime 11</u> -S to SW to NW to N back to W flow progression through day

1/8 12/28 contains 6 days or 9.8%
2/19
3/21
3/27
5/20

<u>Regime 12</u> -SE to S to W to SW progression through the day

contains 0 days or 0%

<u>Regime 13</u> -SE flow all day

1/20 12/10 contains 6 days or 9.8%
4/2
8/24
10/23
11/16

Appendix 5 - A
DIRECTION FREQUENCIES FOR COMPOSITE
REGIMES BY HOUR

	DIRECTION								
	1	2	3	4	5	6	7	8	None
+	0	3	22	21	13	26	0	0	0
-	18	23	3	0	0*	5	0	6	2
blank	0*	8	0	0	0	3	0	0	0

Key is in Appendix 1

* originally there was one in starred squares but a blank was changed to 2 blank, and 5 was changed to 6 because one was not enough to form a new category

Appendix 5 - B

KEY TO STABILITY REGIMES

Stability Classification Number	1	2	3	4	5	Mixing HGT to Top of level Named	Stability Index
1	4.5	4	4	4	4	1	4
2	5	4	4	4	4	1	5
3	3	3	4	4	4	2, 3, 4, 5	3
4	4	4.5	4	4	4	2	4
5	5	5	4	4	4	2	5
6	2	2	3	4	4	3, 4, 5	2
7	4	4	4.5	4	4	3	4
8	5	5	5	4	4	3	5
9	4	4	4	4.5	4	4	4
10	5	5	5	5	4	4	5
11	4	4	4	4	4	5	4
12	5	5	5	5	5	5	5

Appendix 5 - C

LEVEL	HGT AT TO OF LEVEL (ft)	RANGE OF EACH LEVEL (ft)
1	170	up to 250
2	500	300 - 700
3	1000	700 - 1400
4	1700	1400 - 2200
5	2500	2300 and above

This table was used to determine what level should be designated as the top of the mixed layer.

Appendix 6
UPPER LEVEL FLOW PATTERN FOR EACH DAILY FLOW REGIME

REGIME	AM (Hours 1-11) Level 2	3	4	5	PM (Hours 13-23) Level 2	3	4	5	Multipliers AM	PM
1	6	7	7	7	6	7	7	7	1.35	1.35
2	5	5	6	7	7	7	7	7	.55	.55
3	3	3	3	3	3	3	3	3	.70	1.90
4	3	4	4	5	4	5	5	5	1.10	.95
5	3	3	3	3	3	3	3	3	.75	1.55
6	3	3	3	3	3	3	3	3	.80	.80
7	7	7	7	7	3	3	3	3	.80	.55
8	7	7	7	7	5	5	5	5	.45	.40
9	7	7	7	7	6	6	7	7	.70	.80
10	3	3	3	3	1	1	3	3	.70	1.65
11	3	3	4	4	5	5	5	5	.35	.45
12	3	3	3	3	3	3	3	3	.90	.80
13	3	3	3	3	3	3	3	3	.35	1.20

Key to Upper Level Flow Types

1 - SE
3 - SW
4 - W
5 - NW
6 - N
7 - NE

Appendix 7

Mixing Height Categorization by Daily Regimes
Average Heights Expressed in Feet to the Nearest 50 Feet

Regime 1:

Date	1	3	5	7	9	11	13	15	17	19	21	23
1/25	150	150	150	300	300	400	1,500	2,000	1,400	800	500	300
4/19	300	300	150	300	2,600	2,600	2,800	4,600	4,200	2,200	800	150
6/30	200	150	150	150	1,600	2,600	3,200	3,200	3,300	3,200	1,400	600
7/12	4,000	4,000	4,000	4,000	4,800	4,800	5,000	5,000	5,000	5,000	1,000	400
7/18	1,000	1,000	800	1,000	2,000	4,000	4,000	5,000	4,600	4,000	3,000	1,000
7/30	200	200	200	400	2,200	3,000	3,800	4,000	4,000	3,600	800	400
8/11	200	200	200	300	800	1,800	3,600	5,000	5,000	1,600	600	200
10/04	200	200	150	150	1,500	1,000	3,300	3,300	1,500	150	150	150
11/21	400	400	400	600	800	1,500	1,800	2,000	2,200	2,000	1,000	1,000
12/21	150	150	150	150	200	800	1,600	1,800	1,800	600	200	200
12/27	150	150	150	150	400	600	800	800	1,000	1,000	700	500
Total	6,950	6,900	6,500	7,500	17,200	23,100	31,400	36,700	34,000	24,150	10,150	4,900
Average	600	600	600	700	1,550	2,100	2,850	3,350	3,100	2,200	900	450
Level	2	2	2	2	4	4	5	5	5	4	3	2

Regime 2:

1/01	150	150	150	150	150	300	300	300	300	300	300	300
1/07	150	150	150	150	200	400	800	1,400	600	400	200	150
6/12	200	200	300	400	1,400	2,000	3,600	3,800	4,000	3,600	1,600	400
6/24	200	150	150	200	800	1,800	4,000	5,000	5,000	5,000	3,000	1,000
7/06	300	200	200	300	2,000	5,000	3,800	4,000	4,000	4,800	800	300
9/10	100	100	150	150	400	2,000	2,400	3,000	3,000	1,000	600	400
Total	1,100	950	1,100	1,350	4,950	11,500	14,900	17,500	16,900	14,100	6,500	2,550
Average	200	150	200	250	600	1,300	2,900	3,450	3,300	2,350	1,100	450
Level	1	1	1	1	2	3	5	5	5	5	3	2

Regime 3:
(low case)

2/24	500	500	500	1,000	2,000	3,000	3,000	4,000	4,000	3,000	1,000	500
3/02	600	600	600	600	1,200	2,000	3,000	4,000	5,000	2,500	2,500	2,500
3/08	800	800	800	1,000	1,500	2,000	2,500	5,000	5,000	4,000	1,000	400
8/29	400	400	400	600	1,200	3,600	4,000	4,000	3,400	3,000	2,000	2,000
5/25	150	150	150	300	800	3,500	5,000	4,200	4,200	3,600	3,200	3,000
Total	2,450	2,450	2,450	3,500	4,900	14,100	17,500	21,200	21,600	16,100	9,700	8,400
Average	500	500	500	700	1,350	2,800	3,500	4,250	4,300	3,200	1,950	1,700
Level	2	2	2	3	4	5	5	5	5	5	4	4

Regime 3:
(high case)

Date	1	3	5	7	9	11	13	15	17	19	21	23
11/15	1,000	1,000	1,000	1,500	3,500	4,000	4,200	4,200	4,200	4,200	4,000	4,000
12/03	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
12/15	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
11/27	4,200	4,200	4,200	4,200	4,400	4,600	4,600	,4800	4,800	4,000	3,000	2,000
Total	15,200	15,200	15,200	15,700	17,900	18,600	18,800	19,000	19,000	18,200	17,000	16,000
Average	3,800	3,800	3,800	3,950	4,500	5,650	4,700	4,750	4,650	4,550	4,250	4,000
Level	5	5	5	5	5	5	5	5	5	5	5	5

Regime 4:

Date	1	3	5	7	9	11	13	15	17	19	21	23
4/01	150	150	150	200	300	2,200	4,000	6,000	6,000	1,000	800	150
4/13	600	400	200	400	2,200	2,800	3,000	3,500	3,300	2,500	600	200
5/13	200	150	150	300	2,500	3,500	4,000	5,000	3,500	2,000	600	600
8/17	200	200	200	400	1,000	2,000	3,200	3,200	1,000	600	400	200
Total	1,150	900	700	1,300	6,000	11,500	14,200	17,700	13,800	6,100	2,400	1,150
Average	300	250	200	350	2,000	3,000	3,550	4,400	3,450	2,050	600	300
Level	2	1	1	2	4	5	5	5	5	4	2	2

Regime 5:

Date	1	3	5	7	9	11	13	15	17	19	21	23
2/12	200	200	400	600	1,500	3,000	5,000	5,000	3,500	3,500	2,000	1,000
3/14	150	150	150	150	150	2,000	2,200	3,000	2,500	2,000	1,200	800
3/16	200	200	200	600	1,800	2,300	2,800	3,700	2,800	2,300	1,800	1,800
5/01	150	150	150	200	600	1,000	5,000	5,000	5,000	5,000	4,600	4,200
10/22	150	150	150	150	150	200	300	300	300	400	500	600
12/09	150	150	150	150	150	150	150	150	150	150	150	150
Total	1,000	1,000	1,200	1,850	4,700	8,650	14,450	17,150	15,250	13,350	10,250	8,550
Average	150	150	200	300	800	1,450	2,550	2,850	2,400	2,250	1,700	1,400
Level	1	1	1	2	3	4	5	5	5	5	4	3

Regime 6:

Date	1	3	5	7	9	11	13	15	17	19	21	23
3/20	150	150	150	200	400	2,500	3,500	5,000	5,000	3,000	1,000	400
8/23	200	200	200	400	2,200	3,600	4,000	4,600	2,800	2,000	1,000	1,000
9/21	600	600	400	400	1,300	3,700	5,000	5,200	4,000	1,000	400	400
10/10	300	300	400	400	400	1,000	1,200	1,300	1,300	400	400	300
Total	1,250	1,250	1,150	1,400	4,300	10,800	13,700	16,100	13,100	6,400	2,800	2,100
Average	300	300	300	350	1,100	2,700	3,450	4,050	3,000	1,600	700	550
Level	2	2	2	2	3	5	5	5	5	3	3	2

Regime 7:

Date	1	3	5	7	9	11	13	15	17	19	21	23
2/06	200	200	200	200	300	500	600	1,000	800	400	200	150
9/28	600	600	400	400	600	1,200	2,200	3,000	3,000	1,200	600	400
10/14	150	150	150	150	400	800	1,000	1,000	1,200	400	150	150
11/03	400	400	400	400	600	600	1,000	1,600	1,600	1,600	1,600	1,000
Total	1,350	1,350	1,150	1,150	2,200	3,100	4,800	6,600	6,600	3,600	2,550	1,700
Average	350	350	300	300	550	800	1,200	1,650	1,650	900	650	450
Level	2	2	2	2	2	3	3	4	4	3	2	2

Regime 8:

4/07	300	300	300	300	300	500	2,500	2,000	2,000	1,800	1,400	1,200
6/18	400	400	200	200	1,000	1,200	2,600	2,500	2,400	2,600	1,800	600
7/24	200	200	200	300	1,800	2,100	3,400	4,000	1,500	400	400	200
8/05	200	200	200	300	800	1,800	3,600	4,000	4,00	1,600	600	200
Total	1,100	1,100	900	1,100	3,900	5,600	12,100	12,600	9,900	6,400	4,200	2,200
Average	300	300	250	300	1,000	1,400	3,050	3,150	2,500	1,600	1,050	550
Level	2	2	1	2	3	4	5	5	5	4	3	2

Regime 9:

1/19	150	150	150	150	300	300	600	900	700	500	300	150
2/18	150	150	150	150	150	300	500	1,500	1,500	500	300	150
Total	300	300	300	300	450	600	1,100	2,400	2,200	1,000	600	300
Average	150	150	150	150	250	300	550	1,200	1,100	500	300	150
Level	1	1	1	1	1	2	2	3	3	2	2	1

Regime 10:

4/25	150	150	150	300	800	1,200	1,000	1,000	2,000	1,000	400	200
10/28	150	150	150	150	150	150	150	150	150	150	200	200
Total	300	300	300	450	950	1,350	1,150	1,150	2,150	1,150	600	400
Average	150	150	150	250	500	700	600	600	1,100	600	300	200
Level	1	1	1	1	2	3	2	2	3	2	2	1

Regime 11:

5/19	150	150	150	300	800	3,500	5,000	4,200	4,200	3,600	3,200	3,000
6/06	200	200	200	400	1,200	2,000	2,600	2,800	2,800	2,800	2,000	600
Total	350	350	350	700	2,000	5,500	7,600	7,000	7,000	6,400	5,200	3,600
Average	200	200	200	200	1,000	2,750	3,800	3,500	3,500	3,200	2,600	1,800
Level	1	1	1	2	3	5	5	5	5	5	5	4

Regime 12:

Date	1	3	5	7	9	11	13	15	17	19	21	23
5/07	150	150	150	300	1,500	4,000	4,500	4,000	3,000	1,000	500	200
5/31	1,500	1,500	1,500	1,500	1,800	1,800	3,000	2,500	2,300	1,200	1,000	1,000
9/04	400	400	400	400	2,000	4,600	4,600	4,000	3,000	2,000	800	600
9/16	400	400	400	400	2,800	5,000	5,700	5,700	5,000	1,000	600	600
Total	2,450	2,450	2,450	26,00	8,100	15,400	17,800	16,200	13,300	5,200	2,900	2,400
Average	600	600	600	650	1,050	3,850	4,450	4,050	3,350	1,300	700	600
Level	2	2	2	3	4	5	5	5	5	3	2	2

Regime 13:

1/13	1,000	1,000	1,000	1,000	1,000	1,200	1,400	3,000	3,000	2,800	1,500	500
1/31	200	200	200	300	500	1,000	1,000	2,500	1,000	500	300	200
11/09	800	800	800	800	800	800	800	600	400	400	400	400
Total	2,000	2,000	2,000	2,100	2,300	3,000	3,200	6,100	4,400	3,700	2,200	1,100
Average	650	650	650	700	750	1,000	1,050	2,050	1,450	1,250	750	350
Level	2	2	2	2	3	3	3	4	4	3	3	2

Appendix 8
Pasquill Stability Indexes
Grouped by the 13 Regime Days

Regime 1:	1	3	5	7	9	11	13	15	17	19	21	23
1/25	5	5	5	5	4	4	4	4	4	5	5	5
4/19	5	5	5	4	4	4	4	4	4	5	5	5
6/30	5	5	4	4	3	3	4	4	3	5	5	5
7/12	5	4	4	4	4	4	4	4	4	5	5	5
7/18	4	4	4	4	4	2	3	3	4	4	4	5
7/30	5	5	5	3	3	3	3	4	4	5	5	5
8/11	5	5	5	2	3	3	3	4	4	5	5	5
10/04	5	5	5	5	4	3	3	4	4	5	5	5
11/21	4	4	4	4	4	4	4	4	4	4	4	4
12/21	5	4	4	4	4	4	4	4	4	5	5	4
12/27	5	4	4	5	4	4	4	4	5	5	4	4
Total	53	50	49	44	41	38	40	43	44	53	52	52
Average	5	5	4	4	4	3	4	4	4	5	5	5

Regime 2:												
1/01	4	4	4	4	4	4	4	4	4	4	4	4
1/07	5	5	5	5	5	4	4	4	5	5	5	5
6/12	4	4	4	4	4	2	3	3	3	5	5	5
6/24	5	5	3	2	2	2	3	2	4	5	5	5
7/06	5	5	5	4	4	3	3	4	4	4	5	5
9/10	5	5	4	4	2	3	4	4	4	5	5	5
Total	28	28	25	23	21	18	21	21	24	28	29	29
Average	5	5	4	4	3	3	3	3	4	5	5	5

Regime 3:												
2/24	4	4	4	4	4	4	4	4	4	4	5	5
3/02	5	4	4	4	4	4	4	4	4	4	4	4
3/08	5	4	4	4	4	4	4	4	4	4	4	4
5/25	5	5	5	4	3	3	4	2	4	4	4	4
8/29	4	4	4	4	4	4	4	4	4	4	4	4
11/15	4	4	4	4	4	3	3	4	5	5	5	5
12/03	4	4	4	5	4	4	4	4	4	4	4	4
12/15	4	4	4	4	4	4	4	4	5	5	4	5
Total	35	33	33	33	31	30	31	30	34	34	34	35
Average	4	4	4	4	4	4	4	4	4	4	4	4

<u>Pasquill Stability Class</u>

1	Extremely Unstable
2	Unstable
3	Slightly Unstable
4	Neutral
5	Sligh+ly Stable

Appendix 8 (cont.)

Regime 4:	1	3	5	7	9	11	13	15	17	19	21	23
4/01	4	4	4	5	4	4	4	4	4	5	4	5
4/13	4	5	4	4	4	4	4	4	4	5	5	5
5/13	5	5	5	4	3	3	2	4	4	5	5	5
8/17	5	5	5	3	2	3	4	4	4	4	4	4
Total	18	19	18	16	13	14	14	16	16	19	18	19
Average	4	5	4	4	3	4	4	4	4	5	4	5

Regime 5:												
2/12	5	4	4	4	4	4	4	4	4	4	4	4
3/14	5	5	5	5	4	4	4	4	4	4	5	5
3/26	5	4	4	4	4	4	4	4	4	4	4	4
5/01	4	4	4	4	4	4	4	4	4	4	4	4
10/22	5	5	5	5	3	3	3	3	5	5	4	4
12/09	4	5	5	4	4	4	4	4	4	4	4	4
Total	28	27	27	26	23	23	23	23	25	25	25	25
Average	5	4	4	4	4	4	4	4	4	4	4	4

Regime 6:												
3/20	5	5	4	5	3	3	3	4	4	5	5	5
8/23	5	5	5	4	3	3	3	4	4	4	4	4
9/21	5	4	4	4	4	4	3	4	4	5	5	5
10/10	5	5	5	5	3	2	3	4	4	4	5	5
Total	20	19	18	18	13	12	12	16	26	18	19	19
Average	5	5	5	4	3	3	3	4	4	4	5	5

Regime 7:												
2/06	4	4	4	4	4	4	4	4	5	5	4	4
9/28	4	4	4	4	4	4	4	3	3	5	5	5
10/14	5	5	4	4	4	2	2	3	5	5	5	5
11/03	5	4	4	4	3	4	4	3	5	5	5	5
Total	18	17	16	16	15	14	14	13	18	20	19	19
Average	5	4	4	4	4	4	4	3	4	5	5	5

Regime 8:												
4/07	5	5	5	4	3	3	4	4	3	5	5	4
6/18	4	4	4	4	4	4	3	3	4	5	5	4
7/24	5	5	5	3	2	1	1	4	4	4	4	4
8/05	5	4	4	4	4	2	2	2	4	4	5	4
Total	19	18	18	15	13	10	10	13	15	18	19	16
Average	5	5	4	4	3	2	2	3	4	4	5	4

Appendix 8 (cont.)

Regime 9:	1	3	5	7	9	11	13	15	17	19	21	23
1/19	4	4	4	4	4	4	4	4	5	4	4	4
2/18	5	4	4	4	4	4	3	3	4	5	5	5
Total	9	8	8	8	8	8	7	7	9	9	9	9
Average	5	4	4	4	4	4	3	3	4	4	5	5

Regime 10:

4/25	5	4	5	3	3	2	4	4	4	5	5	5
10/28	5	5	4	5	3	3	4	4	5	4	4	5
Total	10	9	9	8	6	5	8	8	9	9	9	10
Average	5	5	4	4	3	3	4	4	4	4	5	5

Regime 11:

5/19	5	5	5	3	2	1	1	2	3	5	5	5
6/06	5	5	4	4	2	2	3	3	3	5	5	5
Total	10	10	9	7	4	3	4	5	6	10	10	10
Average	5	5	4	3	2	2	2	3	3	5	5	5

Regime 12:

9/04	4	5	4	4	4	4	4	4	4	4	4	4
5/07	5	5	5	3	1	3	4	4	4	4	5	5
5/31	4	5	4	3	3	3	3	2	4	4	4	4
9/16	5	5	4	4	3	4	4	4	4	5	4	4
Total	18	20	17	14	11	14	15	14	16	17	17	17
Average	5	5	4	3	3	3	4	3	4	4	4	4

Regime 13:

1/13	4	4	4	4	4	4	4	4	4	4	4	5
1/31	4	4	4	4	4	4	4	4	4	4	5	4
11/09	5	5	4	4	4	3	4	4	5	5	5	5
Total	13	13	12	12	12	11	12	12	13	13	14	14
Average	4	4	4	4	4	4	4	4	4	4	5	5

Appendix 9
TSP Distribution on 13 Daily Regimes

Eugene Commerce Bodg (EC)
Springfield Library (SL)

Regime 1-	1/25	4/19	6/30	7/12	7/18	7/30	8/11	10/4	11/21	12/21	12/17	Total	Average
EC	165	93	102	52	52	74	131	97	53	136	62	1,017	92.5
SL	184	134	118	58	67	89	167	77	60	112	74	1,140	103.6

Regime 2-	1/1	1/7	6/12	6/24	7/6	9/10	Total	Average
EC	83	255	51	80	78	112	659	109.8
SL	75	238	63	95	72	145	688	114.7

Regime 3-	2/24	3/2	3/8	5/25	8/29	11/15	11/17	12/3	12/15	Total	Average
EC	32	23	37	42	25	57	28	26	21	291	32.3
SL	36	24	52	64	48	83	26	39	19	391	43.3

Regime 4-	4/1	4/13	5/13	8/17	Total	Average
EC	78	-	-	116	194	97.0
SL	89	57	65	138	349	97.3

Regime 5-	2/12	3/14	3/26	5/1	10/22	12/9	Total	Average
EC	55	64	33	25	110	55	342	57.0
SL	72	83	62	27	125	63	322	53.7

Regime 6-	3/20	8/23	9/21	10/10	Total	Average
EC	65	60	-	88	213	71.0
SL	61	130	89	87	367	91.8

Regime 7-	2/6	9/28	10/14	11/3	Total	Average
EC	126	33	-	58	217	72.3
SL	107	64	115	-	286	95.3

Regime 8-	4/7	6/18	7/24	8/5	Total	Average
EC	103	48	70	55	276	69.0
SL	130	62	67	88	347	86.8

Regime 9-	1/19	2/18	Total	Average
EC	120	180	300	150.0
SL	125	159	284	142.0

Regime 10-	4/25	10/28	Total	Average
EC	105	65	170	85.0
SL	102	63	165	82.5

Regime 11-	5/19	6/6	Total	Average
EC	59	74	121	60.5
SL	62	79	153	76.5

Regime 12-	5/7	5/31	9/16	9/4	Total	Average
EC	41	49	41	20	151	37.8
SL	52	66	62	25	205	51.3

Regime 13-	1/13	1/31	11/9	Total	Average
EC	50	49	62	161	53.7
SL	66	66	159	291	97.0

Appendix 9 A
TSP Distribution on 13 Daily Regimes
For 1978 TSP Sample Days

Eugene Commerce Bldg. (EC)
Springfield Library (SL)

Regime 1	1/2	1/14	1/26	3/3	5/8	6/1	6/19	7/7	7/19	7/31	8/6	Total Average
EC	38	45	86	80	—	97	76	64	83	99	99	
SL	42	40	67	69	110	110	84	54	95	88	66	

	9/5	9/17	10/5	10/17	11/4	11/10
EC	—	20	114	125	65	161
SL	21	—	—	110	42	117

Regime 2	4/8	4/14	5/2	6/7	10/11
EC	72	34	64	61	81
SL	80	36	79	86	100

Regime 3	2/1	2/7	2/25	4/20	4/26	5/14	5/26	8/12	8/30	12/4	12/22
EC	14	16	23	29	33	—	19	20	27	35	32
SL	17	28	52	43	51	14	32	23	42	53	43

Regime 4	6/13
EC	25
SL	43

Regime 5	10/29	12/16
EC	27	64
SL	21	68

Regime 6	3/9	6/25	8/18	9/11
EC	—	23	68	42
SL	85	29	—	41

Regime 7	7/1	7/25	9/29
EC	30	129	109
SL	32	110	110

Regime 9	2/13	3/15	7/13	9/23
EC	140	139	101	70
SL	120	142	130	120

Regime 10	11/22	11/28
EC	140	36
SL	123	40

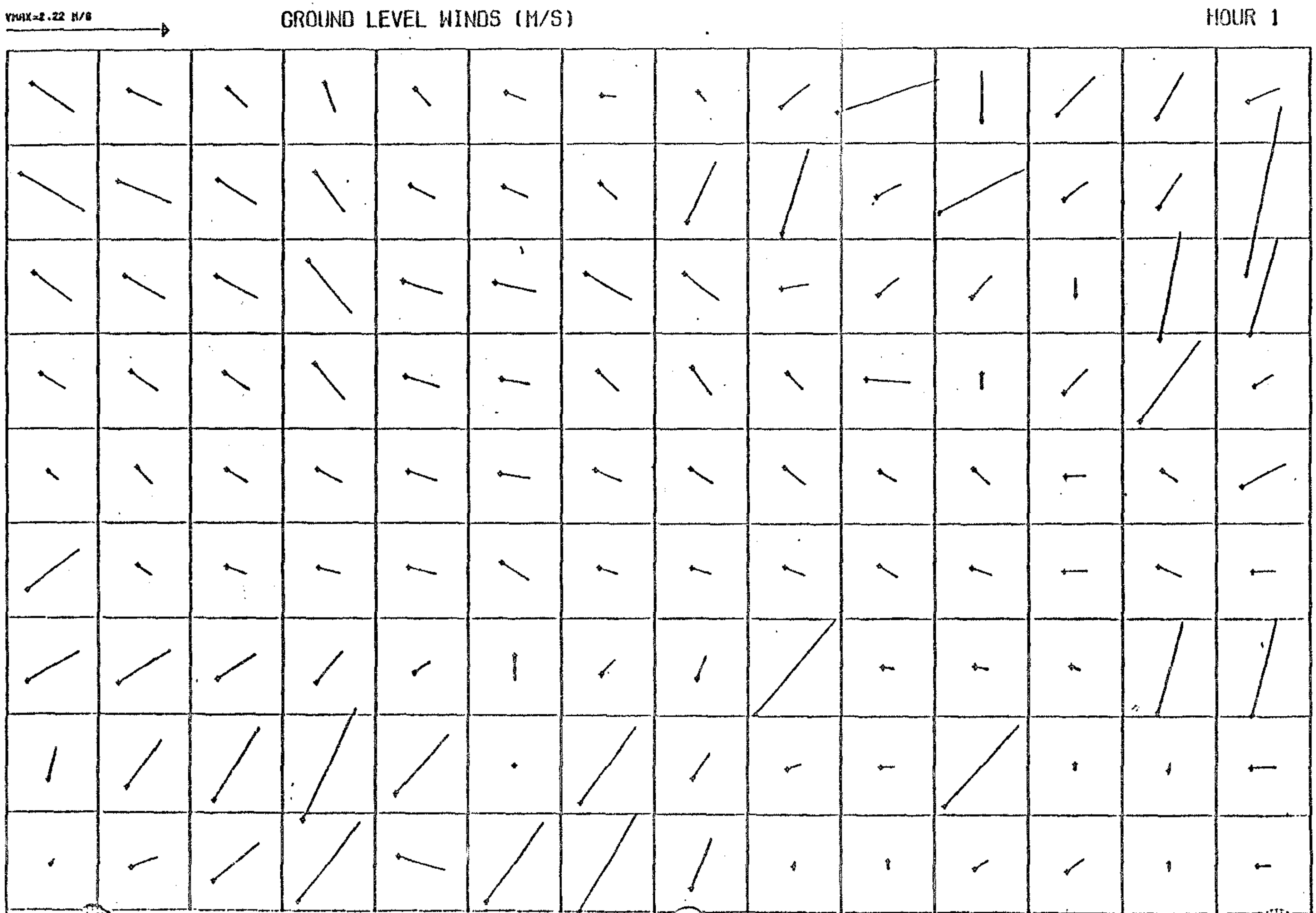
Regime 11	1/8	2/19	3/21	3/27	5/20	12/28
EC	57	65	141	71	59	60
SL	44	63	168	116	63	67

Regime 13	1/20	4/2	8/24	10/23	11/16	12/10
EC	36	17	20	128	65	25
SL	68	21	32	137	97	38

APPENDIX 10

EUGENE-SPRINGFIELD AQMA

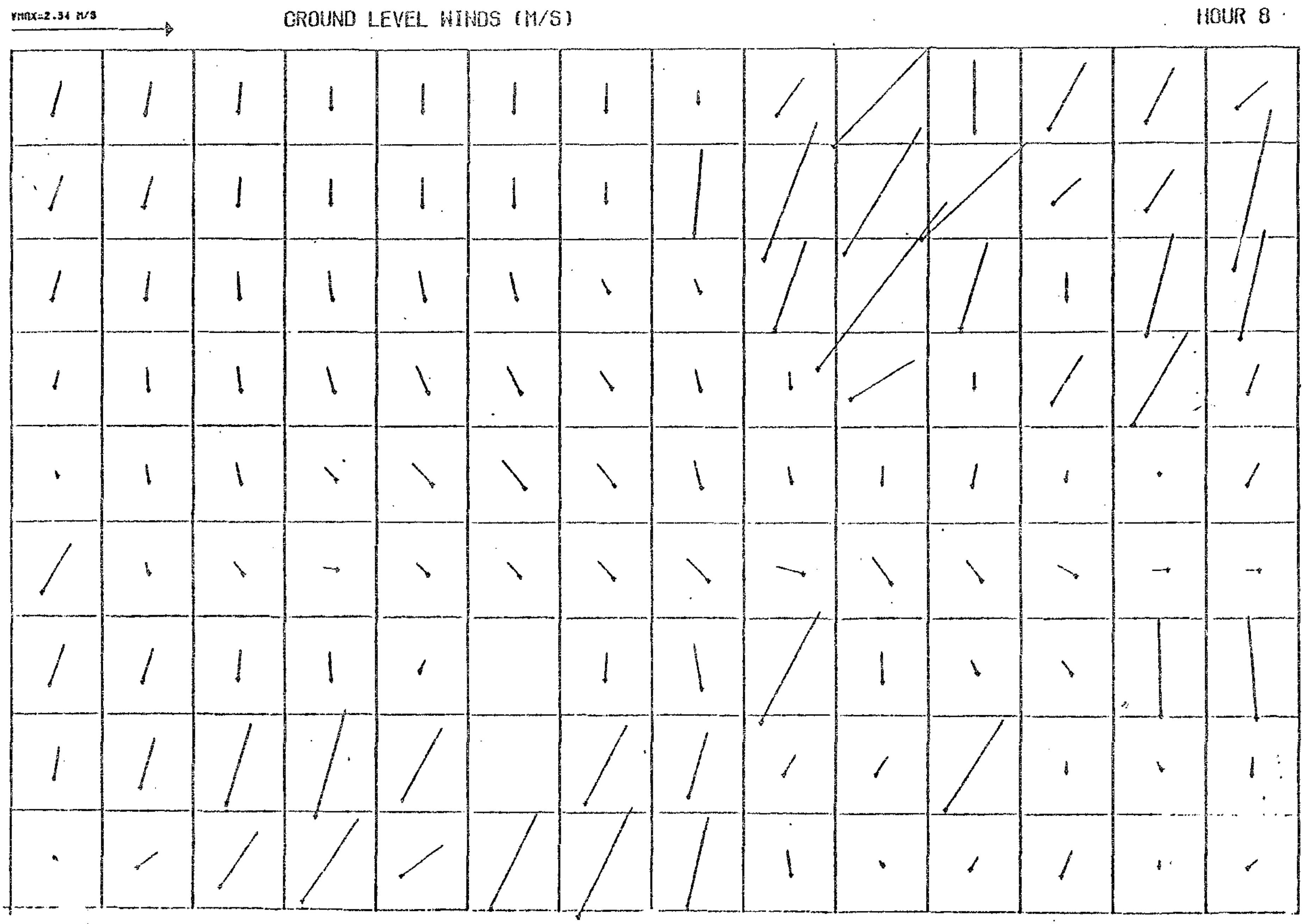
WEST Generated Winds
for February 18, 1977



APPENDIX 10

EUGENE-SPRINGFIELD AQMA

WEST Generated Winds
for February 18, 1977



To: Ralph Johnston
From: Bob Gay
June. 11, 1980

A DESCRIPTION OF THE EUGENE-SPRINGFIELD AIR QUALITY MAINTENANCE AREA AIRSHED MODEL

Air Quality Division
Department of Environmental Quality

April, 1979

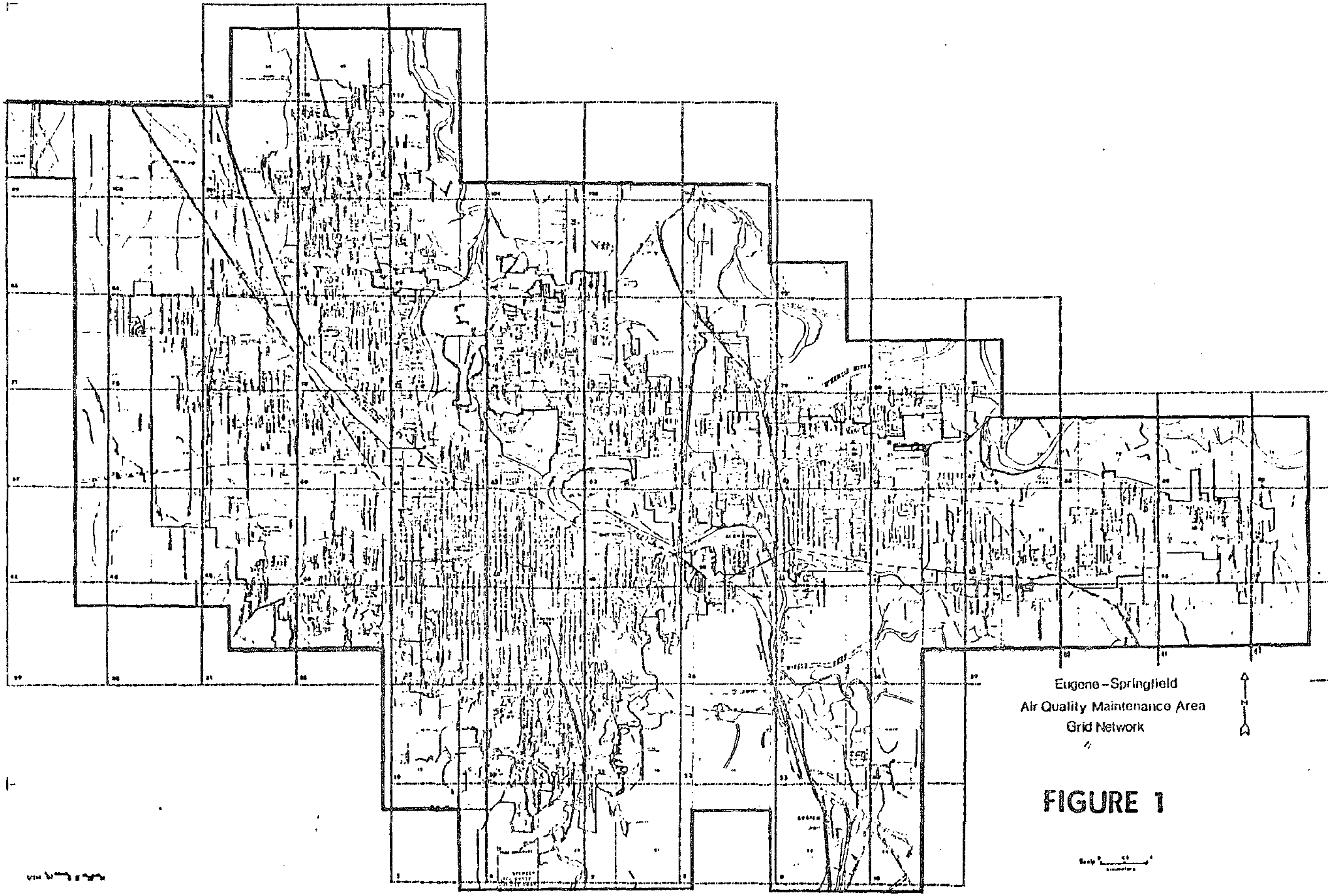
Eugene-Springfield Air Quality Maintenance Area

Airshed Model

Introduction

To assist in the development of control strategies for the Eugene-Springfield Air Quality Maintenance Area (AQMA; see Figure 1), computer simulations of the airshed were made using the Department's GRID model. The mesoscale wind flows induced by the complex terrain necessitated the use of a sophisticated model to accurately predict pollutant concentrations. Existing Gaussion models, CDM, VALLEY and PTMPT, would not be expected to perform as well as GRID in the complex terrain and thus were not utilized.

To provide the flow field input into GRID the model WEST (Winds Extrapolated from Stability and Terrain) was utilized. Observed meteorological conditions were grouped into typical days with each group constituting a typical regime day. The report "Eugene-Springfield Meteorological Regime Analysis 1977" prepared by the Department describes the regimes and the classification process. Wind and stability conditions for each regime day were input to WEST for key stations. With this input WEST developed a divergence free wind field which was used in the GRID model. Figure 2 shows a WEST simulation of a flow pattern.

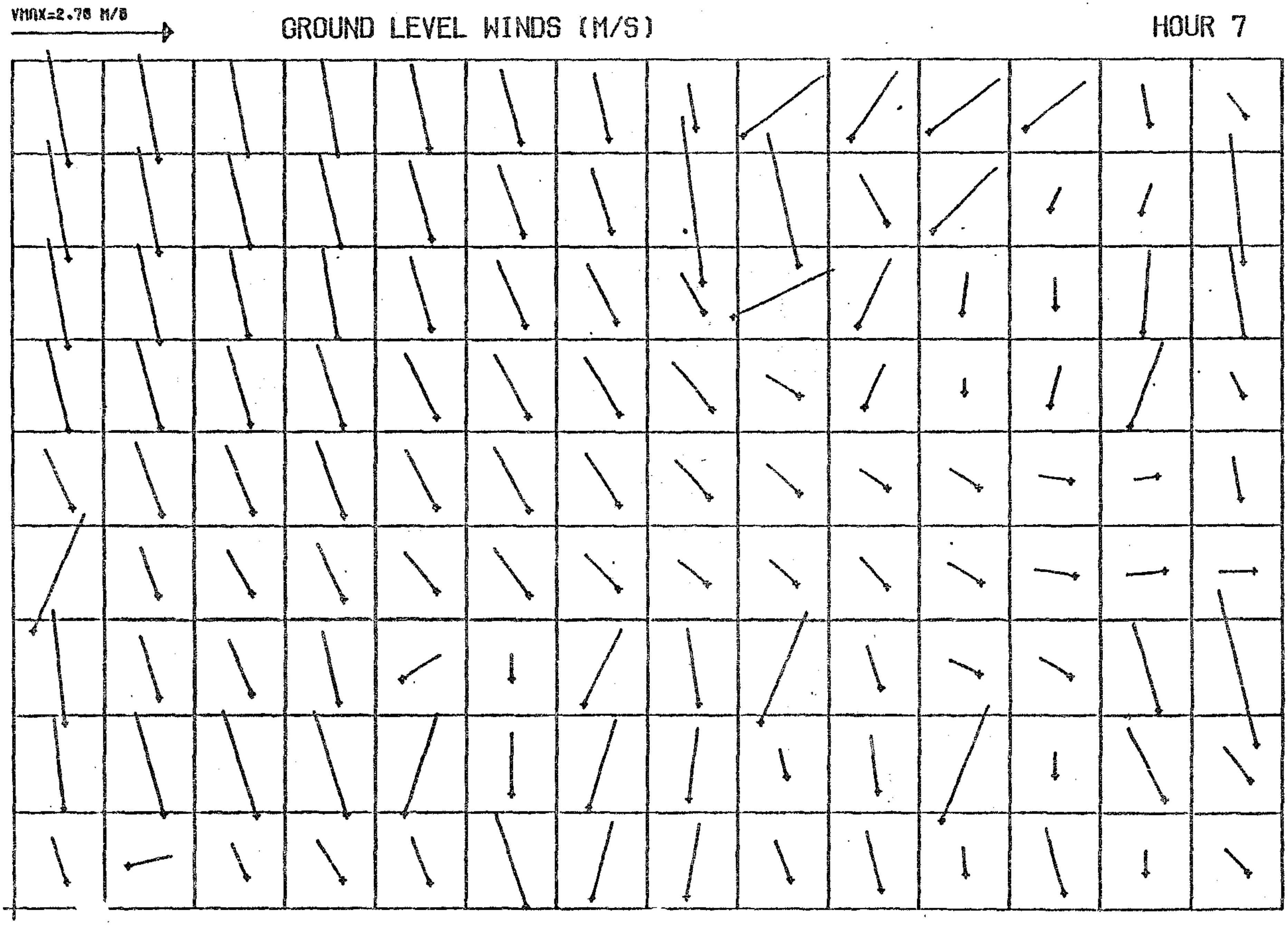


Eugene–Springfield
Air Quality Maintenance Area
Grid Network

FIGURE 1

FIGURE 2

WEST Model Simulated Flow Field



About the GRID Model

Ambient air quality is the result of three basic processes. The first is pollutant emissions; at zero emissions there is no air quality problem. However, this cannot be the only important process, since while pollutant emissions may not vary much from day to day, air quality can show considerable variation. The variability seen in daily air quality is mainly due to atmospheric processes which transport (winds) and disperse (turbulent diffusion) the emissions. A final process that may be a major factor is transformations that occur from chemical reactions among pollutants and atmospheric gases. Additional phenomena that can be included in this last process are: (1) gravitational settling of particulates, (2) absorption of the pollutant on surfaces and (3) rainout and washout of particulates and gases. The atmospheric processes affecting air quality are described through a set of mathematical equations (the model) and these equations are solved with specific emissions and meteorological input data to predict air quality.

The basic equation describing the time rate of change of a pollutant concentration at a given location is given by:

$$\frac{\partial C}{\partial t} = -\vec{\nabla} \cdot \vec{U}C + \vec{\nabla} \cdot \overleftrightarrow{K} \cdot \vec{\nabla} C + S(c) + R(c) \qquad (1)$$

where $\frac{\partial C}{\partial t}$ is the time rate of change of pollutant concentrations at a specific location; $\vec{\nabla} \cdot \vec{U}C$ is the transport of pollutant concentration by the mean wind field; $\vec{\nabla} \cdot \overleftrightarrow{K} \cdot \vec{\nabla} C$ is the dispersion of pollutant concentration by diffusion; S is the rate of pollution emissions; and R is the creation or removal of pollutants by chemical or other transformations.

In the GRID model, the AQMA was divided into a set of cells or grids. A 9 x 14 grid system was established with each grid being 2 kilometers on a side (see Figure 2). Each grid is divided into 5 horizontal layers, the result being 630 distinct cells encompassing the AQMA. Each layer is of a distinct thickness with the surface layer being 50 meters thick. The other layers are, in ascending order, 100, 150, 200 and 250 meters thick. (See Figure 3)

The effects of the complex terrain typical of the region have been incorporated in the GRID model by not allowing any concentration flux into grids that are below ground level and through the use of curvilinear wind fields. The wind is channeled around or over a cell the way it flows in the real atmosphere due to terrain obstructions.

Emissions and diffusion parameters are input into the model and then equation 1 is solved in the grid model using a finite difference approximation. That is, the concentration is updated due to, for example, transport and source emissions in each direction by:

$$C_i^{n+1} = C_i^n + \left[\frac{F^n_{i-1/2} - F^n_{i+1/2}}{\Delta x} + S_i \right] \Delta t$$

where the fluxes $F^n_{i+1/2} = \frac{\Delta x}{2 \Delta t} \left\{ \left[C^n_{i+1} + C^n_i \right] - 1/2 \left[C^n_{i+1} - C^n_i \right] \alpha \right\} \alpha$

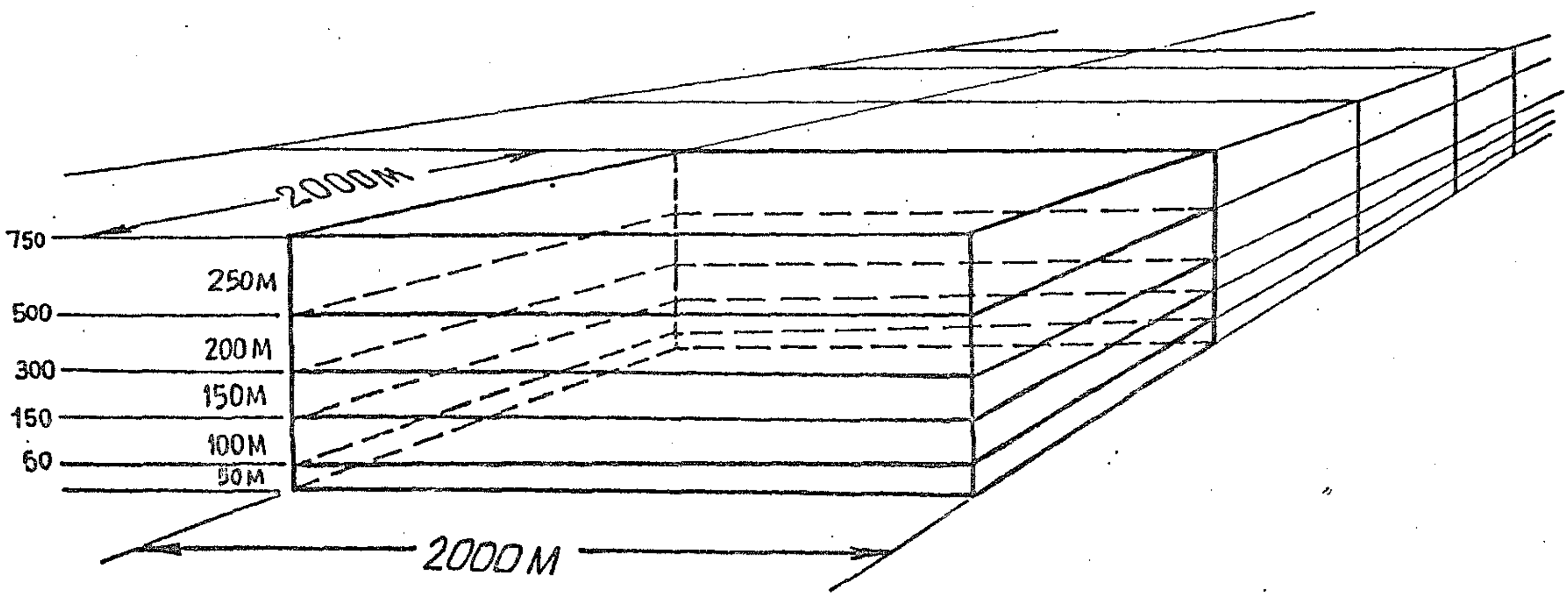
and $\alpha = \frac{U_{i-1/2}}{\Delta x} \Delta t$

for the ith cell and the nth time step, with flux correction limiting C^n_i by

$$.2 * \mathrm{MIN} \left\{ C^n_{i-1}, C^n_i, C^n_{i+1} \right\} \leq C^{n+1}_i \leq 1.8 * \mathrm{MAX} \left\{ C^n_{i-1}, C^n_i, C^n_{i+1} \right\}$$

Figure 3

GRID CELL STRUCTURE



A critical requirement of the grid model is that the wind field be non-divergent, i.e.

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} = 0,$$

in order to prevent an unrealistic buildup or depletion of pollutant concentrations. The method used to insure nondivergence was to adjust the vertical velocity profile. This was accomplished in the equations utilized in the WEST model.

Once the model produces a pollutant concentration field for each regime the annual predicted concentration for each grid cell is calculated by summing each regime concentration multiplied by its respective frequency of occurrence. That is:

$$C_a = \sum_{i=1}^{n} C_i f_i$$

where C_a = annual concentration

C_i = regime concentration

f_i = regime frequency

n = number of regimes

To predict the annual concentration at a specific receptor, R, within a grid cell, X, a weighted average of selected cell concentrations surrounding R is calculated. The cells whose concentrations are included are those that have R within the area bounded by the lines connecting the centroids of the cells. The equation used to give the predicted concentration at R is such that the cell(s) closest to R contribute more to the prediction than those further away. That is, a concentration at a receptor is weighted towards those cells closest to it.

This annual prediction is then compared to the observed annual concentration at the receptor and a calibration factor is developed. The model is then run on another year's data base to determine the predictive capability using the calibration factor.

Future air quality concentrations are then made based on projected emissions inventories, on assumed annual frequency of occurrence of regime days and the calibrated model.

Several options are available for output from the GRID model. One is producing a computer plot of isopleths (lines of equal concentration) of the model predicted particulate concentrations. Other options include a listing of predictions at receptors and a digital printout of the concentrations in each grid cell on an annual basis or by meteorological regime day. (See Figure 4)

Combining this output with other information, such as cost effectiveness, the decision maker than develops a strategy to control emissions so as to attain and maintain air quality standards.

Emissions Sources

Sources of particulates within the study area have been categorized into point sources and area sources in the emissions inventory (EI). Source data has been included in the EI and allocated through the grid network as described below.

FIGURE 4

GRID Model Output

14 9

0	0	0	1	0	0	0	0	0	0	0	0	0	0
12	28	2	2	0	7	2	0	0	0	0	0	0	0
5	10	7	12	26	44	7	8	0	0	0	0	0	0
7	13	24	6	38	59	7	14	85	0	4	0	0	0
5	21	48	81	85	92	84	95	84	59	17	5	1	0
5	33	65	66	77	91	89	141	196	260	137	156	21	11
13	19	25	22	27	66	27	24	22	100	31	30	7	1
7	9	12	13	30	32	19	30	57	57	37	18	12	3
4	7	11	13	24	35	24	26	37	34	14	18	11	6

FREC 1.000 .000 -.000 -.000 -.000 -.000 -.000 -.000 -.000 -.000 11 AUG 77

RECEPTOR	XR	YR	OBSD	PFED	GEOM	COAY2	STATION
1	1.43	8.23	-.00	9.73	7.31	31.69	EUGENE AIRPORT
2	7.75	9.75	-.00	.00	.00	.00	COBURG
3	6.43	4.50	-.00	89.87	75.36	238.27	COMMERCE
4	4.96	4.13	-.00	53.46	41.90	162.33	WESTMORELAND
5	10.56	4.54	-.00	245.20	217.62	561.49	28TH AND C
6	6.60	2.15	-.00	31.77	23.36	106.91	SOUTH EUGENE
7	6.91	5.41	-.00	88.69	79.65	195.84	OAKWAY
8	10.09	4.31	-.00	202.58	172.67	517.02	CITY SHOPS
9	9.13	4.43	-.00	165.00	141.09	411.29	LIBRARY
10	13.07	4.51	-.00	78.37	61.00	240.91	THURSTON
11	10.11	5.03	-.00	147.09	131.71	327.79	OMV

*Point Sources

Point source information taken from the EI for use in the GRID model includes data pertaining to individual source operating conditions. Only sources within the AQMA having total plant site emissions of greater than 10 tons per year of particulate were included in the point source tabulation. Smaller sources were included in the area source categories.

Source information also utilized included: 1) Universal Transverse Mercator coordinates; 2) tons per year of TSP; 3) stack parameters; 4) EI number; 5) SIC number; and 6) an equipment identification number.

*Area Sources

Thirteen area source categories are included in the model application. They are:

1) paved road dust

2) motor vehicles

3) residential space heating - distillate oil

4) residential space heating - natural gas

5) commercial/institutional space heating - residual oil

6) commercial/institutional space heating - natural gas

7) open burning and field burning

8) wood space heating

9) orchard pruning

10) railroads and aircraft

11) unpaved road dust

12) small point sources (less than 10 tons per year emissions)

13) agricultural tilling and off-highway vehicles.

Emissions from each of the 13 categories were allocated to the grids in the AQMA by various methods. The methodology for allocation is described in the report "Eugene-Springfield Air Quality Maintenance Area Data Base Development," prepared by Seton, Johnson and Odell, February, 1978.

*Operating Schedules

Operating schedules for each source category are necessary as input to the modeling data bases. These schedules represent the daily and monthly variations in emissions that result from changes in heating requirements, production schedules, rainfall and other factors. A complete description is given in the Data Base Development report previously mentioned.

Inclusion of operating schedules allows for a more accurate modeling of the pollutant concentrations in the AQMA.

*Other EI Adjustments

To calculate the effective plume height from the emission sources standard plume rise equations as developed by Briggs are utilized. This information combined with other data input (such as meteorology) is used so as to better simulate what is actually happening in the atmosphere.

The EI is also adjusted so as to estimate the emissions for particles less than 30 microns in size. This is done so as to minimize the errors resulting from particle deposition. The larger particles settle out much closer to the source and thus would not affect as large an area of the airshed as those particles less than 30 microns. As is the case with the other considerations taken into account in the EI, this adjustment for particle size helps to bring about a more accurate simulation of air pollution concentrations.

Summary

Combining meteorological and emission inventory data with mathematical equations (the model) produces a simulation of particulate concentrations in the Air Quality Maintenance Area. The Area can then be analyzed to identify areas that may be subject to high pollution.

Utilizing the model output with other information, such as cost effectiveness, the decision maker can then develop a strategy to control emissions so as to attain and maintain air quality standards.

Part 4 4.6.4.1-1

Eugene GRID Model Assumptions

1. Conservation of mass

GRID is a conservation of mass or grid cell type model which uses a finite difference approximation of the basic diffusion equation:

$$\frac{\partial c}{\partial t} = - \nabla \cdot \vec{u}c + \nabla \cdot \overleftrightarrow{K} \cdot \nabla c + S$$

where:

$\frac{\partial c}{\partial t}$ = time rate change of particulate concentration

$\nabla \cdot \vec{u}c$ = advection of particulate concentration by the mean wind field u

$\nabla \cdot \overleftrightarrow{K} \cdot \nabla c$ = dispersion of particulate concentration by diffusion, approximated by the eddy diffusivity constant K

S = rate of particulate emissions

∇ = the "del" operator $(\partial/\partial x + \partial/\partial y + \partial/\partial z)$

The finite difference solution assumes that at may be approximated by a finite time Δt. Further a distance parameter ∂x may be approximated by a finite change in distance Δx.

In GRID the horizontal cell size (Δx or Δy) is 2,000 meters. Δz or the vertical cell size is variable. The ceiling heights of each grid cell layer are 50, 150, 300, 500, and 750 meters, respectively, above ground elevation.

The current solve routine is a flux corrected version of a Crowley's second order advection technique. Flux refers to transportation forces between cells. These forces arise mainly from advection (mean wind transport (i.e., wind speed and direction) by cell) and diffusion (concentration gradients between cells).

The time step Δt must be sufficiently small to assure stability in the calculations. Yet if too small, it would unreasonably increase simulation costs. It is computed from the maximum wind speed specified within the entire wind field that is being used during each hour of the simulation. Thus it changes whenever a new wind field is being used.

Initial concentrations within the model are set up during the first hour of the day by computing concentrations six times as long as during other hours of the day. This is done in lieu of specifying boundry conditions.

Several steps were taken to maximize accuracy when interpreting model results, The number of subtractions of model results to obtain strategy effectiveness were kept to a minimum. Further, smaller differences in predicted concentrations were scaled from model runs simulating larger emission differences.

2. Divergence Free Wind Fields

A basic requirement of conservation-of-mass type models is that the wind fields be divergence free. Mathematically this is stated as:

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} = 0$$

where u, v, and w are the x, y, and z vector componants of the wind velocity in each grid cell.

A simpler way of stating this is the winds cannot be allowed to build up pressure within any cell. This would arise if the sum of the cell face wind velocities multiplied by their respective cell face areas did not equal zero at each cell.

Divergence free wind fields are derived for the model from a pre-processor model called WEST.

3. Regime Classification of Meteorology.

As simulation costs are directly proportional to the number of days simulated, annual runs require the use of generalized meteorology. As a result in the Eugene/Springfield version of GRID each year's meteorology was approximated by a different weighting of 13 meteorological regimes. The basic assumption is that each of 365 days meteorology can be approximated by one of the 13 generalized meteorological types. The derivation of these 13 regimes is described elsewhere.

This regime approximation works best when simulating a long time period--e.g., when used to simulate annual average concentrations for past and future years.

For model simulations of a single day two different approaches were used. An "average" high particulate day was simulated by regime 7. To better simulate a "worst case" day, wind fields were generated from an actual worst case day (February 18, 1977). This latter approach probably better estimates worst case air quality in Eugene/Springfield because any regime day includes a wide range of pollution levels.

4. Plume Rise

Briggs plume rise equations for plume rise due to buoyancy flux are used in GRID. Depending on atmospheric stability (determined according to Pasquill, 1961), two different plume rises can be calculated. One plume rise estimate is used for unstable and neutral conditions. Another is used for stable conditions. Momentum effects due to exit velocity are not considered in GRID (nor in most EPA models).

It has been observed that plumes often due not rise above inversion layers. Within GRID, this situation was simulated by means of a selective plume trapping algorithm. Only plumes with a buoyancy flux sufficient to reach to twice the mixing height are allowed to penetrate past that mixing height. Remaining plumes are trapped within the mixing layer. Sensitivity tests have shown that this does not predict concentrations dramatically higher than those predicted without plume trapping.

Plume penetration of the inversion layer is of concern because plumes above the inversion layer have minimal effect on predicted ground level concentrations. However within GRID, these emissions above the inversion layer are not completely ignored as they are in most other models. A diffusion rate through the inversion layer is still finite and is still calculated. Further, fumigation is at least partially accounted for because emissions within a stable layer are simulated to diffuse downward as the inversion layer rises.

5. Hourly Operating Schedules

As area sources are dominated by motor vehicle emission sources, hourly area source emissions are input proportional to average hourly motor vehicle activity within the AQMA. This activity schedule is an important consideration as motor vehicle activity is low during night hours when ventilation restrictions are usually larger.

Point source emissions are allocated by hour of the day according to their individual operating schedules.

6. Decay Factors

Although decay factors were considered for simulation of particulate fallout, they were not used. There is conflicting literature information as to decay rates, especially for the important soil dust emissions. Also, with the relatively small distances between sources and receptor (as compared to Willamette Valley scale simulations), the time for decay is relatively short. With typical decay rates used past DEQ simulations, this would have had minimal effect on particulate concentrations.

7. Evaluation of Model Predictions

Model predictions were compared with Hi-vol observations (e.g., see Figure 1). A slope = 1 line with an intercept equal to the observed background concentration was felt to best describe this comparison. This was used rather than a traditional least squares line because:

a. It is impossible to inventory all emission sources (e.g., pollen, secondary TSP, and fugitive sources). This would mean that a perfect model with a perfect meteorological data base would have points all on the left of the 1:1 slope line. For larger underpredicted sites (e.g., city shops), this would cause an unreasonable adjustment in a least squares analysis.

b. There are an insufficient number of points (Hi-vols) to establish a regression line with accuracy in Eugene/Springfield.

c. CMB analysis have shown individual source contributions to reasonably be predicted by the GRID model.

d. Key sites are well predicted by a 1:1 slope line.

For these reasons, overpredictions were scaled down to the 1:1 line. This overpediction would have unreasonably shown overeffectiveness of some strategies. In contrast, underpredictions were not scaled up. Instead these were handled by evaluating differences between present and future model predictions and adding them to present Hi-vol values. Any consistant underprediction is thus minimized.

Patrick Hanrahan
June 20, 1980

AN144(b) (1)

Eugene-Springfield AQMA

TSP SIP

I. The Problem

1978 and 1987 Standard Exceedances

TABLE I

Summary of Projected 1978 and 1987 TSP Standard Exceedances

	1978*		1987**	
	Exceedances of 60 ug/m^3 Standard (ug/m^3)	Exceedances of 150 ug/m^3 Standard (ug/m^3)	Exceedances of 60 ug/m^3 Standard (ug/m^3)	Exceedances of 150 ug/m^3 Standard (ug/m^3)
Location				
Commerce				8.8
Westmoreland		8		16.5
Library			3.4	
Thurston				
DMV				
PNW Bell	7.6	14	11.4	21.9
City Shops	9.3	84	17.8	67.2
Grid (11.4)	8.9	16	11.4	27
Grid (12.4)	0.6		5.6	
Grid (3.4)				
Grid (4.5)		22		39
Grid (5.4)				22
Grid (6.3)			0.6	
Grid (7.4)				6
Grid (8.4)		7		20
Grid (8.5)				1

1978 and 1987 Emissions

TABLE II

Source Contributors to Eugene/Springfield AQMA TSP Emission Totals and Estimated Growth in TSP Emissions

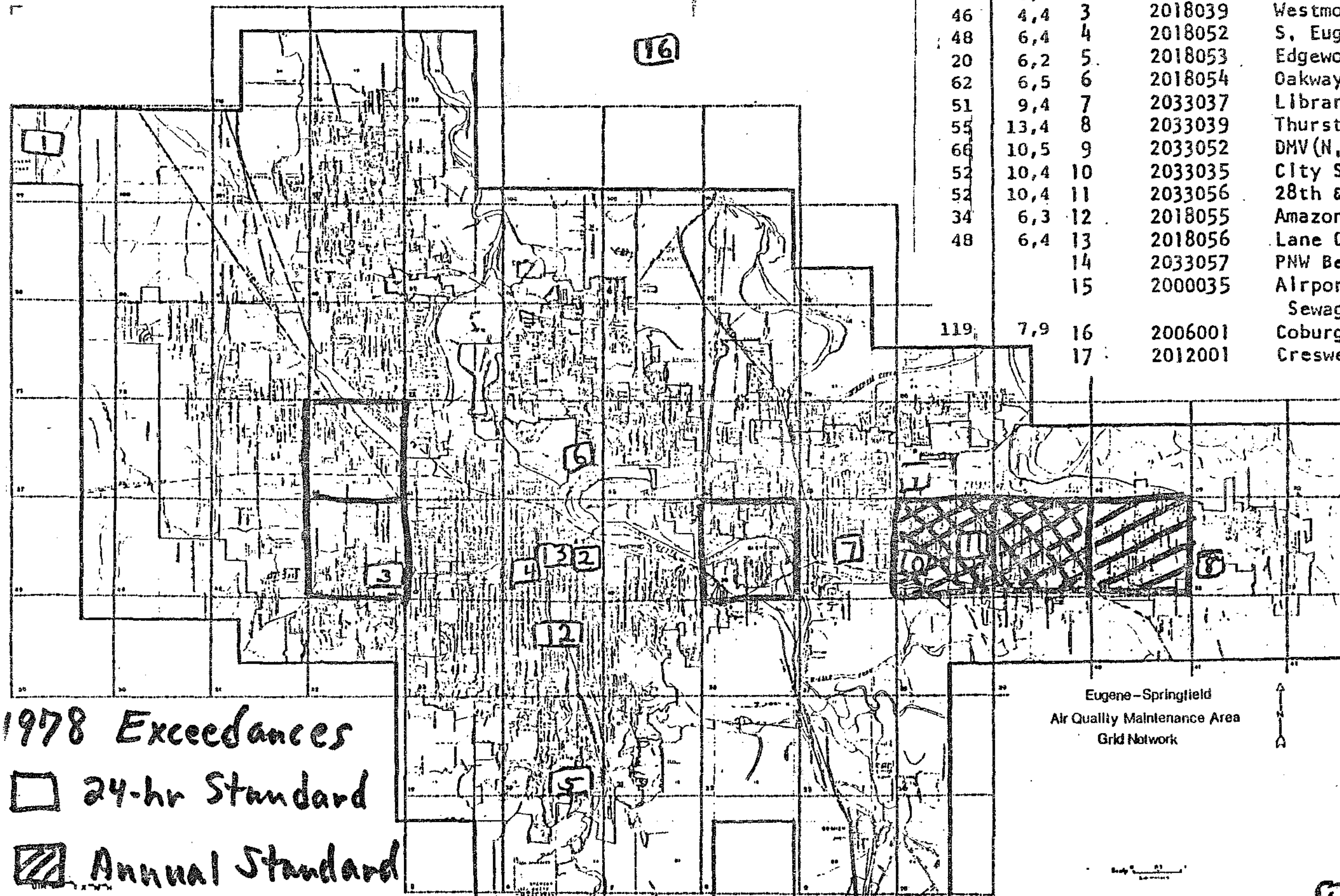
Emissions Source Categories	1978 Emissions (Tons/Year)	Percent Contribution	1987 Emissions (Tons/Year)	Percent Contribution	1978-1987 Growth (Tons/Year)
Point Sources	8,517.5*	61.6	5529.0	42.4	-2988
Area Sources					
Paved Road Dust**	2,481.0	17.9	3090.0	23.7	609
Motor Vehicle Exhaust	219.0	1.6	105.7	0.8	-113
Space Heating					
Residential (Oil)	11.2	0.1	11.2	0.1	0
Residential (Gas)	5.8	0	5.8	0	0
Commercial (Oil)	3.4	0	3.4	0	0
Commercial (Gas)	0.5	0	0.5	0	0
Open Burning/Field Burning	72.5	0.5	72.5	0.6	0
Wood Space Heating***	967.5	7.0	2208.7	17.0	1241
Orchard Pruning	10.0	0.1	10.0	0.1	0
Railroads & Aircraft	44.7	0.3	44.7	0.3	0
Unpaved Road Dust	1,240.0	1.9.0	1240.0	9.8	0
Small Point Sources	134.6	1.0	174.1	1.3	40
Agricultural Tilling & Off-Road Vehicles	121.5	0.9	121.3	0.9	0
Subtotals (Area Sources)	5,312.0	38.4	7,086	57.6	+1774
Total (Area & Point)	13,829	100.0	12,615	100.0	-1214

*1978 Point Source Emission=RACT, except for Kingsford and veneer dryers. These sources are now on compliance schedules to achieve RACT before 1987.

** Includes trackout surcharge (32%)

***Based on Talbot, Wong and Associates telephone survey

99	1,8	1	2000033	Airport
48	6,4	2	2018035	Commerce
46	4,4	3	2018039	Westmorel
48	6,4	4	2018052	S. Eugene
20	6,2	5	2018053	Edgewood
62	6,5	6	2018054	Oakway
51	9,4	7	2033037	Library
55	13,4	8	2033039	Thurston
66	10,5	9	2033052	DMV(N, 1
52	10,4	10	2033035	City Shop
52	10,4	11	2033056	28th & C
34	6,3	12	2018055	Amazon
48	6,4	13	2018056	Lane C.C
		14	2033057	PNW Bell
		15	2000035	Airport-Sewage
119	7,9	16	2006001	Coburg
		17	2012001	Creswell



Eugene–Springfield
Air Quality Maintenance Area
Grid Network

1978 Exceedances

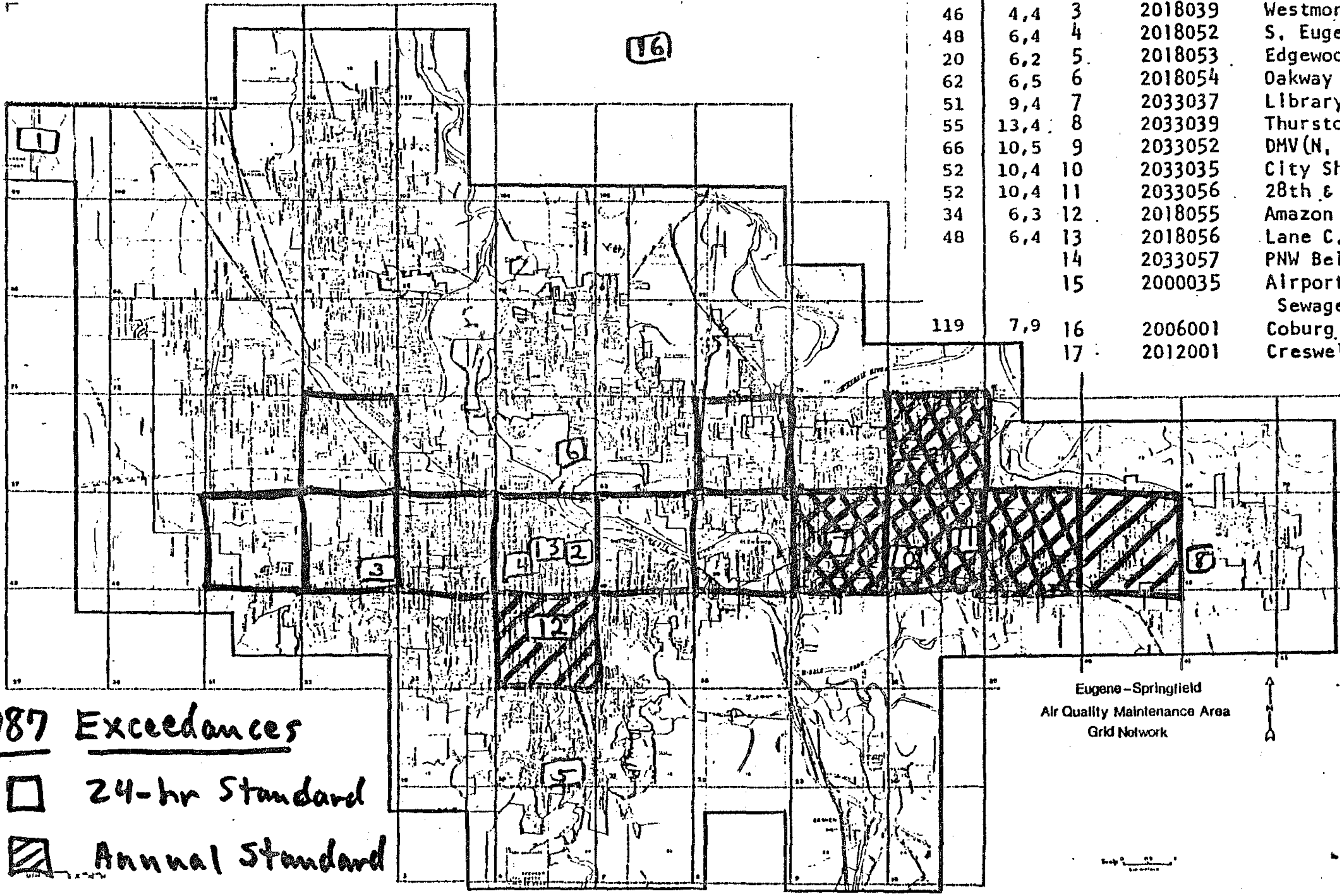
24-hr Standard

Annual Standard

Both Standards

17 Creswell OR.
27 km South of Goshen

99	1,8	1	2000033	Airport
48	6,4	2	20180	Commerce
46	4,4	3	2018039	Westmore
48	6,4	4	2018052	S. Eugen
20	6,2	5	2018053	Edgewood
62	6,5	6	2018054	Oakway
51	9,4	7	2033037	Library
55	13,4	8	2033039	Thurston
66	10,5	9	2033052	DMV(N,
52	10,4	10	2033035	City Sho
52	10,4	11	2033056	28th & C
34	6,3	12	2018055	Amazon
48	6,4	13	2018056	Lane C.C
		14	2033057	PNW Bell
		15	2000035	Airport- Sewage
119	7,9	16	2006001	Coburg
		17	2012001	Creswell



87 Exceedances

☐ 24-hr Standard

▨ Annual Standard

▩ Both Standards

17 ↓ Creswell OR.
9.7 km ... of Goshen

TABLE II A. Annual Geometric Mean TSP[8] – Major Contributing Sources to 1978 and 1987 TSP Levels ($\mu g/m^3$)

	1987 Exceedance Over 60 $\mu g/m^3$ Standard (1)	Point Source Impacts (2) 1978	Point Source Impacts (2) 1987	Area Source Impacts (3) 1978	Area Source Impacts (3) 1987	Transportation Impacts (4) 1978	Transportation Impacts (4) 1987	Paved Road Impacts (5) 1978	Paved Road Impacts (5) 1987	Unpaved Road Impacts (6) 1978	Unpaved Road Impacts (6) 1987	Wood Burning Impacts (7) 1978	Wood Burning Impacts (7) 1987
1. Commerce	0	1.5	1.4	21.3	28.1	14.3	16.7	10.6	13.2	2.2	2.8	6.1	10.3
2. Westmorland	0	1.0	0.8	10.4	15.1	7.5	9.2	4.8	6.1	2.3	3.1	2.3	5.2
3. So. Eugene	0	0.9	0.7	5.6	8.2	3.9	4.8	2.1	2.7	1.6	2.2	1.6	3.2
4. Oakway	0	1.9	1.7	14.2	18.7	11.0	12.3	8.8	10.3	1.5	1.8	2.7	5.8
5. Library	3.4	3.2	2.8	17.6	22.9	13.7	16.0	10.6	12.7	2.2	2.8	3.4	6.3
6. Thurston	0	10.0	8.7	13.3	20.4	10.8	14.5	6.4	8.7	4.1	5.6	1.9	5.0
7. DMV	0	3.6	2.0	19.3	25.9	14.8	17.7	9.9	12.1	4.2	5.2	3.4	6.9
8. PNW Bell	11.4	3.6	2.7										
9. City Shops	17.8	3.4	2.3	18.2	23.9	14.1	16.8	9.4	11.3	4.2	4.9	3.0	6.8
10. GRID 11,4	11.4	14.1	12.5	19.9	24.1	15.8	17.4	6.6	7.5	8.3	9.1	2.5	5.8
11. GRID 3,4	0	.8	.8	14.1	24.9	11.6	19.9	4.2	6.6	7.5	12.5	0.8	3.3
12. GRID 4,5	0	3.3	2.5	18.3	24.1	14.9	18.3	10.8	13.3	4.2	5.0	1.7	3.3
13. GRID 5,4	0	.8	.8	17.4	24.1	11.6	14.1	7.5	9.1	3.3	4.2	4.2	9.1
14. GRID 6,3	0.6	.8	.8	19.9	27.4	12.5	14.1	9.1	10.8	2.5	3.3	5.8	12.5
15. GRID 8,5	0	1.7	.8	19.1	24.9	15.8	18.3	10.0	12.5	4.2	5.0	3.3	5.8
16. GRID 8,4	0	2.5	1.7	18.3	23.2	14.9	18.3	11.6	14.1	2.5	3.3	2.5	5.0
17. GRID 7,4	0	5	5	14.1	19.1	10.8	12.5	5.8	6.6	4.2	5.0	3.3	5.8
18. GRID 12,4	5.6	13.3	10.8	14.1	21.6	10.8	15.8	5.0	6.6	5.8	8.3	2.5	5.8
19. GRID 5,5	0	1.7	1.7	15.8	20.8	11.6	12.5	8.3	9.1	2.5	3.3	2.5	5.8

1. From Table IA
2. From "all point sources" model run with long term average meteorology (1977-78 365 day average regime frequencies), and selective plume trapping. 1978 emissions = RACT, except for Kingsford and Veneer driers. 1987 emissions = RACT.
3. From "all area sources" model runs with long term average (LTA) emissions rates and meteorology (1977-78 365 day average regime frequencies), and selective plume trapping.
4. Combination of three VMT-based area sources--paved and unpaved road dust, and motor vehicle exhaust
5. Paved road dust only
6. Unpaved road dust only
7. Wood Space Heating only

Table IIC "Worst" Worst Case, 24-hr ave. TSP – Major Contributing Sources (μg/m³)

	1987 Exceedance over 150 μg/m³ Standard (1)	Point Source Impacts (2) 1978	Point Source Impacts (2) 1987	Area Source Impacts (3) 1978	Area Source Impacts (3) 1987	Transportation Impacts (4) 1978	Transportation Impacts (4) 1987	Paved Road Impacts (5) 1978	Paved Road Impacts (5) 1987	Unpaved Road Impacts (6) 1978	Unpaved Road Impacts (6) 1987	Wood Burning Impacts (7) 1978	Wood Burning Impacts (7) 1987
1. Commerce	8.8	13.1	11.3	66.6	85.9	46.4	52.9	34.9	42.5	7.3	9.0	17.8	30.3
2. Westmorland	16.5	10.9	9.4	39.8	55.0	28.4	33.2	19.2	23.2	7.5	9.7	9.3	19.2
3. So. Eugene	0	6.8	4.6	12.9	18.8	9.1	11.3	5.2	6.4	3.4	4.5	3.4	7.0
4. Oakway	0	13.5	9.8	47.4	62.5	39.0	44.4	29.9	35.4	6.6	8.1	7.1	16.7
5. Library	0	50.1	41.1	54.9	71.0	43.1	49.5	31.6	37.7	8.7	10.5	10.1	19.5
6. Thurston	0	9.9	8.5	28.4	44.9	23.0	32.0	15.4	21.6	7.1	10.5	3.7	10.5
7. DMV	0	51.0	37.5	55.0	74.1	42.3	50.5	26.8	32.9	13.6	16.6	9.2	19.3
8. PNW Bell	21.9	66.4	54.8	62.1	81.2	48.2	56.3	31.3	37.3	14.6	17.7	10.9	21.5
9 City Shops	67.2	60.4	48.7	57.4	75.3	45.1	53.1	28.7	34.4	14.5	17.7	9.4	18.8
10. GRID 3,4	0	4	3	57	98	47	78	17	28	27	46	7	17
11. GRID 4,5	39	34	27	80	100	65	75	46	55	17	20	7	18
12. GRID 5,4	22	15	13	70	95	47	56	30	37	12	15	17	33
13 GRID 11,4	27	53	49	55	71	45	50	19	23	23	26	8	17
14 GRID 8,4	20	34	26	60	76	50	58	40	48	7	9	8	16
15. GRID 6,3	0	3	2	53	75	33	38	24	28	7	13	18	35
16. GRID 8,5	1	21	14	56	74	45	53	29	37	12	15	9	19
17 GRID 7,4	6	30	25	64	70	44	52	27	33	14	17	8	16
18 GRID 9,5	0	37	25	40	57	29	33	17	23	8	9	10	21
19, GRID 5,5	0	7	7	57	73	42	47	30	37	9	10	10	21
20 GRID 3,6	0	8	7	48	67	39	48	26	32	11	13	6	15

1. From Table IC
2. From "all point sources" model run with "worst worst case" meteorology (February 18, 1977), and selective plume trapping. 1978 emissions=RACT, except for Kingsford and Veneer Dryers (DEQEVIT). 1987 emissions=RACT (DEQEE9U).
3. From "all area sources" model runs (DEQEVIY) with long term average (LTA) emissions rates, "worst worst case" meteorology (February 18, 1977), and selective plume trapping.
4. Combination of 3 VMT-based area sources--paved and unpaved road dust, and motor vehicle exhaust (DEQEVIY)
5. Paved road dust only. (DEQEE9U)
6. Unpaved road dust only. (DEQEE9U)
7. Wood space heating only. (DEQEE9U; DEQEVIY)

The Solution

A. Candidate Control Strategies Modeled

Point Sources

- HF Boilers - 0.1 and 0.05 gr/scf
- Part. Bd. Dryers - 1.0 and 0.35 lb/1000 ft^2
- Cyclones - Baghouse
- Pulp Mill - BACT
- Rock Crushers - 10% Opacity.

Area Sources

- Paved Road Dust - Trackout reduction; (cleaning credits)
- Unpaved Road dust - paving
- Wood Space Heat - burn drier wood; weatherization.
- VMT Reductions - affects PRD, UPRD and motor veh.

B. Approach of Proposed Strategy

Phase I = "Hard Strategies, Implemental Now

1. Pave "worst 10 miles"
2. Cyclone controls
3. Weatherize 50% of AQMA homes, by 50% (ave)
4. Growth Mgmt Plan

Phase II = Study Additional Strategies and Improve Model.

1. Sources to be studied
   a. HF Boilers - LAER (0.05 gr/scf); improved operations.
   b. Wood Heating - PR Campaign to "burn drier wood"
      Promote weatherization.
   c. Paved Road Dust - trackout control; vacuum sweeping
   d. Other - slash, field burning; rock crushers
2. Model Improvement
   a. Meteorology - develop worst case met regime(s)
      - variance study
   b. CMB Analysis - road dust, wood stoves, other
   c. Calibration - at more violation sites.
      - decay factor feasibility

Phase III = Select and Implement Additional Strategies

- Reassess 1987 exceedances
- Select & Implement Additional Strategies to attain and maintain TSP Standards

C. Estimated Results of Strategies

CUMULATIVE IMPACT of STRATEGIES ON EXCEEDANCES – ANNUAL AVE.

	GRID		PHASE I			Phase II			
		1987 Exceedance	PAVING	CYCLONES	WEATHERIZE (25%)	PRD Trackout (50%)	VMT Reduced (10%)	Burn Drier Wood	Boilers to 0.05
EUGENE	48	-2.41	-2.89	-2.92	-4.47	-6.37	-8.27	-9.62	-10.47
WESTMORLAND	46	-7.15	-8.67	-8.72	-9.50	-10.70	-11.60	-12.25	-12.40
So. EUGENE	20	-27.71	-28.17	-28.19	-28.67	-28.87	-29.37	-29.77	-30.11
OAKWAY	62	-9.13	-9.29	-9.35	-10.23	-11.03	-12.23	-12.98	-13.77
3,4	45	-7.71	-15.18	-15.18	-15.81	-18.31	-20.41	-20.96	-20.96
4,5	60	-1.07	-2.74	-2.74	-3.37	-7.97	-10.07	-10.62	-11.42
5,4	47	-3.56	-5.23	-5.23	-6.48	-8.18	-9.38	-10.48	-10.48
6,3	34	-0.6	-0.6	-0.6	-2.48	-3.28	-4.48	-6.08	-6.08
7,4	49	-3.56	-3.56	-3.56	-4.61	-5.01	-6.21	-7.11	-9.61
5,5	61	-4.39	-5.22	-5.22	-6.05	-8.55	-9.75	-10.45	-10.45
3,6	73	–	–	–	–	–	–	–	–
SPR LIB	51	+3.4	+2.39	+2.31	+1.76	-0.84	-2.49	-3.24	-4.39
THURSTON	55	-8.50	-12.26	-13.46	-14.24	-16.74	-18.24	-18.89	-21.64
DMV	66	-0.12	-3.55	-3.73	-4.76	-7.26	-9.06	-9.96	-10.91
PNB	81	+11.4	+8.47	+8.27	+7.24	+4.14	+2.34	+1.44	+0.57
11,4	53	+11.4	+3.1	+1.4	+0.35	-1.35	-3.05	-3.95	-8.95
8,4	50	-1.9	-2.73	-2.73	-3.36	-3.36	-5.06	-5.61	-6.41
8,5	64	-1.9	-6.05	-6.05	-7.10	-9.6	-11.7	-12.6	-12.6
12,4	54	+5.6	-0.21	-1.91	-2.74	-3.94	-5.64	-6.34	-9.69
9,5	65	–	–	–	–	–	–	–	–

CUMULATIVE IMPACT of STRATEGIES ON EXCEEDANCES – 24-HOUR AVE 7

	GRID	1987 Exceedance	PHASE I Paving			Phase II PRD Truck ox (50%)			
			Paving	Cyclones	Weatherize (25%)	PRD Truck ox (50%)	VMT Reduced (10%)	Burn Drier Wood	Boilers to 0.05
EUGENE	48	+8.8	+7.6	+6.42	+1.87	-3.73	-9.03	-12.98	-17.98
WEST MIRLAND	46	+16.5	+13.3	+12.68	+9.78	+5.18	+1.88	-0.62	-5.72
SO. EUGENE	20	-51.6	-53.3	-53.5	-54.55	-55.15	-56.25	-57.15	-59.45
OAKWAY	62	-4.8	-8.4	-10.42	-12.92	-16.02	-20.52	-22.67	-23.87
3, 4	45	-6.0	-34.0	-34.0	-36.5	-49.5	-52.0	-54.15	-55.15
4, 5	60	+39.0	+32.0	+32.0	+29.25	+14.25	+6.75	+4.35	+2.35
5, 4	47	+22.0	+18.0	+18.0	+13.0	+6.0	-0-	-4.35	-10.35
6, 3	34	-10.0	-12.0	-13.0	-18.25	-19.75	-23.75	-28.3	-29.3
7, 4	49	+6.0	+5.0	+4.0	+1.5	-2.5	-7.5	-9.65	-14.65
5, 5	61	-7.0	-11.0	-15.0	-18.25	-24.25	-28.75	-31.55	-32.55
3, 6	73	-16.0	-25.0	-34.0	-36.5	-43.5	-48.5	-50.65	-52.65
SPR. LIB.	51	-0.2	-6.4	-16.24	-19.19	-26.59	-31.49	-33.99	-40.14
THURSTON	55	-9.5	-16.10	-26.68	-28.31	-34.91	-38.21	-39.61	-39.91
DMU	66	-1.3	-13.3	-26.56	-29.46	-36.96	-41.96	-49.46	-48.06
PNB	51	+21.9	+10.10	-6.84	-10.09	-19.59	-25.19	-27.99	-34.39
11, 4	53	+27.0	+3.0	-24.0	-26.75	-31.75	-37.25	-39.65	-41.65
8, 4	50	+20.0	+19.0	+18.0	+15.5	+7.5	+1.5	-0.65	-4.65
8, 5	64	+1.0	-13.0	-27.0	-29.75	-32.75	-37.75	-40.15	-41.15
12, 4	54	-5.0	–	–	–	–	–	–	–
9, 5	65	+5.0	-2.0	-9.0	-12.25	-14.75	-18.25	-21.05	-23.05

III. Growth Management Strategy

A. For "Major" New or Modified Sources (≥ 50 T/yr)

1. NSR rule, ... plus
2. "Zero impact" within the AQMA (LRAPA rule)
3. To eliminate such impacts, apply
   a. LAER - inside AQMA
      BACT - outside AQMA
   b. Offsets, for remaining impact

B. For "Minor" New or Modified Sources

1. Highest and Best Practible Controls
2. Available Growth Cushion

OR

1. Highest and Best Practicable Controls
2. Allocate up to 10% of available growth cushion as a Growth Increment
3. Require offsets for remaining impact.

C. Background TSP

Sources - outside AQMA

Slash Burning
Field Burning
Agriculture
Urban Plume - track trends @ Background sites
Major Point Sources outside LRAPA jurisdiction - Ask DEQ to enforce special LRAPA "zero impact" requirements on permit applicants

D. Area Sources

- Offsets required for major or minor sources must include not only stack emissions, but also those area source emissions "induced" by facility operation or employee activities = NSR rule.

(11)

V. Estimated SIP Adoption Schedule

August 29	Draft SIP mailed to CAC, DEQ
Sept. 3rd	CAC Mtg - SIP Presentation - Comments
Sept 10th	CAC Mtg – present revised SIP; request CAC approval
Sept 12th–15th	Final SIP draft ready for public hearing
Sept. 20th	Publish Public Notices for – LRAPA Board SIP Hearing – Accelerated A-95 Review
Oct. 21st	LRAPA Board conducts SIP hearing
Oct. 31st	Get on EQC agenda
Nov. 7th	DEQ final Staff report due
Nov 21st	EQC Adoption (concurrence) of SIP
Dec. 1st	Transmit approved SIP → EPA

Appendix 4.6.3.1--1

Seton, Johnson and Odell Data Base

seton, johnson & odell, inc.
consulting engineers

317 s.w. alder street
portland, oregon 97204
(503) 226-3921

EMISSION INVENTORY IMPROVEMENTS AND PROJECTIONS FOR THE EUGENE-SPRINGFIELD AIR QUALITY MAINTENANCE AREA

Prepared For:

State of Oregon
Department of Environmental Quality

By:

Candice L. Hatch
F. Glen Odell, P.E.

DATA BASE DEVELOPMENT

February 15, 1978
By:
Seton, Johnson, & Odell, Inc.

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LIST OF FIGURES, Continued

EXECUTIVE SUMMARY

The purpose of this study was to develop data bases for six different years for total suspended particulate (TSP) emission sources within the Eugene-Springfield Air Quality Maintenance Area (AQMA) (see pg. 14). The Eugene-Springfield area has been designated as an AQMA by the U.S. Environmental Protection Agency because of that area's continuing and projected violations of the National Ambient Air Quality Standards for total suspended particulate. The EPA requires that areas designated as AQMA's for specific pollutants must develop, by January 1, 1979, attainment and maintenance plans which will reduce pollutant concentratons for those pollutants below the Federal standards by January 1, 1983. The particulate emissions data bases generated in this study will be used in subsequent computer modelling of ambient particulate concentrations to help determine which control strategies should be adopted to reduce particulate concentrations in the Eugene-Springfield AQMA below the Federal standards.

Emission data bases were generated for 1974, 1976 and for projection years 1980, 1985, 1990 and 1995. A worst case data base was also developed for 1995. Historical emission data for point sources and most area sources was obtained from the Department of Environmental Quality (DEQ) emission inventory. For new area source emission categories, emission factors were researched and emissions were calculated. Emission projections for future years employed historically based information to approximate the most probable emission occurrence conditions. A large number of local and state wide agencies were contacted in an effort to obtain the most accurate available information. The emission source data base for each year was based on the best available information about each source.

Point source projections were calculated using two methodologies. All wood products related industry emissions were projected to decline according to reduced timber harvesting. Other AQMA industries had their emissions increased up to their maximum production capacity based on a projected employment timetable.

Area source projections methodologies varied for each area source category. Generally, trends were developed using appropriate demo-

TABLE 1

EUGENE-SPRINGFIELD AQMA

SOURCE CONTRIBUTORS TO TSP EMISSION TOTALS

SOURCE CATEGORY	1976 EMISSIONS TONS/YEAR	% CONTRIBUTION	1995[1] EMISSIONS TONS/YEAR	% CONTRIBUTION
Point Sources:				
Process equipment	8064.5	50.0	7466.4	37.3
Unpaved yards	156.7	1.0	156.7	0.8
Subtotal	8221.2	51.0	7623.1	38.1
Area Sources:				
Paved road dust	2829.0	17.5	4940.0	24.6
Motor vehicles	566.2	3.5	678.2	3.4
Residential space heating - distillate oil	11.5	0.1	11.2	0.1
Residential space heating - natural gas	5.9	0	6.0	0
Commercial space heating - residual oil	3.4	0	3.4	0
Commercial space heating - natural gas	0.5	0	0.6	0
Open burning & field burning	72.4	0.4	61.0	0.3
Wood space heating	556.5	3.4	918.1	4.6
Orchard pruning	10.0	0.1	10.0	0.1
Railroads & aircraft	39.6	0.2	46.1	0.2
Unpaved road dust	3528.0	21.9	5359.0	26.7
Small point sources	173.8	1.1	260.3	1.3
Agricultural tilling & off-highway vehicles	123.1	0.8	117.7	0.6
Subtotal	7919.9	49.0	12411.6	61.9
Total	16141.1	100.0	20034.7	100.0

[1] most probable case

EMISSION TRENDS

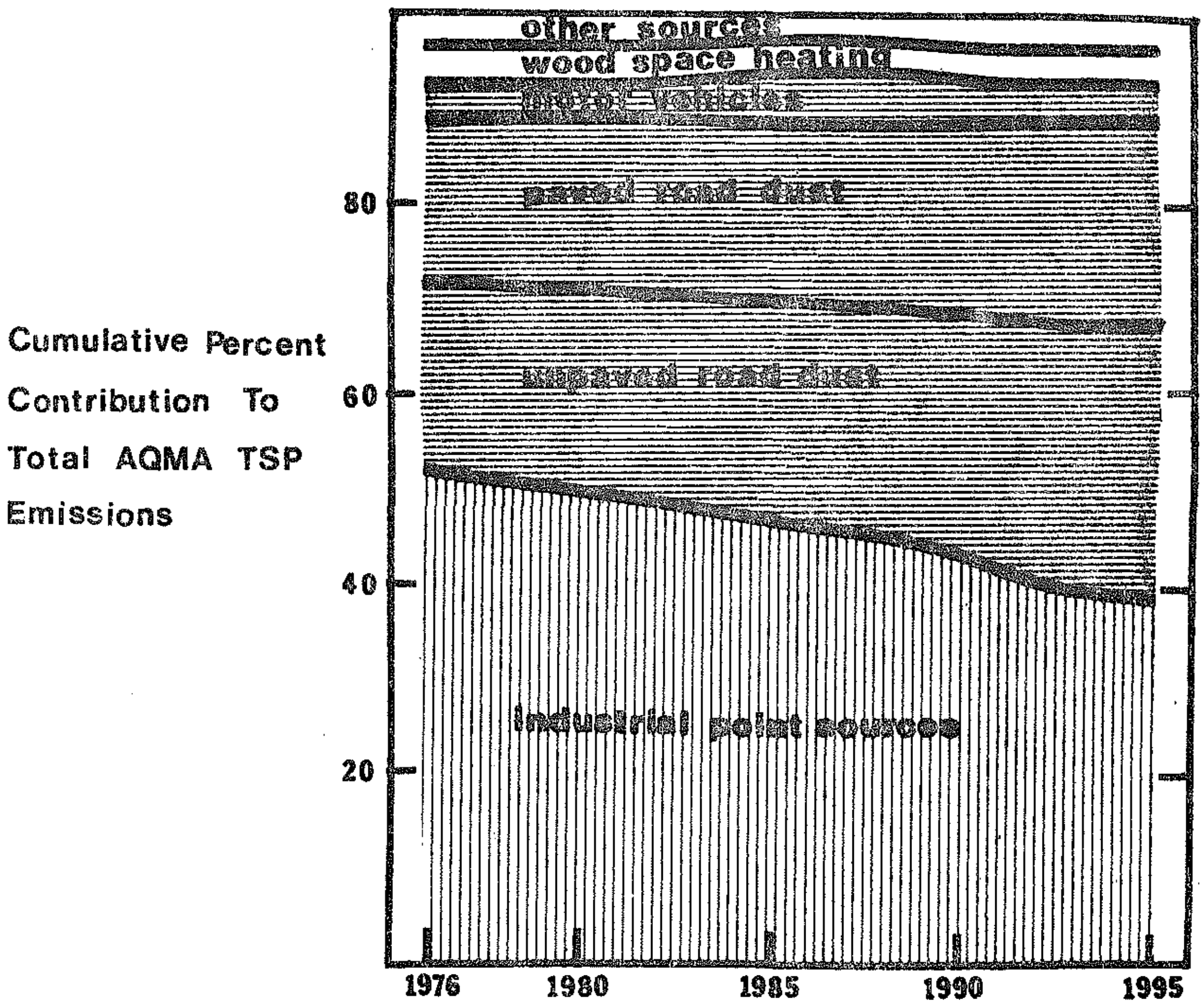
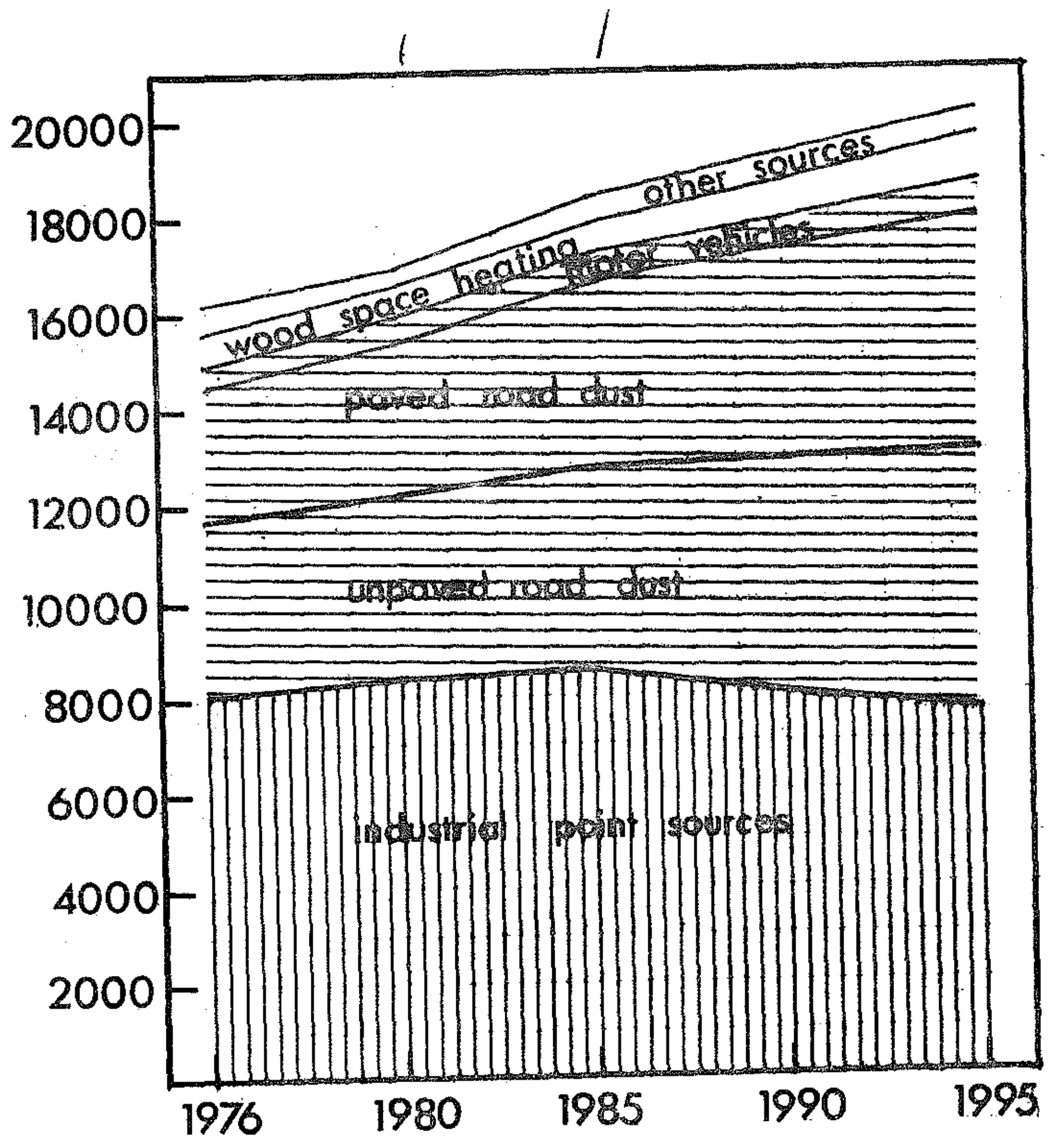


FIGURE 1

Figure 2

Cumulative Tons Contribution of Sources To Total AQMA TSP Emissions



EXECUTIVE SUMMARY, Continued

graphic or applicable information supplied by local, private or government agencies.

Of the fourteen source categories for which TSP emissions were projected, five sources dominate. As can be seen from Table 1 on page 7, the significant categories are point sources, paved road dust, motor vehicles, wood space heating and unpaved road dust. The combined contribution of these categories for all years of interest is over 97% of total emissions.

The emission trend graph on Figure 1 best details how these five categories will change. Point source emissions as a unit are expected to decline, even though some individual industries may show increases with production growth. The largest emission increases are projected in paved road dust, in which 1995 emissions will be 70% greater than in 1976. Paved road dust is projected to comprise 24.3% of total AQMA emissions in 1995, compared with 17.6% in 1976. Although unpaved roads are a larger AQMA emission source than paved roads in 1976 and 1995, the growth rate of unpaved road dust is not as high. If current growth trends continue paved road dust emissions will surpass unpaved emissions after 1995. Figure 2 shows the cumulative tons contribution of major sources to total AQMA TSP emissions. Although there is a separate motor vehicle category which includes TSP emissions from tire wear and exhaust, paved and unpaved road dust categories are also motor vehicle related. The shaded areas on the emission trend graph display how industrial and motor vehicle related emissions far overshadow emissions from the other categories.

The maps presented on pages 11 and 12 (Figures 3 and 4) indicate the percent change per grid in area and total source particulate emissions between 1976 and 1995. The area source categories primarily responsible for grids showing significant percent increases are paved and unpaved road dust, and wood space heating.

The final section in this report deals with recommended data improvements. The sources requiring the most attention are paved and unpaved road dust. The current results for these two sources are based on significant staff efforts to use the best information available at the time of this study. However, the emission factors

EXECUTIVE SUMMARY, Continued

for these two sources are relatively new, and may need to be modified as additional emission rate information becomes available.

Figure 3

PERCENT CHANGE IN AREA SOURCE TSP

EMISSIONS PER GRID 1976 - 1995

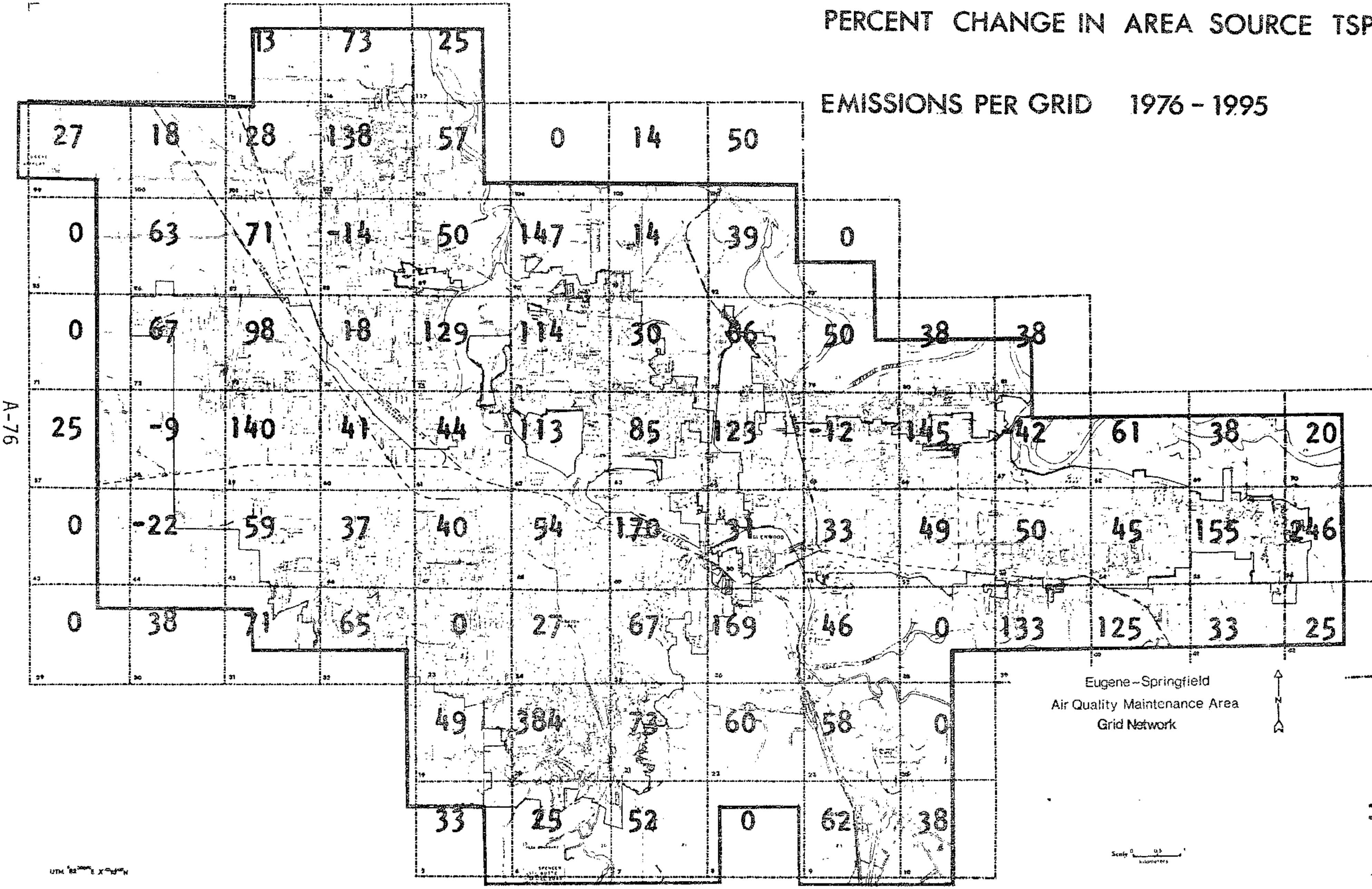
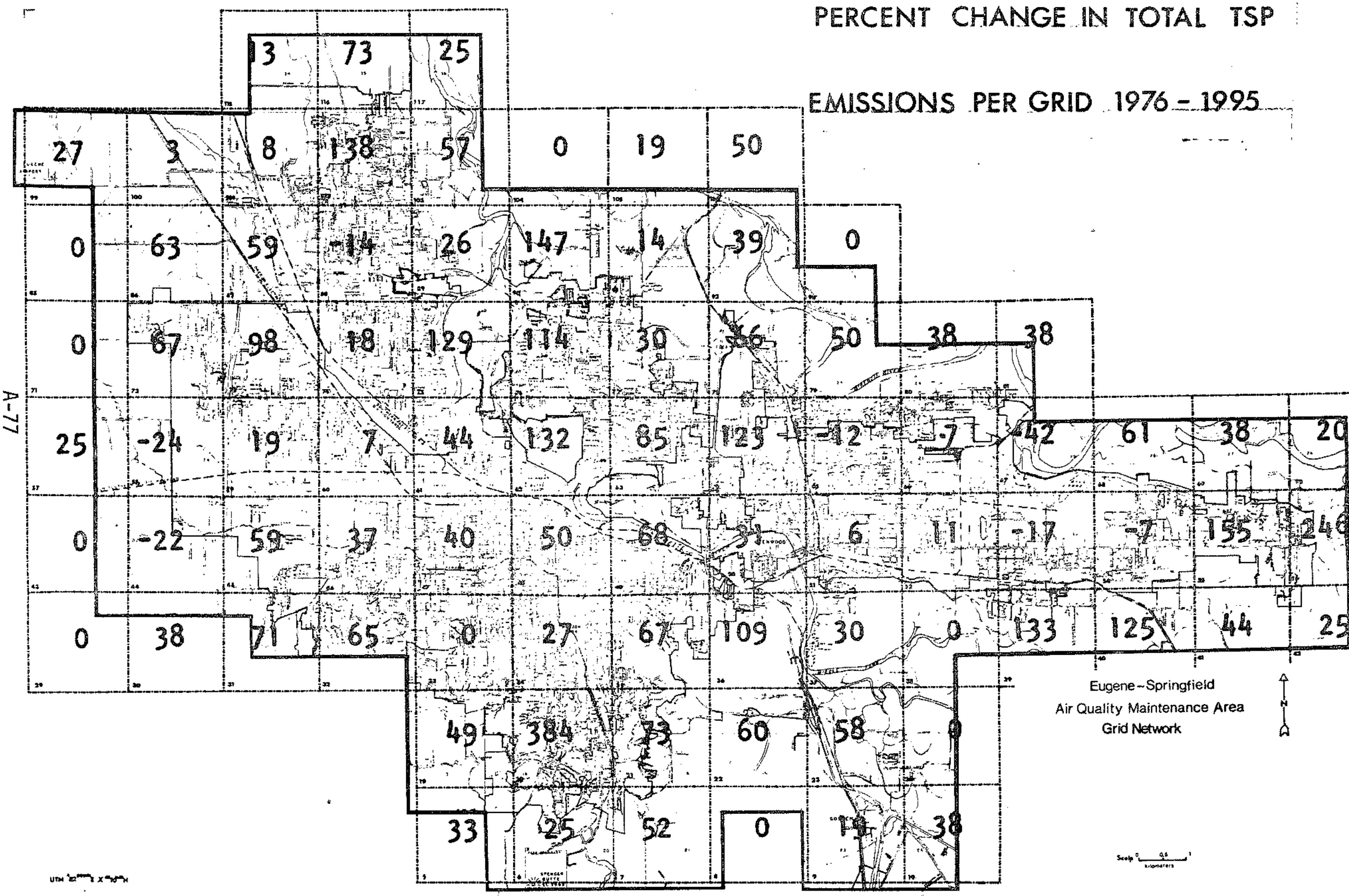


Figure 4

PERCENT CHANGE IN TOTAL TSP

EMISSIONS PER GRID 1976 - 1995

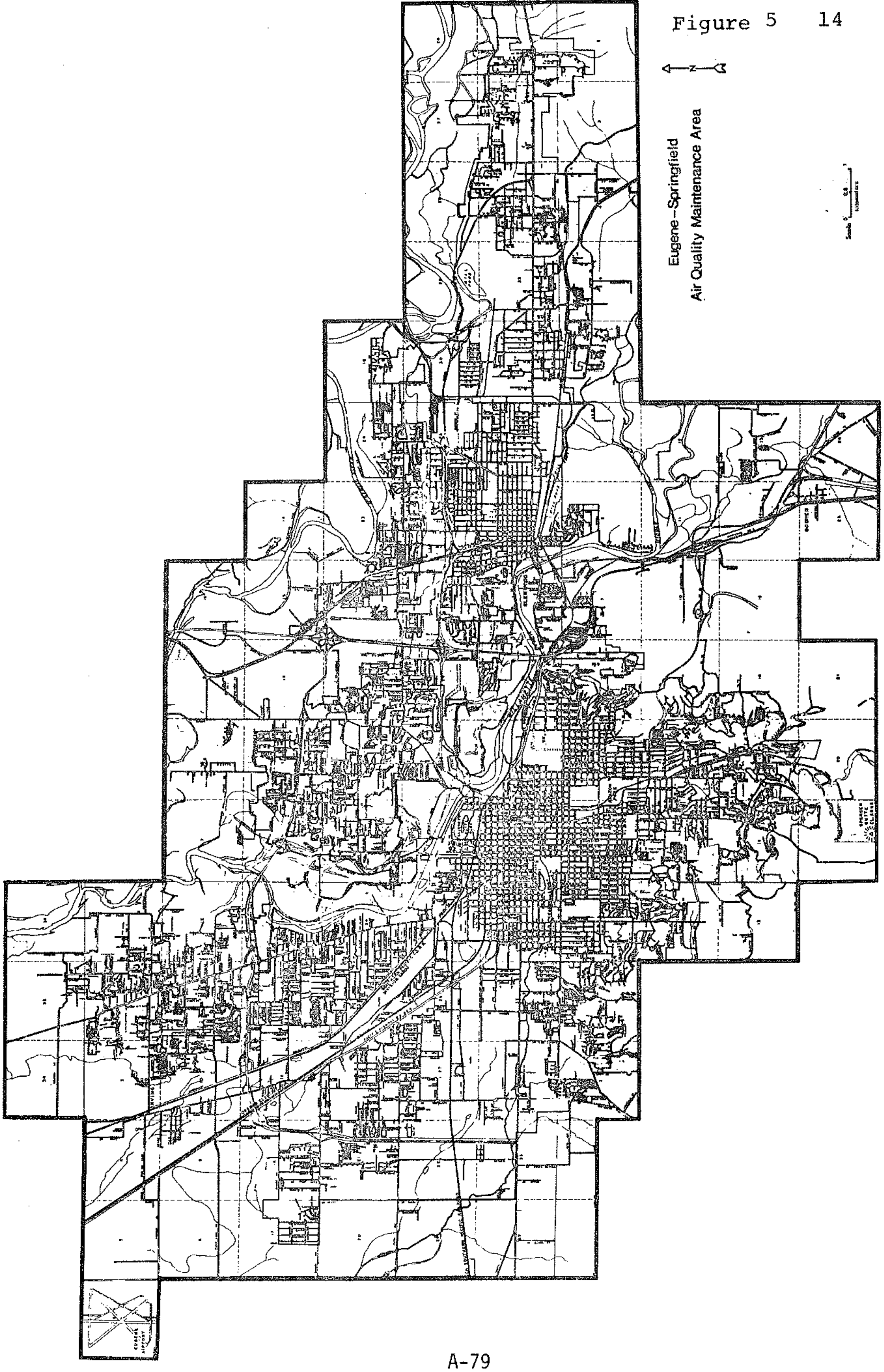


1. INTRODUCTION

The purpose of this study is to assist the Oregon Department of Environmental Quality (DEQ) and Lane Regional Air Pollution Authority (LRAPA) in the first step toward preparing an Air Quality Maintenance Area (AQMA) Plan. The Eugene Springfield area has been designated as an Air Quality Maintenance Area because future growth in the area is projected to cause continuing violations of the National Ambient Air Quality Standards for total suspended particulate (TSP).[1] The map in Figure 5 outlines the study area.

The scope of work consisted of developing TSP emission inventory data bases for 1974 and 1976 and projecting emissions for future years 1980, 1985, 1990 and 1995. Significant sources of TSP were included in each data base under the two main headings of point and area sources. Projections for all four future years were based on most probable occurrence parameters. An additional 1995 data base was produced based on 'reasonable' worst case information. All allocation and projections were made consistent with federal regulations and studies of the area.

Figure 5 14



2. EMISSIONS ALLOCATION

Base year data were collected for 1974 and 1976. Total suspended particulate (TSP) emissions were allocated to the 2 x 2 kilometer grid network developed for the Eugene-Springfield AQMA (Figure 6). Table 2 is a summary of county and AQMA TSP total emissions. Allocation procedures and results are described in the following sections.

2.1 Point Sources

Point source information as recorded in the emission inventory (EI) for Lane County is updated each year according to individual source operating conditions. Data for all point sources inside the AQMA were extracted from the inventory by LRAPA. Only sources having a total plant site emission of greater than 10 tons per year of TSP were included in the point source tabulation; smaller facilities are incorporated in the area source categories. Table 3 is a list of point sources contained in this study and their assigned emissions. Other important point source parameters are:

a. UTM coordinates
b. tons per year of TSP
c. stack parameters
d. EI number
e. SIC number
f. ID number (equipment identification)

Careful consideration and review of each point source was performed before coding emissions and stack parameters. As an overall view of point source emissions in the Eugene-Springfield AQMA, the following breakdown by standard industrial classification (SIC) applies:

Figure 6

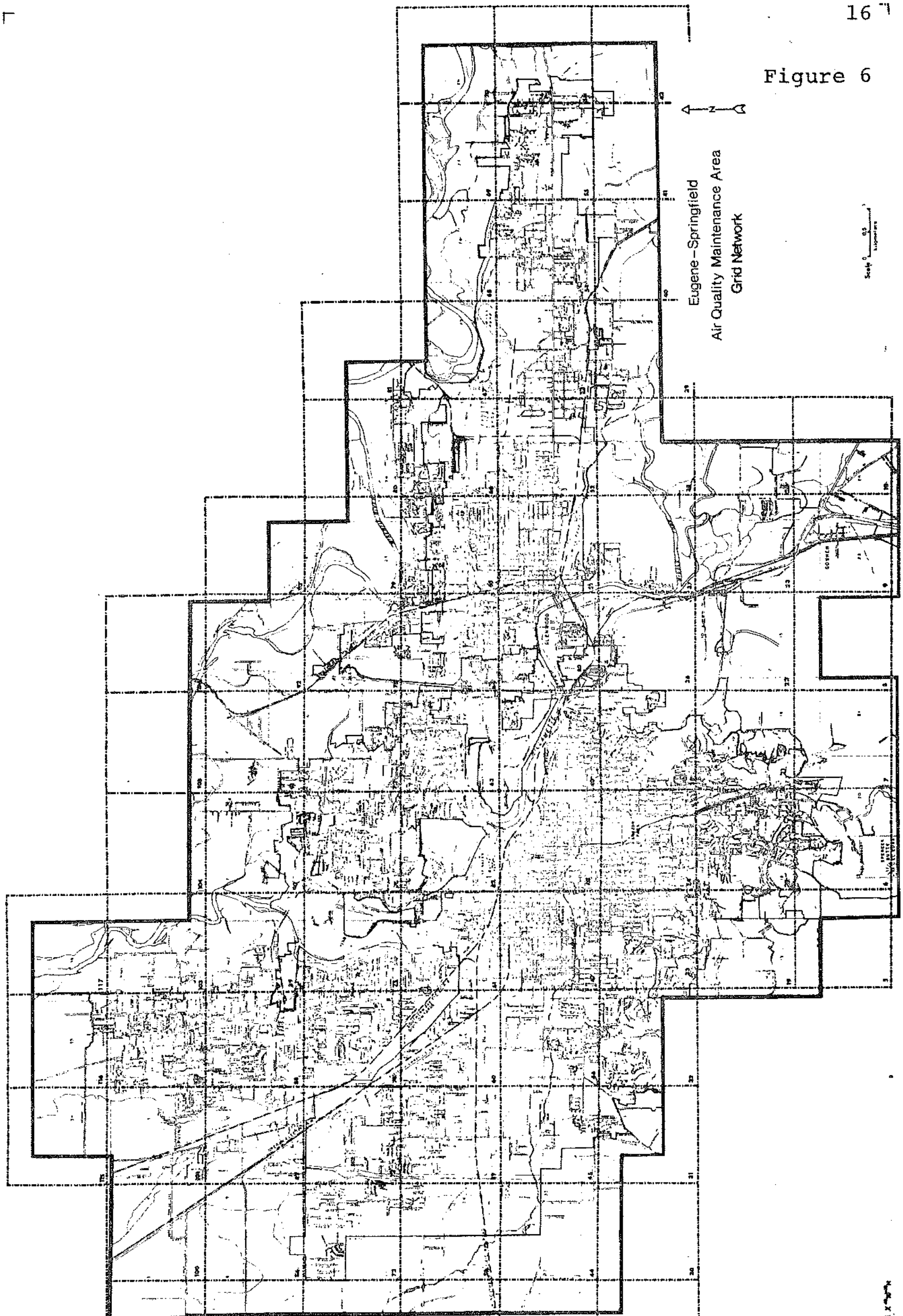

Eugene-Springfield
Air Quality Maintenance Area
Grid Network

TABLE 2

TOTAL SUSPENDED PARTICULATE EMISSIONS

1976 (tons/year)

SOURCE CATEGORY	LANE COUNTY TOTALS (DEQ)	EUGENE-SPRINGFIELD AQMA TOTAL	% OF AQMA TOTAL
POINT SOURCES:			
Process equipment	--	8064.5	50.0
Unpaved yards	--	156.7	1.0
SUBTOTAL		8221.2	51.0
AREA SOURCES:			
Paved road dust	--	2829.0	17.5
Motor vehicles	901.9	566.2	3.5
Residential space heating, distillate oil	16.1	11.5	0.1
Residential space heating, natural gas	8.6	5.9	0
Commercial space heating, residual oil	15.4	3.4	0
Commercial space heating, natural gas	3.9	0.5	0
Open burning & field burning	435.0	72.4	0.5
Wood space heating	--	556.5	3.4
Orchard pruning	37.4	10.0	0.1
Railroads & aircraft	192.5	39.6	0.2
Unpaved road dust	--	3528.0	21.9
Small point sources	--	173.8	1.1
Agricultural tilling & off-highway vehicles	489.4	123.1	0.8
SUBTOTAL	2100.2	7919.9	49.0
TOTAL	2100.2	16141.1	100.0

TABLE 3 — Major Point Sources >25TPY

EUGENE-SPRINGFIELD AQMA

POINT SOURCES ----- >10TPY

EI#	ID#	NAME	EQUIPMENT DESCRIPTION	TSP TONS/YEAR 1974	TSP TONS/YEAR 1976
200529	231	Bohemia Inc. Particleboard	Incinerator/Baghouse	32.1	32.1
200529	232	Bohemia Inc. Particleboard	Saw & Dry Kiln/cyclone	105.6	67.8
200529	233	Bohemia Inc. Particleboard	Sander/baghouse	6.0	6.0
201203	320	Cone Lumber Co.	Boiler, wood fired	41.6	41.6
201203	321	Cone Lumber Co.	Cyclone	7.5	7.5
201203	322	Cone Lumber Co.	Cyclone	8.3	8.3
201204	331	CAMAC Veneer	Chipper/cyclones	13.7	13.7
201209	370	Clear Fir Products Co.	Boiler, wood fired	14.9	14.9
201209	371	Clear Fir Products Co.	Baghouse	1.2	1.2
202119	661	Delta Sand & Gravel	Sizing equipment	29.8	29.8
202500	681	Eugene Sand & Gravel	Dryer/multiclone	8.0	8.0
202501	690	Eugene Stud & Veneer Inc.	Boiler, wood fired	17.7	17.7
202501	691	Eugene Stud & Veneer Inc.	Cyclone	2.6	2.6
202505	710	Eugene Water & Electric	Multiclone For which source?	493.6	375.9
202524	801	Eugene Sand & Gravel	Sizing equipment	39.4	39.4
203102	901	Georgia Pacific Corp.	Wood waste burner	5.0	5.0
203102	902	Georgia Pacific Corp.	All other sources	9.6	9.6
203511	1050	Hearin Mfg. - Bethel Dry Kiln	Boiler, wood fired	36.0	36.0
203511	1051	Hearin Mfg. - Bethel Dry Kiln	Planer/cyclone	1.0	1.0
205139	1541	Morse Brothers Inc.	Dryer/venturi	0.0	4.0 ?
205800	1561	National Metallurgical	Furnace/baghouse	0.0	0.0
205800	1562	National Metallurgical	Furnace/baghouse	20.0	13.2
205800	1563	National Metallurgical	Baghouse	0.2	0.2
207465	2011	Springfield Quarry Rock Products	Crusher/wet cyclone	15.6	15.6
207471	2041	SWF Plywood (plant #2)	Veneer dryer	0.0	0.0
207471	2042	SWF Plywood (plant #2)	Chip handling/cyclone	7.7	7.7
207471	2043	SWF Plywood (plant #2)	Other/cyclone	0.6	0.6
208557	2280	University of Oregon	Boilers, wood fired controls?	511.6	511.6
208851	2341	Wildish Sand & Gravel	Dryer/multiclone	21.0	16.0
208871	2501	Wildish Sand & Gravel	Dryer/multiclone	13.8	13.8
208892	2641	Wildish Sand & Gravel	Sizing equipment	39.1	39.1
208893	2651	Wildish Sand & Gravel	Sizing equipment	54.7	54.7
208896	2681	Willamette Quarries Inc.	Sizing equipment	12.2	12.2

TABLE 3
EUGENE-SPRINGFIELD AQMA
POINT SOURCES, Continued...

EI#	ID#	NAME	EQUIPMENT DESCRIPTION	TSP TONS/YEAR 1974	TSP TONS/YEAR 1976
208850	2331	Weyerhaeuser Co.	Recover furnaces	686.6	596.7
208850	2332	Weyerhaeuser Co.	Lime kiln	567.5	104.5
208850	2333	Weyerhaeuser Co.	All other sources	117.6	69.8
208858	2391	Weyerhaeuser Co.	Air transfer cyclone	13.8	13.8
208858	2392	Weyerhaeuser Co.	Hog & sand cyclone	32.6	32.6
208858	2393	Weyerhaeuser Co.	Sander/cyclones	8.3	8.3
208858	2394	Weyerhaeuser Co.	Veneer dryer	28.4	28.4
208866	2460	Weyerhaeuser Co.	Boiler, wood fired	1667.0	1667.0
208866	2461	Weyerhaeuser Co.	Hog/cyclone	4.9	4.9
208866	2462	Weyerhaeuser Co.	Planer & saw	51.6	51.6
208866	2463	Weyerhaeuser Co.	Air transfer system	26.1	26.1
208867	2471	Weyerhaeuser Co.	All other sources	62.6	47.0
208867	2472	Weyerhaeuser Co.	Dryer	551.0	413.0
203105	921	Georgia Pacific Corp.	All other sources	58.9	58.9
203105	922	Georgia Pacific Corp.	Veneer dryer	36.8	36.8
203105	920	Georgia Pacific Corp.	Boilers, wood fired	187.6	187.6
204402	1140	Kingsford Corp.	Furnace	2657.0	2657.0
204402	1141	Kingsford Corp.	Dryer	163.6	163.6
207050	1811	Rosboro Lumber Co.	All sources	15.1	15.1
207056	1850	Rosboro Lumber Co.	Boiler, wood fired	115.1	115.1
207056	1851	Rosboro Lumber Co.	Cyclones	13.0	13.0
208864	2450	Willamette Industries - Springfield	Boiler, wood fired	1.3	1.3
208864	2451	Willamette Industries - Springfield	Veneer Dryer	17.7	17.7
208864	2452	Willamette Industries - Springfield	Hog & chipper	11.8	11.8
207459	2000	Seneca Sawmill Co.	Boiler, natural gas	1.6	1.6
207459	2001	Seneca Sawmill Co.	All other sources	22.9	22.9
204700	1170	Leading Plywood Corp.	Other	1.0	1.0
204700	1171	Leading Plywood Corp.	Veneer dryers	19.0	19.0
204700	1172	Leading Plywood Corp.	Hog/cyclones	3.9	3.9
201205	340	Cabax Mills - Mill A	Boiler, wood fired	52.0	52.0
201205	341	Cabax Mills - Mill A	Veneer Dryer	24.0	24.0
201205	342	Cabax Mills - Mill A	All other sources	8.4	8.4

TABLE 3
EUGENE-SPRINGFIELD AQMA
POINT SOURCES, Continued...

EI#	ID#	NAME	EQUIPMENT DESCRIPTION	TSP 1974	TONS/YEAR 1976
201218	420	Cascade Handle	Boiler, wood fired	26.0	26.0
201218	421	Cascade Handle	Sander/cyclone	12.1	12.1
204701	1180	Lane Plywood Inc.	Boilers, wood fired	60.0	60.0
204701	1181	Lane Plywood Inc.	Veneer dryer	26.2	26.2
204701	1182	Lane Plywood Inc.	All other sources	21.2	21.2
202500	9003	Eugene Sand & Gravel (excavation site)	Unpaved yards	34.7	34.7
202119	9008	Delta Sand & Gravel	Unpaved yards	72.9	72.9
209951	9018	Zip-O-Log Veneer/Sawmill	Unpaved yards	11.8	11.8

SIC #	DESCRIPTION	1976 POINT SOURCE EMISSIONS (T/YR)	% OF TOTAL
14 --	Sand & Gravel	163.0	1.9
24 --	Wood Products	3860.8	45.0
26 --	Paper Products	771.0	9.0
28 --	Charcoal Products	2820.6	32.9
29 --	Asphalt	28.0	0.3
32 --	Nonmetallic Minerals	27.8	0.3
33 -	Smelting	13.4	0.2
49 --	Power Generation	887.5	10.4

Figures 7 & 8 display the spatial distribution of point source emissions for 1974 and 1976. The numbers in each grid are point source TSP emissions in tons per year. (Unpaved yard emission allocation is presented in Section 2.2).

2.2 Area Sources

Thirteen categories of important area sources are included in the study:

1. paved road dust
2. motor vehicles
3. residential space heating - distillate oil
4. residential space heating - natural gas
5. commercial/institutional space heating - residual oil
6. commercial/institutional space heating - natural gas
7. open burning and field burning
8. wood space heating
9. orchard pruning
10. railroads and aircraft
11. unpaved road dust
12. small point sources (sources <10T/yr emissions)
13. agricultural tilling and off-highway vehicles

Allocation procedures for each category were quite varied and will be further detailed in the following pages. Unless otherwise specified, allocation procedures for 1974 and 1976 are identical.

Paved road dust - Because of the relative newness of calculation procedures no previous emissions had been calculated for the Eugene-Springfield AQMA. Development of an emission factor was necessary before emissions could be calculated and distributed. EPA has been working with Midwest Research Institute (MRI) and PEDCo Environmental, Inc. to develop an overall emission factor.[2, 23]

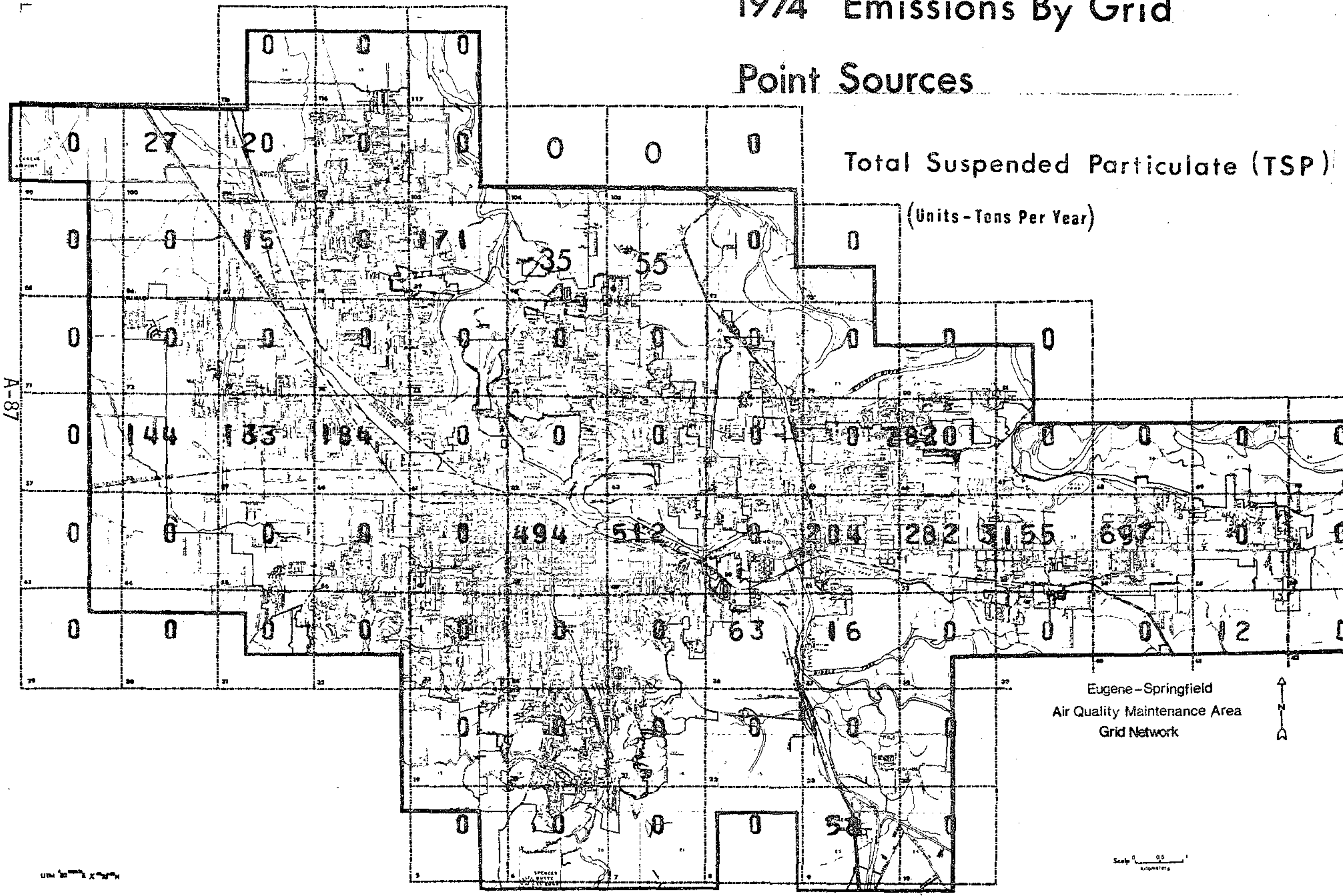
Figure 7

1974 Emissions By Grid

Point Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)



Eugene-Springfield
Air Quality Maintenance Area
Grid Network

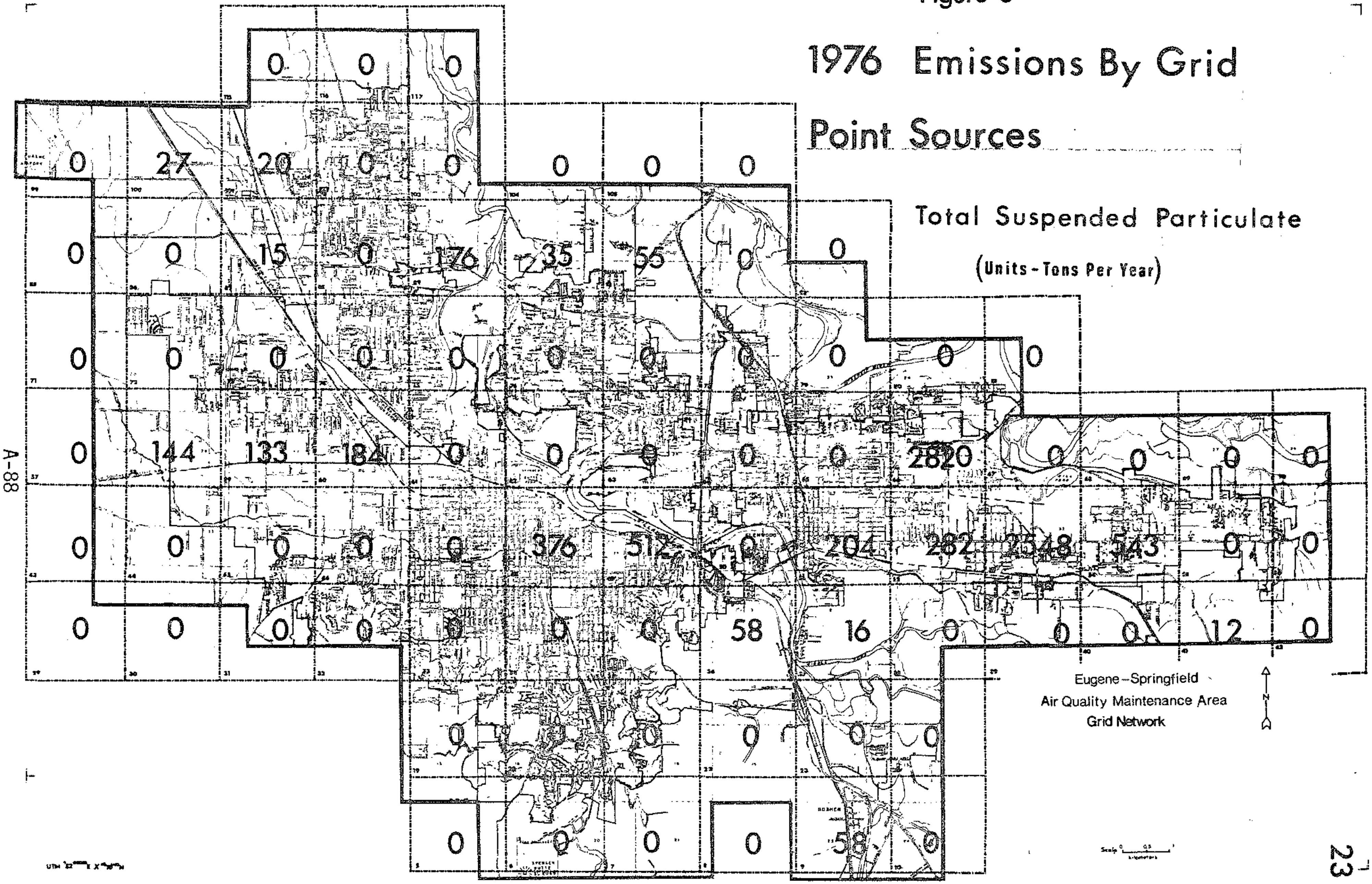
Figure 8

1976 Emissions By Grid

Point Sources

Total Suspended Particulate

(Units - Tons Per Year)



A problem has arisen in emission factor development in that the PEDCo study results do not agree with the MRI study paved road dust emission rates. EPA is in the process of producing a report which combines the two studies, but it will not be completed in time for this analysis. Therefore, an estimated emission factor was calculated using best available information.

The emission factor equation developed by MRI was not used in this AQMA study due to the conflicting results in the PEDCo report and EPA recommendation. The "Control of Reentrained Dust From Paved Streets" report by PEDCo displays a regression analysis which finds no correlation between street dust loadings and paved road dust emission rates. The MRI equation was based on such a correlation developed on an artificially dust loaded street. In the MRI study an attempt was made to correlate emission rates and land use zones, PEDCo found no justification for such a relationship. Due to these conflicts, EPA recommended using emission rates from actual measurements.

PEDCo measured dust concentrations due to vehicular traffic on thirty-five streets.[23] These concentrations were converted to source emission rates using the Gaussian line source equation and other appropriate input data. The average total vehicle dust emission rate for PEDCo's 35 sites was 4.21 grams per vehicle-mile (at 10 meters downwind). MRI data was only measured on 5 streets averaging 6.85 grams per vehicle-mile (at 5 meters downwind. Actual study data are provided in Appendix 8.1.a.

Taking a weighted average of these two rates results in an emission rate of 4.54 g/vmt for total particulate due to vehicles. Subtracting out particulate emissions due to exhaust, tire wear, etc., leaves a total paved road dust emission factor of 4.02 g/vmt.

Our review of EPA's document "Guideline for Development of Control Strategies in Areas with Fugitive Dust Problems", together with several conversations with EPA staff, led to the conclusion that some additional corrections to the emission factor are necessary.[3] These corrections include the effects of rainfall and particle size. It was found in the MRI study that approximately 90% (by weight) of TSP emissions from paved roads were less than 30 μm in size.[2] This is considered the aerodynamic cut-off diameter for entrainment of particles. Larger particles will fall out not far from the roadway.

2.2 Area Sources, continued

The literature indicates that paved road dust entrainment does not occur on days with more than 0.01 inches of rain.[3] The AQMA had 111 such days (w) in 1976, and 138 days (w) in 1974.[6] Combining these two facts resulted in this emission factor:

$$e = (.9)\ (4.016\ \text{g/vmt})\ \left(\frac{365 - w}{365}\right)$$

Where:

e = emission factor (g/vmt)
w = mean annual # of days with > .01 inches rainfall

Therefore for 1976, e = 2.52 g/vmt
1974, e = 2.25 g/vmt

Vehicle miles traveled (vmt) per grid were allocated in the motor vehicle category. Multiplying these vmt/grid by the proper emission factor distributed paved road dust emissions per grid for 1976 and 1974. Emissions are greater for vehicles with more than four wheels. The actual distribution displayed in figure 9 was completed as follows:

$$e\left(\frac{HDVvmt}{grid} \times \frac{18}{4} + \frac{LDVvmt}{grid}\right) = \frac{TSP}{grid}$$

This equation assumes heavy duty traffic has 18 wheels and thus the correction factor of (18/4).

Motor Vehicles

Oregon State University's Civil Engineering Department, working under contract to National Science Foundation, supplied vmt data by grid for the Eugene-Springfield Area (see Appendix 8.1.b). Actually, OSU coded link lengths and average daily traffic for each grid by road type (freeway, arterial, local, etc.). From this information, vmt per grid were calculated.

The next step in allocating motor vehicle emissions was to determine the heavy duty vehicle (HDV) mix on these different road types. Oregon State Highway Division (OSHD) publishes Traffic Volume Tables which list the different percentages of HDV at established recorder locations.[7] For freeways the average HDV mix was 10% and for other roads was 5% HDV.

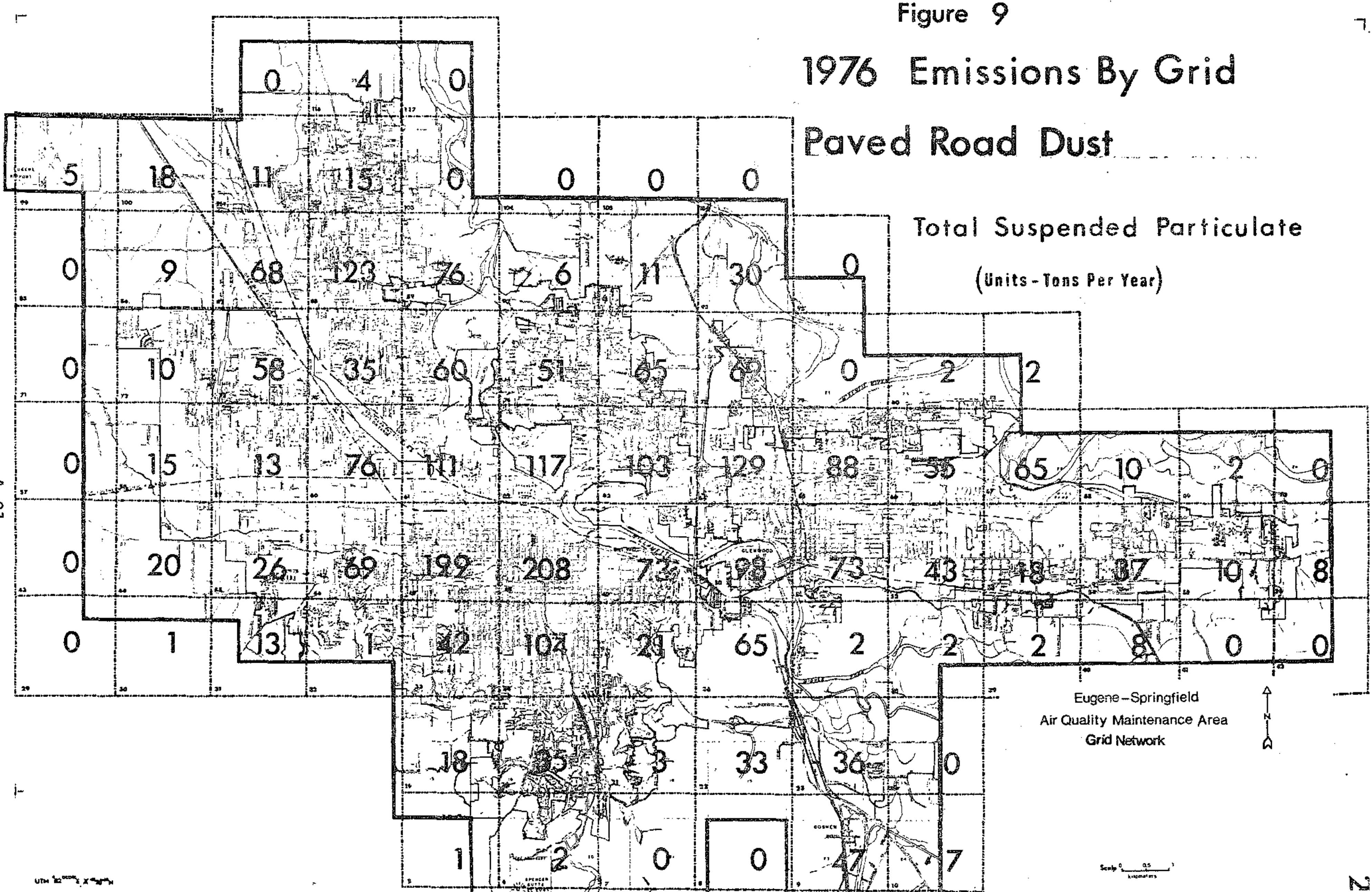
Motor vehicle emissions and total vmt for Lane County were supplied by DEQ. Ratioing AQMA total vmt (8.776×10^8) to the county vmt (1.373×10^9) results in about 63% of county traffic

Figure 9

1976 Emissions By Grid
Paved Road Dust

Total Suspended Particulate

(Units - Tons Per Year)



2.2 Area Sources, continued.

occurring inside the AQMA. Motor vehicle emissions (TSPmv) per grid were calculated by adding light duty vehicle (LDV) emissions and heavy duty vehicle (HDV) emissions using this equation:

$$\left(\frac{VMT_{LDV}}{grid} \times \frac{\text{county } TSP_{LDV}}{\text{county } VMT_{LDV}}\right) + \left(\frac{VMT_{HDV}}{grid} \times \frac{\text{county } TSP_{HDV}}{VMT_{HDV}}\right) = \frac{TSP_{mv}}{grid}$$

The map in Figure 10 shows how these emissions are distributed throughout the AQMA in 1976.

Residential Space Heating - Distillate Oil and Natural Gas

The Bureau of Governmental Research has records of Oregon's 1970 census broken down by county. For Lane County, they provided a computer listing of the number of owner occupied houses (OOH) using various fuels per census tract. Lane Council of Governments (LCOG) had population distribution per census tract (CT) for 1976 and 1970.[8] The OOH for 1976 were obtained by multiplying OOH in 1970 by the population changes per census tract (see Appendix 8.1.c) LCOG information has been used in several studies for the Eugene-Springfield area and has proven most reliable.

Census tracts were outlined on a grid network map and fraction of a census tract per grid calculated.

The county total TSP emission for residential space heating (rsh) were divided by county total houses (COOH) to determine emissions per household. Emissions per grid were allocated according to:

$$\frac{FCT}{grid} \times \frac{OOH}{CT} \times \frac{TSPrsh}{COOH} = \frac{TSPrsh}{grid}$$

where: $\frac{FCT}{grid}$ = fraction of census tract per grid

Natural gas emissions were allocated in a similar manner

Commercial/Institutional Space Heating - Residual Oil and Natural Gas

Oregon's Department of Commerce supplied DEQ with a complete listing of boilers in Lane County. This listing included each boiler's location and heating surface area. From work done previously in the Portland Interstate AQMA (PIAQMA) study, a positive relationship between boiler heating surface area and fuel consumption was found.[9]

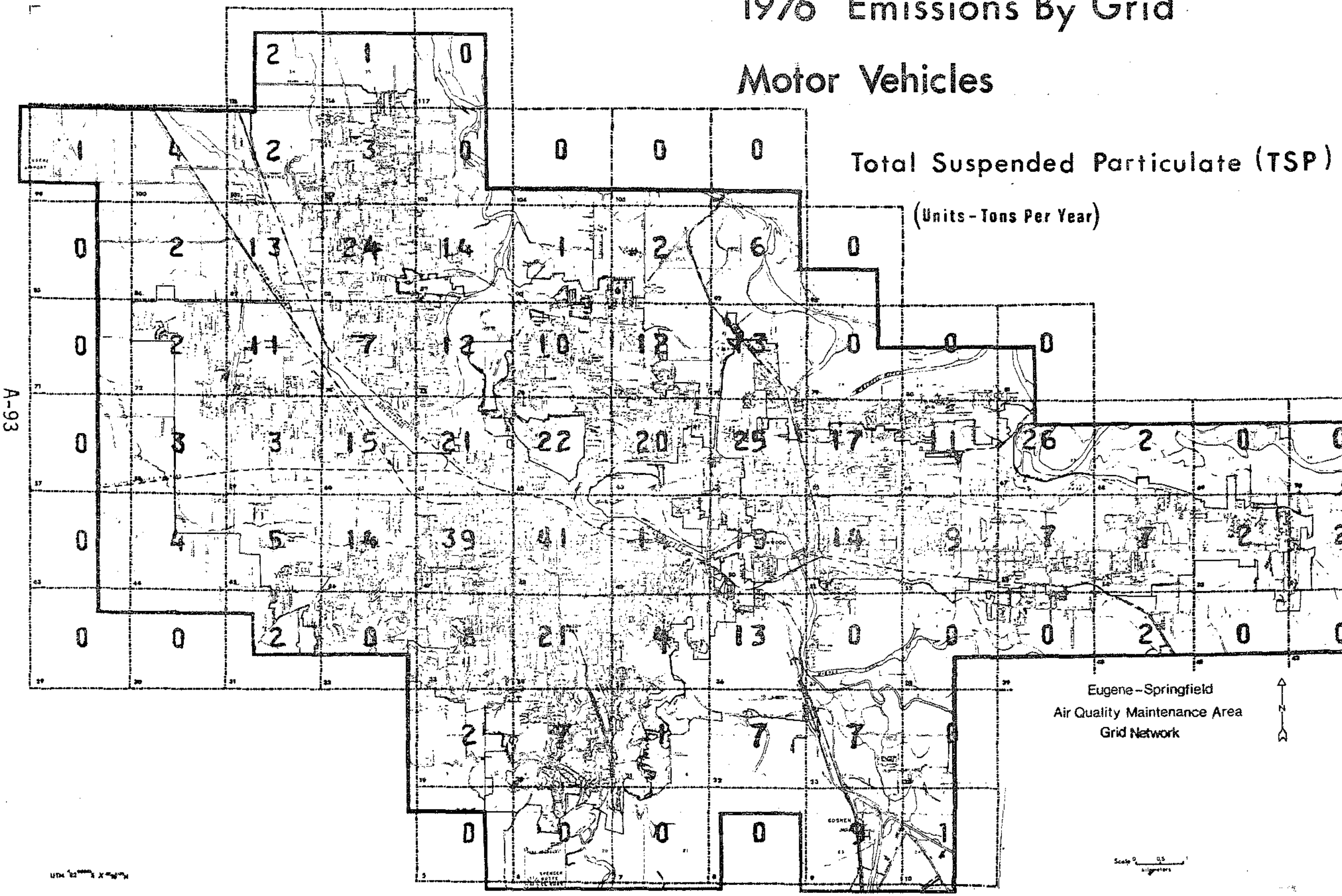
Figure 10

1976 Emissions By Grid

Motor Vehicles

Total Suspended Particulate (TSP)

(Units - Tons Per Year)



2.2 Area Sources, Continued

Using the Commerce boiler list as a master, all boilers inside the AQMA were located and their heating surface areas allocated to appropriate grids. Large boilers with annual particulate emissions greater than 10 tons, were excluded from this process and included as point sources.

Because this category is particularly relevant to residual oil and natural gas consumption, a boiler fuel use estimation was needed. A random sampling of boilers was taken from the master list and a telephone survey performed by LRAPA. There were 254 responses from a sample of 332 boilers resulting in the following fuel use breakdown:

38% residual oil
22% distillate oil
22% natural gas
13% electric
4% steam
1% wood

DEQ supplied county total TSP emissions for commercial space heating. Emissions were allocated according to the following:

$$\frac{ft^2}{grid} \times \frac{CTSPro}{C\ ft^2} \times FU = \frac{TSPro}{grid}$$

where: ft^2/grid = heating surface area per grid
CTSPro = county total TSP for residual oil
C ft^2 = county total heating surface area
FU = fuel use fraction from survey

Natural gas emissions were allocated similarly.

Open Burning and Field Burning

Open burning emissions for residential and commercial use areas are calculated on a population basis.[10] Therefore, TSP for open burning was allocated by population. The population figures per census tract from LCOG were employed to allocate population per grid.[8] There is no open burning in Eugene so these grids were excluded from allocation. Combining population per grid, county total population and county emissions, open burning AQMA emissions were distributed (figure 11).

Figure 11

1976 Emissions By Grid

Field Burning and Open Burning

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

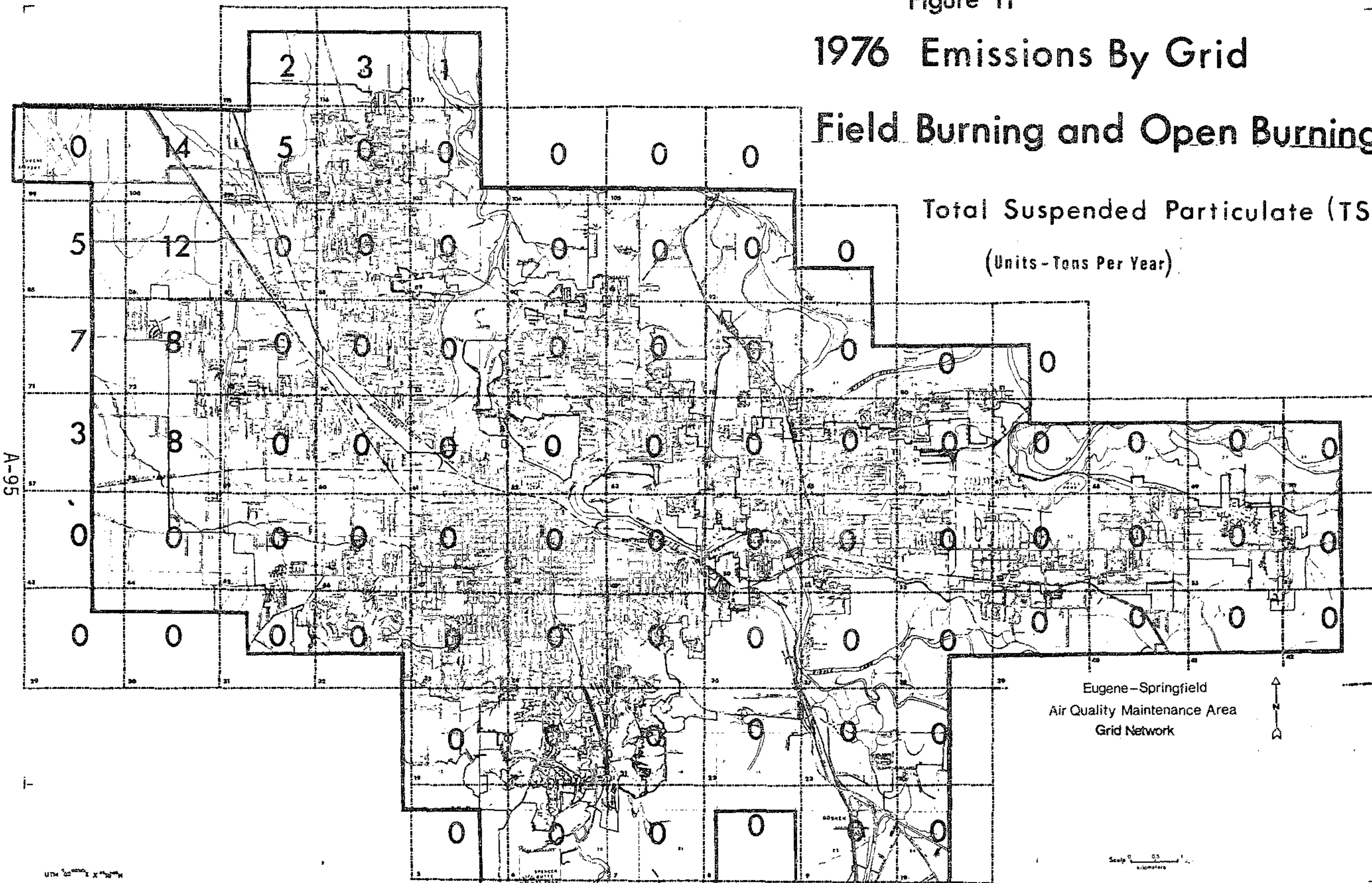


TABLE 4

WOOD SPACE HEATING SURVEY RESULTS

FUEL	% OF RESIDENCES TELEPHONE SURVEY	1970 CENSUS
Electric	56	59
Natural gas	14	16
Distillate oil	13	21
Wood	6	4

2.2 Area Sources, Continued

Field burning occurs only in one limited area in the northern part of the AQMA. Actual acreages burned per grid were supplied by DEQ. Emissions were allocated to these grids only. It should be emphasized that the present study considers only emissions originating within the AQMA, and that the impact of external sources will be considered in subsequent studies by DEQ.

Wood Space Heating

The rising cost and uncertainty of supply of oil and natural gas are believed to be contributing to an increase in wood burning for residential heating. In order to estimate the amount of wood burned inside the AQMA, a telephone survey was conducted by LRAPA. A statistically designed random list of names was extracted from the telephone book in order to acquire as representative a sample as possible. Responses to questions from the questionnaire in Appendix 8.1.d were inputs to a computer program which reduced the data. Output included city name, sample size, owner or renter, primary fuel used in heating, and average number of cords burned per household per wood burning device. When comparing the survey results to information from the 1970 census, the theory that wood fuel is being used more today than in 1970 is supported in Table 3. A reduction in the use of oil and natural gas is also demonstrated.

The Air Quality Planning and Standards Division of EPA supplied the emission factors for fireplaces and heating stoves of 23 and 18 pounds particulate per ton of wood burned respectively. Recent source tests support these findings.[11]

From the telephone survey information and emission factors, the amount of TSP emitted per household was calculated according to this equation:

$$\frac{(FP \times CB_1 \times FPef) + (HS \times CB_2 \times HSef)}{OOH} = \frac{TSPwb}{OOH}$$

where:
- FP = fireplace and heatolator units
- HS = heating stoves and wood heaters
- CB_1 = average no. of cords burned per fireplace
- CB_2 = average no. of cords burned per heating stove
- OOH = number of owner occupied households

2.2 Area Sources, Continued

where: FPef = fireplace emission factor
(23 lb/T x 3500 lb/cord x 1T/2000 lb = 40.2 lb/cord

HSef = heating stove emission factor
(18 lb/T x 3500 lb/cord x 1T/2000lb = 31.5lb/cord)

TSPwb = wood burning total suspended particulate (T/yr)

Eugene results were 0.017 TSPwb/OOH while Springfield had 0.015 TSPwb/OOH. These factors in combination with the number of OOH per grid, developed in residential space heating, were used to allocate wood space heating emissions as in Figure 12.

Orchard Pruning

Orchard pruning emissions occur when farmers burn the prunings from their trees. Allocation was accomplished using NASA infrared aerial photographs to locate the grids containing orchards. The Census of Agriculture has 6918 acres of orchards in Lane County. County emissions of 37.4 T/yr was distributed as 0.005 T/yr/acre. Multiplying emissions per acre times the number of orchard acres per grid completed emission distribution.

Railroad and Aircraft

Railroad emissions were separated into road and switching yard categories. Interviews with the Southern Pacific Railroad indicated approximately 4% of total fuel consumption could be allotted to each switching yard as was done in the PIAQMA study.[9] Therefore, 4% of county emissions were allocated to the switching yards in Eugene (12 T/yr) and Springfield (3 T/yr). Remaining county emissions were divided by total county track mileage to obtain emissions per year per mile of track (0.53 T/yr/mi). A map showing railroad tracks was used to determine the number of miles of track per grid.

There is only one major airport within the AQMA. Aircraft emissions (4.4T/yr) were allocated to the grids containing this airport.

Unpaved Road Dust

The unpaved road dust category is new to the Eugene-Springfield AQMA emission inventory and may prove to be one of the most significant contributors of TSP. The first step to include this category is emission factor development. The equation for unpaved road dust emissions as described in Supplement #5 to Compilation of Air Pollutant

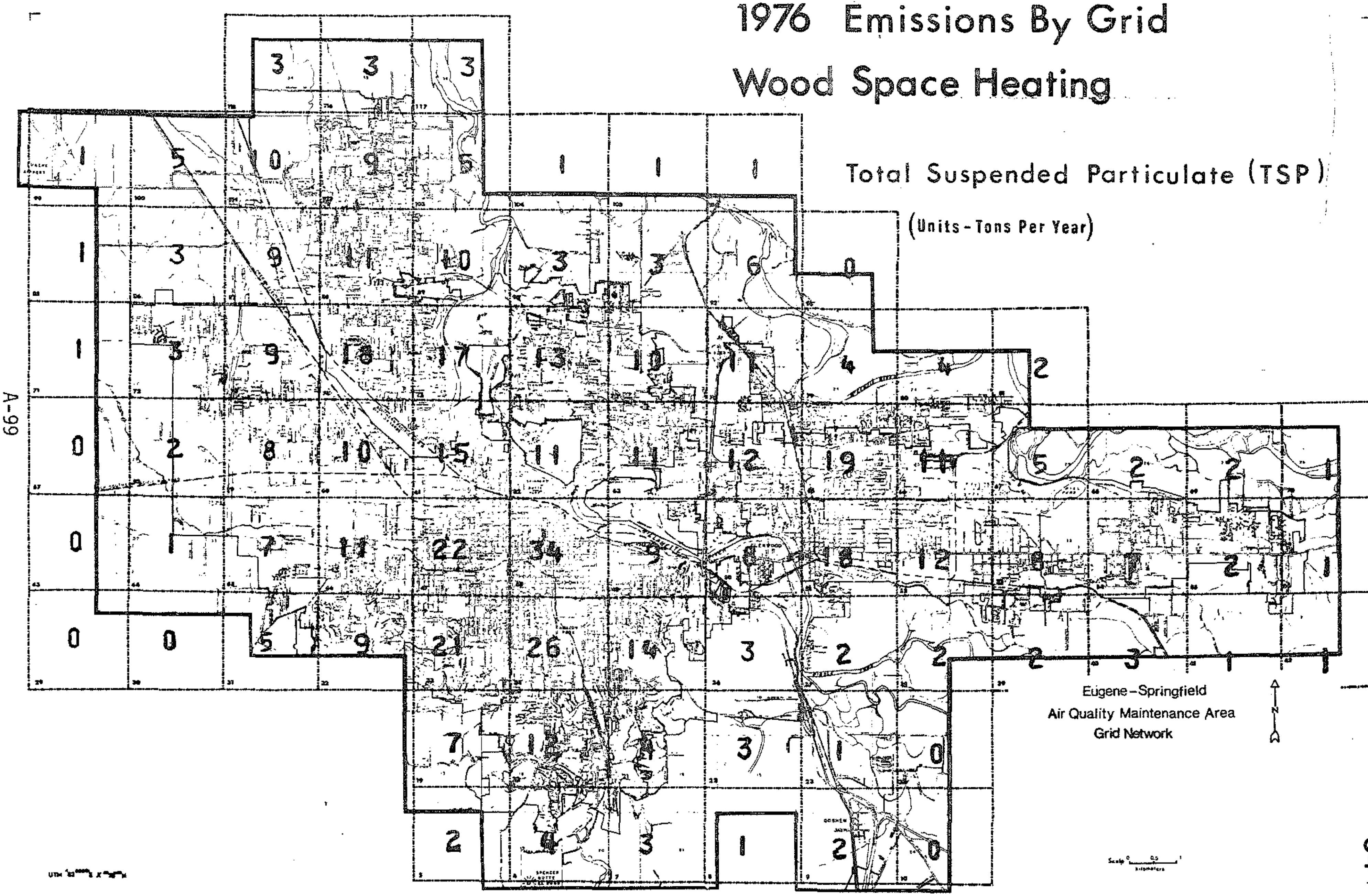
seton, johnson & odell, inc.

Figure 12

1976 Emissions By Grid
Wood Space Heating

Total Suspended Particulate (TSP)

(Units - Tons Per Year)



2.2 Area Sources, Continued

Emission Factors (AP-42)[12] is:

$$e = 0.81\, s \left(\frac{S}{30}\right) \left(\frac{365-W}{365}\right)$$

where:

e = emission factor (lb/vmt)
s = silt content of road surface material (%)
S = average vehicle speed (30 - 50 mph)
W = mean annual # of days with $\geq$0.01 in rainfall

How does the # days affect emission factor - look at moisture content

Because of the nature of roads in the AQMA, several assumptions and modifications were made to this basic equation.

For reasons discussed in the paved road dust section, this category includes particles <30 μm. For unpaved road emissions, particles in this size range make up 60% of e.[3]

Silt content (s) is defined as the portion of loose, dry surface dust which will pass a 200-mesh screen. For gravel roads, the average silt content was found to be about 12%.[13] The exact percentage of silt on gravel roads in the AQMA was not available so the average figure was used.

In the literature the reported vehicle speed on gravel roads is between 30 and 50 mph.[3, 13] After driving several city unpaved roads, the average speed was found to be about 20 mph. County road speed was estimated to be somewhat higher (30 mph). Previous studies indicate emissions vary linearly for speeds between 30 and 50 mph. This explains the factor S/30 in the equation.[13] But for speeds less than 30 mph, emissions vary approximately as ratio of speeds squared or $(S^2/30^2)$.[13, 14]

The emission factor equation was developed for four-wheeled vehicles. There is a correction for vehicles with more than four wheels of N/4, where N is the number of wheels per vehicle. Due to the lack of vehicle mix information on unpaved roads, an emission factor for only four wheeled vehicles was developed.

Rainfall varies from year to year so emission factors for both 1974 and 1976 were calculated.[6] Including modifications discussed above the following equation was used:

$$e = .6\ (.81)\ s \left(\frac{S}{30}\right)^2 \left(\frac{365-W}{365}\right)$$

For city roads the emission factors are 818.2 g/vmt for 1976 and 727.3 g/vmt for 1974. County roads with a 30 mph speed have 1863.6

2.2 Area Sources, Continued

and 1636.4 g/vmt for the same years.

Mileages and locations of unpaved roads were supplied by Eugene and Springfield Public Works Departments and by the Lane County Department of Transportation. There are 43.5 miles of unpaved roads inside the AQMA.

Lane County's Transportation Department also supplied Average Daily Traffic (ADT) counts on county maintained roads. ADT's were not available for city unpaved roads. Many of Springfield's gravel roads are close to heavily traveled areas.indicating their ADT's may be higher than the average 100 to 150 ADT cited in the literature.[14] Traffic counters were placed at several different locations in Springfield. One day's total volume was obtained for each location (see Appendix 8.1.e). The average ADT applied to Springfield gravel roads was 191. Eugene unpaved roads are in more remote areas so the average ADT of 125 was ~~used~~.

Applying the emission factors, mileages and ADT's the resulting emission distribution in Figure 13 was produced.

Small Point Sources

The point sources within the AQMA with TSP emission <10 tons/year were provided by LRAPA's emission inventory and are listed in Appendix 8.1.f. Each source was allocated to the appropriate grid by its UTM coordinates. For grids containing more than one source, emissions were totaled (Figure 14).

Agricultural Tilling and Off-Highway Vehicles

Agricultural acreage was allocated to grids using aerial photos. The Lane County total emissions associated with agricultural tilling are 470 T/yr. Oregon State University Extension Service reported 66,000 acres in Lane County require tilling.[15] Emissions are approximately 0.007 tons per year per acres tilled. Allocation was accomplished by taking emissions in tons/year/acre times acres/grid.

Off-highway vehicles were included in the agricultural tilling category because most of the vehicles are used in farming. Gasoline powered off-highway vehicles are divided into agricultural,

Figure 13

1976 Emissions By Grid

Unpaved Road Dust

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

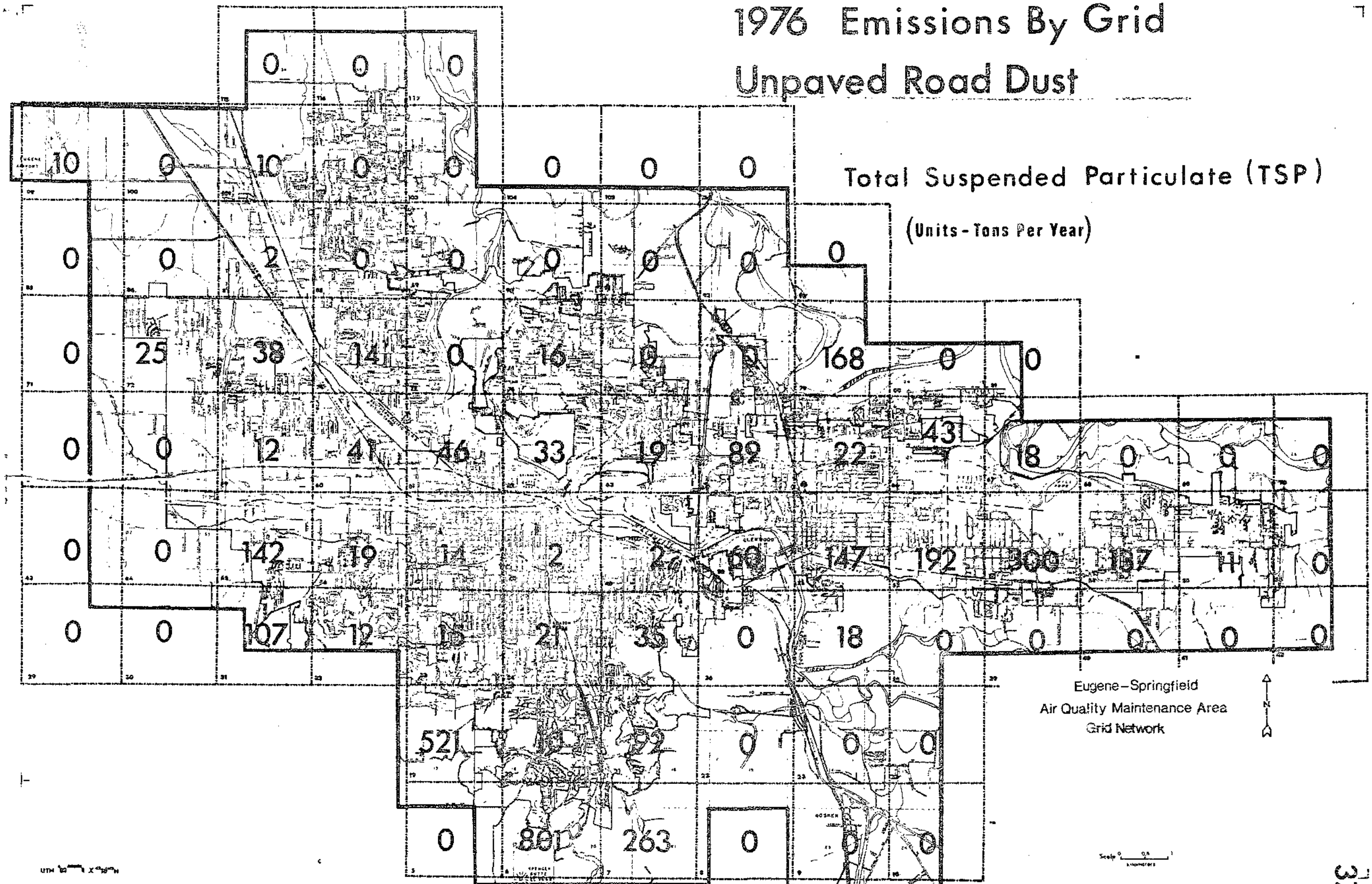


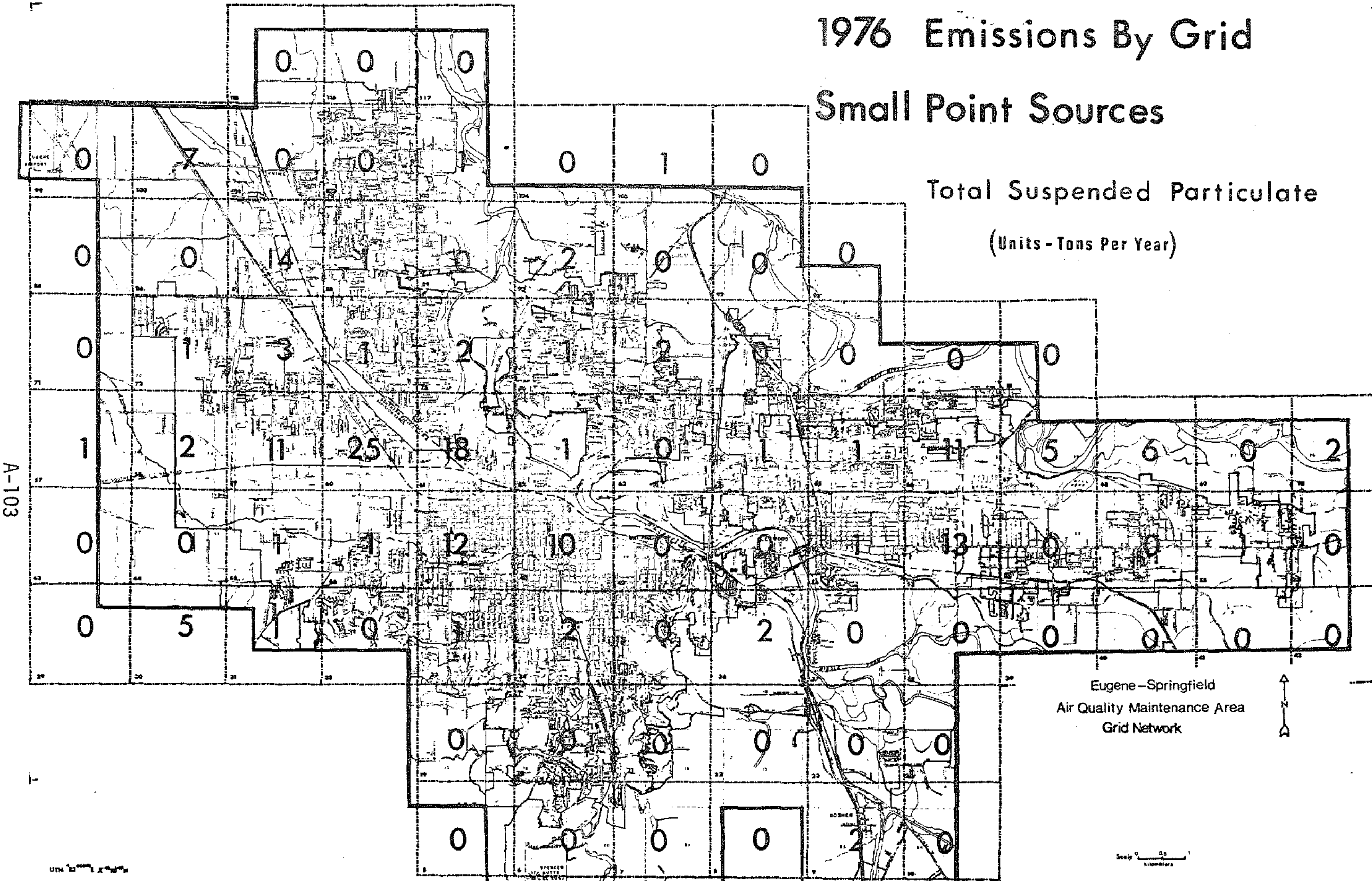
Figure 14

1976 Emissions By Grid

Small Point Sources

Total Suspended Particulate

(Units - Tons Per Year)



2.2 Area Sources, Continued

lumber, marine and commerce divisions. Emissions from these divisions are calculated using Oregon Department of Transportation Motor Vehicle Division gasoline fuel tax refund information and the appropriate emission factor.[16] Table 5 shows the emissions for each division and the county total of 6.6 T/yr for gasoline fuel.

Off-highway lumber vehicle emissions occur mostly outside of the AQMA. Commerce and marine emissions were negligible. All three sources, totaling less than 2 T/yr in AQMA emission, were excluded from allocation. The diesel powered agricultural vehicle emissions for Lane County total 12.8 T/yr in 1976 and were included in the agriculture category.

The total for Lane County gasoline and diesel agricultural off-highway emissions equals 14.5 T/yr in 1976. AQMA off-highway emissions (TSPoff) represented 27.5% of county emissions or 5.3 T/yr and were allocated by:

$$\frac{\text{Ag tilled acres}}{\text{grid}} \times \frac{\text{5.3 T/yr (AQMA total)}}{\text{Ag tilled acres (AQMA total)}} = \frac{\text{TSPoff}}{\text{grid}}$$

Summing agricultural tilling and off-highway vehicle emissions per grid distributed emissions as in Figure 15.

Other Area Sources

Forest fire and slash burning occur predominantly outside the AQMA. Marine emissions for the county were 0.1 T/yr and negligible when compared to other categories. All three categories were eliminated from allocation in this study. However, LRAPA [illegible] should not be excluded.

Unpaved Yards

Several point sources in the AQMA have large unpaved plant yards with significant amounts of traffic. This traffic generates TSP emissions like those generated on unpaved roads. Yard traffic information was collected by LRAPA for several of the major unpaved yard sources (see Appendix 8.1.g.). Information, such as vehicle type, speed and miles traveled per day, was collected and used with the emission factor equation developed for unpaved roads to calculate emissions per source. The list of sources and their associated emissions are presented in Table 6. Some sources did

TABLE 5

OFF-HIGHWAY VEHICLES - LANE COUNTY

(Gasoline Emissions)

	AGRICULTURE	LUMBER	MARINE	COMMERCE
Fuel consumption, 10^3 gal/yr	459.8	963.2	56.8	287.1
% of total fuel	26.0	54.5	3.2	16.3
Emissions, T/yr	1.7	3.6	0.2	1.1

Figure 15

1976 Emissions By Grid
Ag. Tilling and Off-Highway Vehicles

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

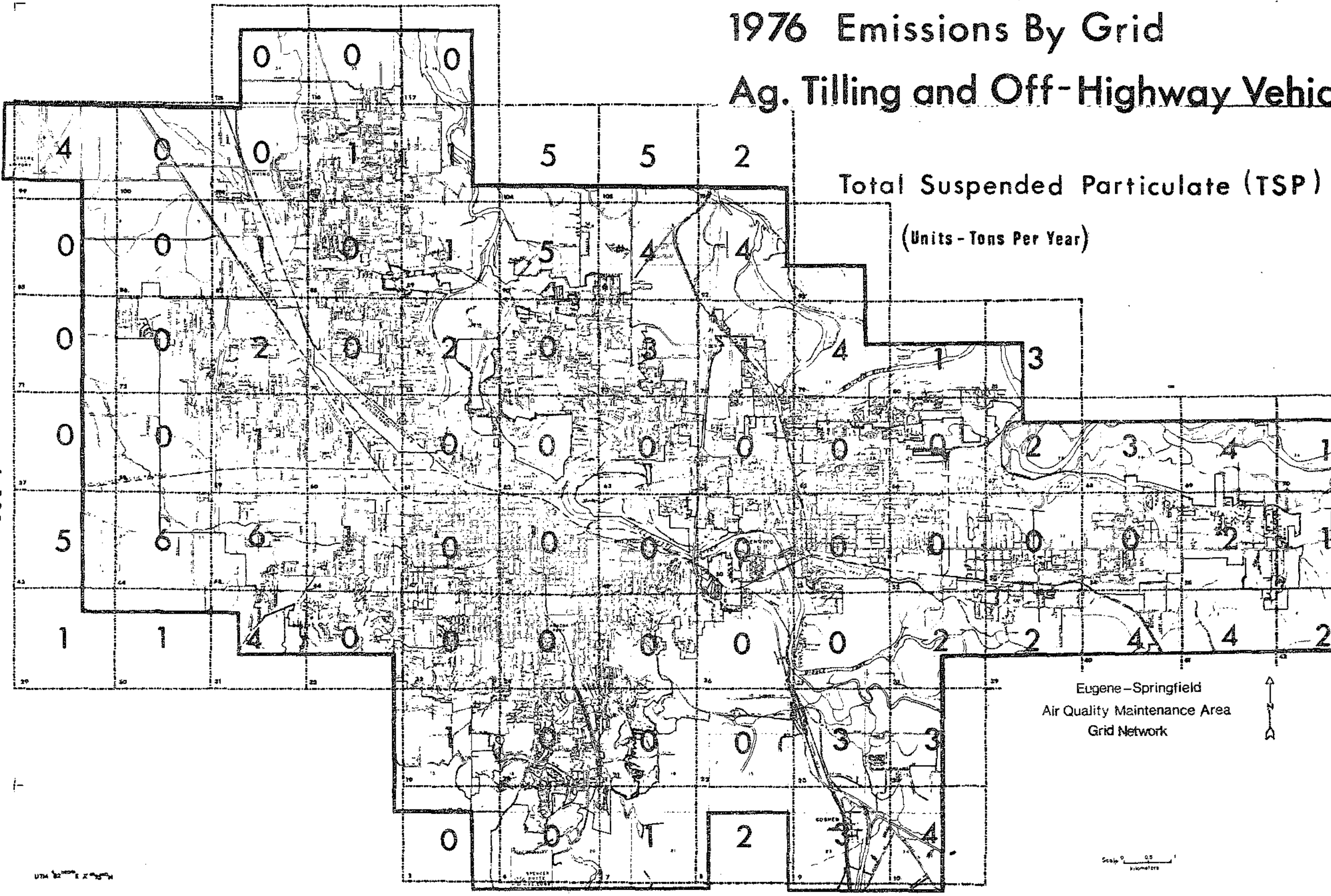


TABLE 6

POINT SOURCE UNPAVED YARD EMISSIONS

SOURCE	VMT/YR	SPEED[1] (MPH)	1976 EMISSIONS (TONS/YEAR)	1976 EMISSION FACTOR[2] (LB/VMT)
Simpson Extruded Plastics	64.1		0.02	0.55
Southern Pacific R.R.	1.7		negligible	0.55
Eugene Sand & Gravel (Excavation Site)	12,784	40	34.7	5.42
Parsons Redimix	3,030		0.8	0.55
States Veneer	1,042		0.3	0.55
Georgia Pacific	18,837		5.2	0.55
Delta Sand & Gravel	191,761	13	72.9	0.76
G.P. (Irving & Praire)	3,388	6	0.3	0.17
Eugene Sand & Gravel	23,323	8	3.4	0.29
Huntington Wood Ind.	20,875		5.7	0.55
Chembond	19,125		5.3	0.55
Morse Bros Asphalt	55,137	16	5.9	1.15
Wildish Sand & Gravel	10,313		2.8	0.55
Phillips Forest Products	8,438		2.3	0.55
Moon Trucking	10,653		2.9	0.55
Central Mfg.	1,404		0.4	0.55
Zip-O-Log	42,835		11.8	0.55
TOTAL			156.7	

1. Where no speed available, an average speed of 11 mph was used
2. Assume particles <30 μm, # days with rain of 111, factor varies as $\left(\frac{\text{speed}}{30}\right)^2$, 12% silt content

2.2 Area Sources, Continued

not provide traffic speed information. In these cases, the average of the traffic speeds from other sources was employed.

Total emissions of 157 tons per year were developed for this category. Since each unpaved yard is associated with a point source, emissions were allocated as point sources and located by UTM coordinates.

The results of the allocation process are displayed in the following maps. Figure 16 is a map locating 1976 total area source emissions per grid and figure 17 is a map showing 1976 total suspended particulate emissions for point and area sources combined. 1974 emission figures are presented in Appendix 8.1.g.

2.3 Operating Schedules

A required input to data bases used in modeling is an operating schedule for each source category. An operating schedule represents the monthly variation in emissions for each category, expressed as percent of total annual emissions. Schedules showing frequently significant monthly variations in point source operations were provided by LRAPA. Table 7 lists each area source category and the basis for 1976, 1974 and projection year schedules. Tables in Appendix 8.1.h list the actual input percentages.

One of the main factors affecting paved and unpaved road dust emission variations is rainfall. Table 7 presents number of days per month emissions could be entrained in 1976. These are the days with less than 0.01 inches of rain.[6] The same method was used to determine operating schedules for 1974. For projection years, an average year rainfall was analyzed (1969).

Motor vehicles have operating schedules based upon traffic counts for each month. Oregon State Highway Department (OSHD) publishes traffic volume counts at permanent recorder stations within AQMA.[7] From Table 8, it can be seen that traffic volumes increase during summer months. The same schedule was used for all years.

Heating degree days is a measure of space heating operations. Table 7 shows the number of heating degree days per month in 1976.

Figure 16

1976 Emissions By Grid

Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

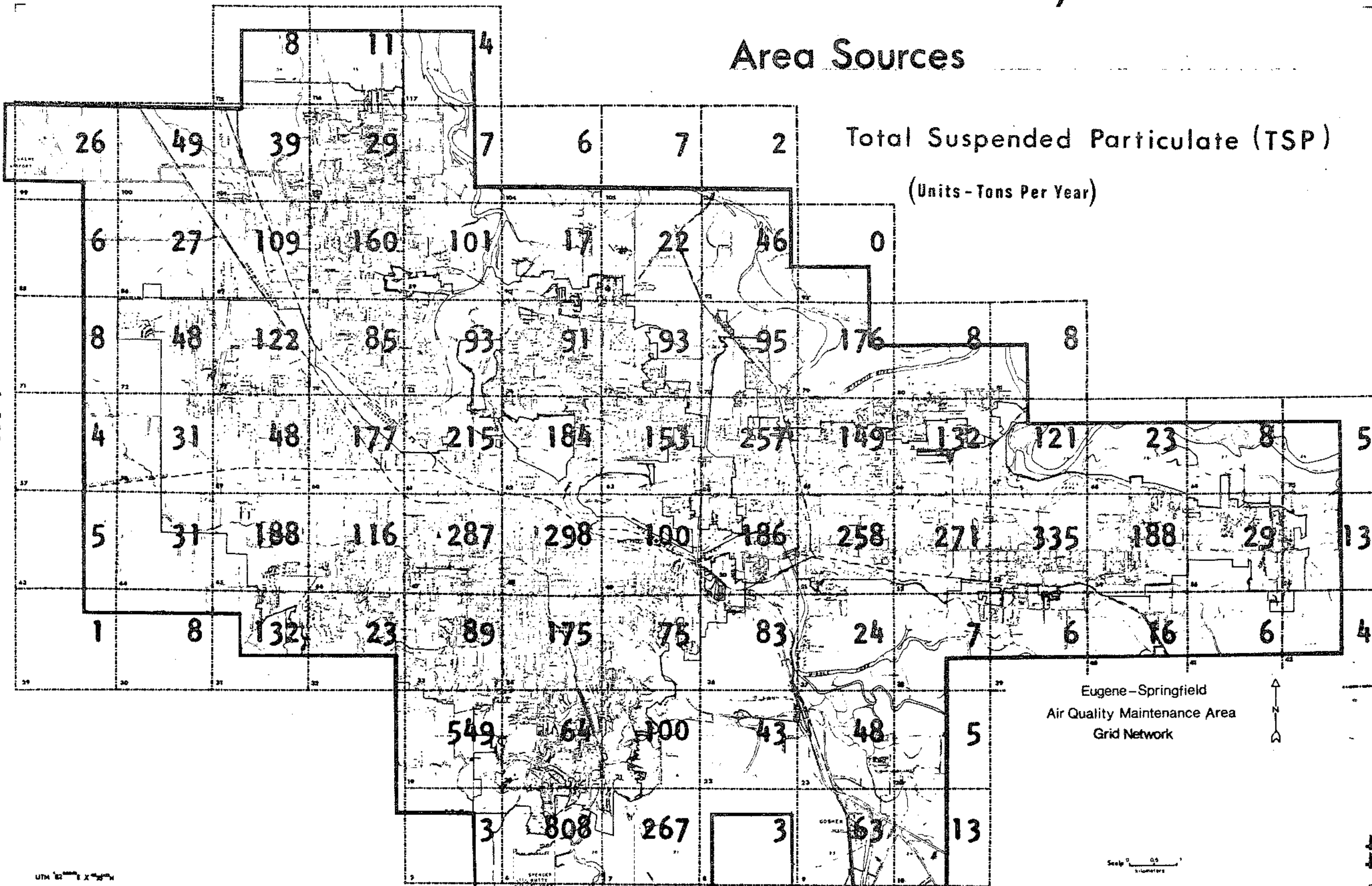


Figure 17

1976 Emissions By Grid

Point and Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

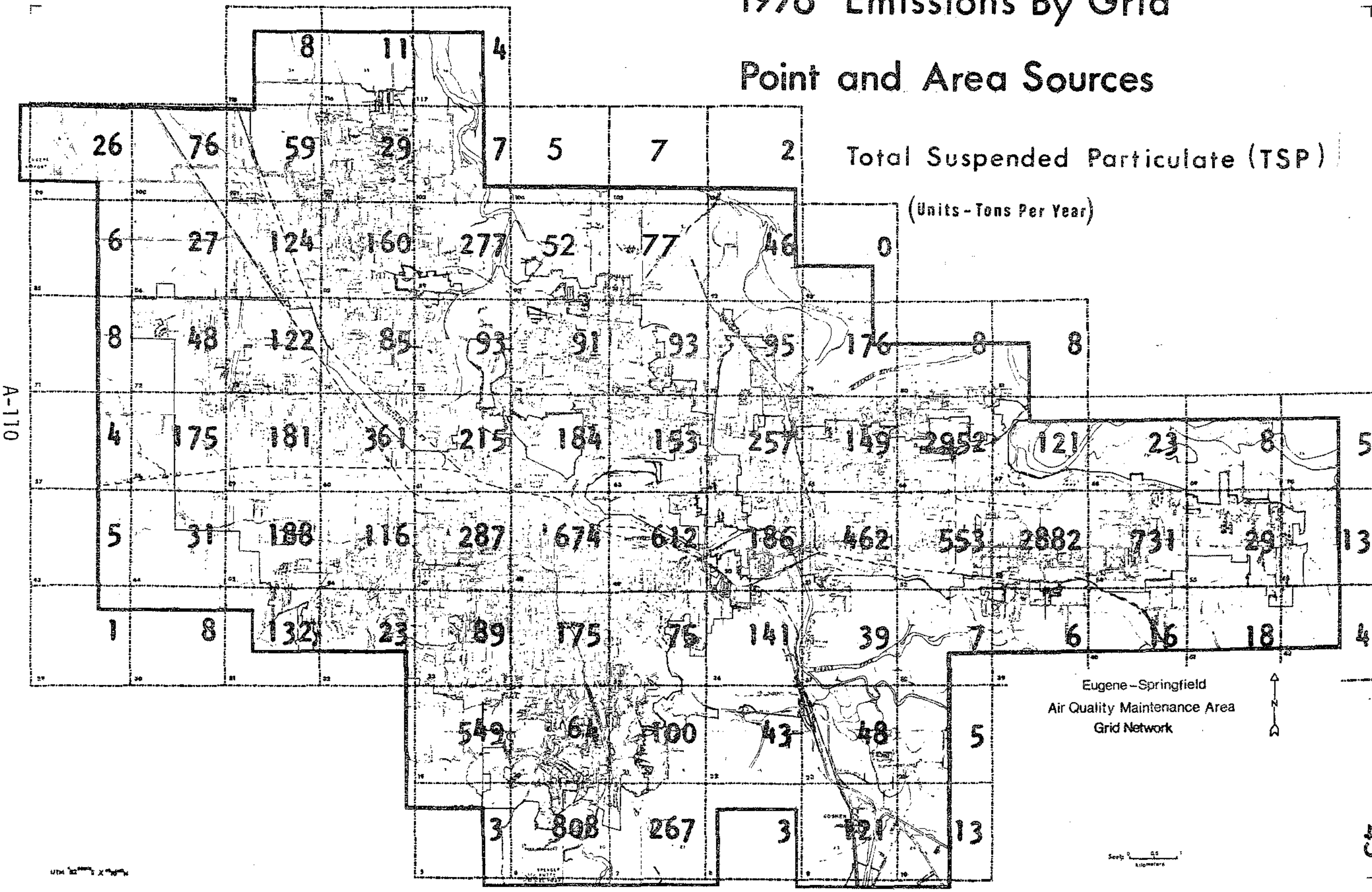


TABLE 7

BASIS FOR OPERATING SCHEDULE DETERMINATION

ID#	CATEGORY	BASIS FOR OPERATING SCHEDULE 1976	1974	PROJECTION YEAR
1001	Paved road dust	# of days with <.01 inches rain	# of days in 1974	# of days in an average year
1002	Motor vehicles	OSHD-traffic volume tables	Same as 1976	Same as 1976
1003	Residential space heating distillate oil	Degree days in 1976 (DD)	DD in 1974	DD (10 yr average)
1004	Residential space heating natural gas	Degree days in 1976 (DD)	DD in 1974	DD (10 yr average)
1005	Commercial space heating residual oil	Degree days in 1976 (DD)	DD in 1974	DD (10 yr average)
1006	Commerical space heating natural gas	Degree days in 1976 (DD)	DD in 1974	DD (10 yr average)
1007	Open burning and field burning	Open (Spring & winter) & field (summer) (weighted %)	Same as 1976	Same as 1976
1008	Wood space heating	DD in 1976	DD in 1974	DD (10 yr average)
1009	Orchard pruning	Pruning schedule	Same as 1976	Same as 1976
1010	Railroads & aircraft	Constant	Constant	Constant
1011	Unpaved road dust	# of days with <0.1 inches rain	# of days in 1974	# of days in an average yr.
1012	Small point sources	Constant	Constant	Constant
1013	Agricultural tilling and off-highway vehicles	Ag T (spring & fall) & off (constant) (weighted %)	Same as 1976	Same as 1976

TABLE 8

OPERATING SCHEDULE DEVELOPMENT

AREA SOURCE CATEGORY		J	F	M	A	M	J	J	A	S	O	N	D
Paved and unpaved road dust	# of entrainment days	17	14	16	15	21	25	28	21	27	24	22	24
	% of total	6.7	5.5	6.3	5.9	8.3	9.8	11.1	8.3	10.6	9.4	8.7	9.4
Motor Vehicles	VMT/day x10^3 –												
	ORE126	2.3	2.5	2.7	2.8	3.0	3.1	3.7	3.9	3.2	2.7	2.2	2.2
	I-105	28.7	30.2	32.6	32.1	32.7	35.6	35.1	37.0	35.0	34.8	34.6	31.8
	% of total	7.1	7.5	8.2	8.1	8.2	8.9	8.9	9.4	8.9	8.6	8.4	7.8
Space Heating	# of degree days (1976)	707	664	636	478	316	210	10	38	58	340	518	840
	% of total	14.7	13.8	13.2	9.9	6.6	4.4	0.2	0.8	1.1	7.1	10.8	17.4
Open Burning & Field Burning	OB - 9.7% of emission FB-90.3% of emission	2	2	6	30	30	20	20	40	30	10	15	15
	Weighted operating schedule												
Orchard pruning	% operation		30	40	30								
Railroads, aircraft small point sources	Constant operation (%)	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Agricultural tilling & off-highway vehicles	AT-96.0% of emissions					30	15	10	15	30			
	OV-4.0% of emissions	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	Weighted operating schedule	.34	.34	.34	.34	29.1	14.8	9.8	14.8	29.1	.34	.34	.34

2.3 Operating Schedules, Continued

1974 degree days were counted for the 1974 schedule and an average year was selected for projection year operations.[6] Space heating applies to residential, commercial and wood categories.

Open burning emissions occur mostly in spring and winter as can be seen from Table 8. Field burning is done in the summer. The weighted operating schedule is based upon monthly emissions from each source.

Orchard pruning emissions occur when farmers burn their tree prunings. Table 8 lists this operating schedule.

Railroad and aircraft operations do not change drastically through the year. Each small point source has a different operating timetable. So all three schedules were input as constant as in Table 8.

Agricultural tilling and off-highway vehicle operations were combined by weighting emissions similar to the open burning category (Table 8.).

2.4 Fugitive Dust Emission Sources

Ten high-volume samplers (hi-vols) are operated to measure TSP in the Eugene-Springfield AQMA. Each location is specified on the map in Figure 18. Microscopic analysis of historic hi-vol filters shows a significant percentage of the filter weight is soil dust so this study has been especially concerned with identifying as many dust sources as possible, such as paved and unpaved roads, agricultural tilling, and unpaved point source yards.

In order to better understand the results obtained from hi-vol filters, more information was needed about each hi-vol site and potential uninventoried sources around the site.

Identification of fugitive dust sources was accomplished using aerial photographs and, where necessary, site inspection. For the purpose of this study, the following definitions will apply:

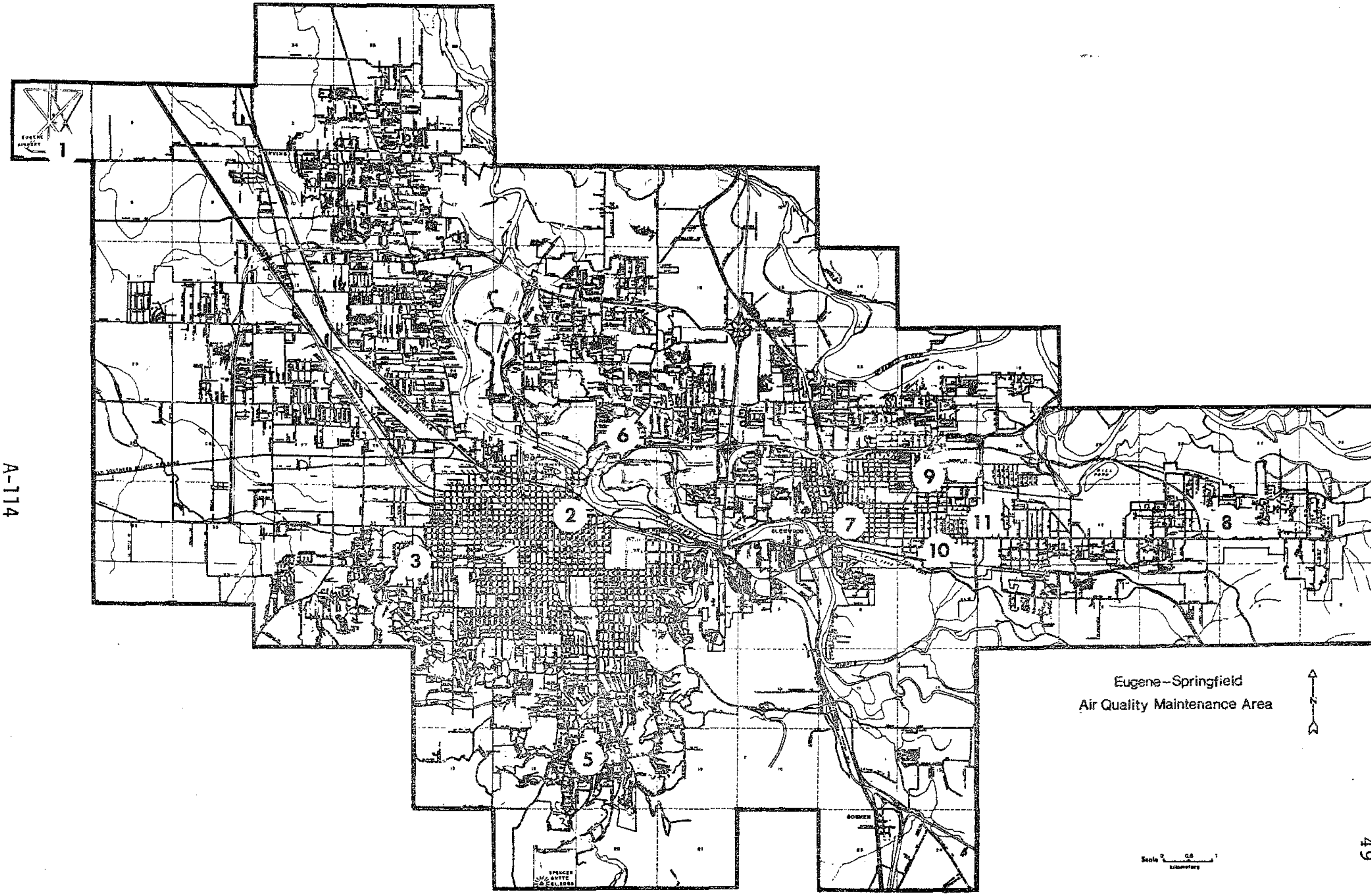


FIGURE 18

TOTAL SUSPENDED PARTICULATE
HIGH VOLUME AMPLER LOCATIONS

2.4 Fugitive Dust Emission Sources, Continued

1. yard - dirt or gravel area with vehicle traffic
2. lot - dirt or gravel area with no vehicle traffic
3. open area - area without buildings or associated buildings
4. unpaved - either dirt or gravel (all roads, yards and lots are unpaved unless otherwise specified)
5. fugitive dust source - any area without paving or vegetation covering
6. point source yard or lot - area associated with commercial or industrial building or group of buildings.

Identification procedures varied between Eugene and Springfield. For Eugene hi-vol sites all major fugitive dust sources within a 1 kilometer radius around each site were identified using 1974 black and white aerial photographs. The photo scale was 1" - 100 ft. making identification quite easy in most cases. Some difficulty was encountered in identifying unpaved roads in wooded areas, but wooded areas were not frequently found inside the AQMA. Temporary construction sites were not included as fugitive sources.

Detailed aerial photographs were not available for the Springfield area. The vicinity of each hi-vol sampling site was visited and visually inspected. This inspection process located the major fugitive sources. Infrared aerials were employed to obtain more information and to cross-check visual observations. This method was not as detailed as that used for Eugene in identifying smaller sources.

The result of this survey was quite enlightening. Some hi-vol sites may have up to 6% of the total area surrounding them consisting of possible fugitive sources. Table 9 displays the results; more detailed maps of each site are included in Appendix 8.1.i. Due to the nature of the airport hi-vol location, it was not included in this survey. The airport site is almost entirely surrounded by fugitive dust sources (agricultural lands).

The next step was to quantify emissions from as many of the identified fugitive sources as possible. Unpaved road emissions were included in the unpaved road dust category. Fugitive emissions from point source yards were more difficult to handle. Not every point source keeps records of vehicle traffic in their yard. Where

TABLE 9

FUGITIVE DUST SOURCES

SITE	UNPAVED OR OPEN AREA	% OF TOTAL AREA (1-km radius)
EUGENE		
# 2-Eugene Commerce Bldg.	17.4 acres	0.5
#3-Westmoreland School	28.5 acres	0.7
#5-Edgewood School	5.1 acres	
#6-Oakway Mall	28.9 acres	0.7
SPRINGFIELD*		
#7-Springfield Library	> 54.3 acres	1.4
#8-Thurston High School	> 5 acres	
#9-N. 18th Street	> 16 acres	0.4
#10-Springfield Shops	> 159 acres	4
#11-Springfield 28th & C Street	> 237 acres	6

*NOTE: Springfield areas more approximate due to methodology of observation

NOTE: For sites in less developed areas no attempt was made to include open areas with grass or other vegetation cover.

2.4 Fugitive Dust Emission Sources, Continued

information was available, emissions were calculated and allocated to their point source grid as unpaved yard emissions. No attempt was made to inventory emissions from open lots due to lack of emission factors. Emissions from these sources are related primarily to wind erosion. Unpaved parking lot emissions were not inventoried because of the lack of traffic information.

3. EMISSION PROJECTIONS

Particulate emission projections, in conjunction with computer modeling, form a basis for analysis of whether the Eugene-Springfield AQMA will be in compliance with ambient air standards in the future. Each category's projected emissions were calculated from the 1976 data base by multiplying emissions per grid by appropriate growth factors. Methodologies for obtaining the growth factors were different for each category and are explained later in this section. Future years for which emissions were projected are 1980, 1985, 1990 and 1995. These study years were chosen in consideration of EPA regulations requiring coordination of this study with LCOG Waste Water Treatment Plans (Section 208).[17]

The projections of most general interest are those which describe emission patterns which are most likely to occur. These estimates are defined as most probable case projections.

Worst case projections are examples of what reasonably could occur if growth of TSP emissions within the AQMA is faster than expected under most probable conditions and if adverse weather conditions occur which promote greater TSP emissions. The only worst case data base produced was for 1995.

Growth factors used throughout the study are based primarily on demographic projections by LCOG, ODOT and other agencies responsible for planning functions within the AQMA. In some of the specific industrial areas, SJO developed bases for projection using information obtained from appropriate industry sources.

3.1 Point Sources

Industrial growth inside the Eugene-Springfield AQMA can occur in three ways:

1. Expansion of existing sources beyond their present maximum capacities at the same location.
2. New sources locating inside the AQMA.
3. Growth of existing sources up to their maximum capacity.

Prediction of existing source expansion beyond its maximum capacity is highly speculative. Only new sources having air contaminant discharge permits at the beginning of this study were

3. EMISSION PROJECTIONS, Continued

included. Only one expected new source, Bioenergy Manufacturing Co., has its permit at this time.

One of the best indicators of industrial growth is production rate. As production increases so do emissions, assuming no process changes or additional controls. It was decided to analyze each point source and develop growth factors dependent upon its capability to increase production.

A significant percentage (about 50%) of point sources located in the Eugene-Springfield AQMA are timber related industries. A recent study entitled "Timber for Oregon's Tomorrow" by Dr. John Beuter of the Oregon State University Forest Products Research Laboratory projects a decline in timber harvesting and timber related employment.[18] Although not necessarily supporting Beuter report conclusions, the U.S. Forest Service for the Pacific Northwest Region agree with the findings in Table 10.[19]

It cannot be assumed that employment in the wood products industry will increase if raw materials amounts decrease. Negative growth factors for all timber related industries were based on Beuter's reported declines in timber harvesting. These factors, while approximate and insensitive to shifts within sectors of the wood products industry, are a reasonable approach to projecting expected emissions from point sources in the industry.

Since no increase in timber availability can be seen, a worst case assumption is timber harvesting will remain at present levels. Therefore, worst case TSP emissions from timber related industries will remain at 1976 emission levels.

The basis for determining the capability for increased production for all sources not in the timber products category was to compare 1976 process weight information (as recorded in EI) and maximum capacity (from air contaminant discharge permits). The allowable increment of growth for each point source is listed in Table 11.

In order to assign a reasonable time schedule to these existing point source growth rates, employment projections from LCOG were studied.[20] These employment figures were developed for various SIC's and are summarized in Table 12. This schedule of growth was

TABLE 10

TIMBER TREND

YEAR	TIMBER HARVEST	TIMBER-DEVELOPMENT EMPLOYMENT
1975-1985	1.00	1.00
1985-1995	0.73	0.79
1995-2005	0.59	0.64

TABLE 11

POINT SOURCE ALLOWABLE GROWTH

(relative to 1976)

EI#	SOURCE	ALLOWABLE INCREMENT OF GROWTH (%)	SIC
202119	Delta Sand & Gravel	67	1442
202500	Eugene Sand & Gravel (asphalt)	41	2951
202505	EWEB	59	4911
202524	Eugene Sand & Gravel (crusher)	29	1442
204402	Kingsford Corp.	0	2861
205139	Morse Bros. Inc.	33	2951
207465	Springfield Quarry	10	3295
208557	Univ. of Oregon	69	4961
208851	Wildish Sand & Gravel (#1 asphalt)	29	2951
208871	Wildish Sand & Gravel (#2 asphalt)	27	2951
208892	Wildish Sand & Gravel (#1 crusher)	40	1442
208893	Wildish Sand & Gravel (#2 crusher)	43	1442
208896	Willamette Quarries	100	3295
205800	National Metallurgical	0	3339

TABLE 12

EMPLOYMENT SCHEDULE OF GROWTH

(relative to 1976)

SIC	1980	1985	1990	1995
1442	1.04	1.09	1.14	1.20
2861 2951 3295	1.09	1.20	1.31	1.44
4911 4961	1.10	1.22	1.35	1.48

3. EMISSION PROJECTIONS, Continued

used for each plant site up to that plant's maximum capacity. Worst case emissions will occur when each source operates at maximum capacity.

There is only one point source in the AQMA that uses natural gas with a residual oil back up fuel. If natural gas supplies to this source were curtailed, particulate emissions would increase as a result of the fuel switch. Northwest Natural Gas has an optimistic forecast for Lane County natural gas supply. The number of interruptible days from 1980 to 1995 is projected to be less than the actual interruptible days in 1976. Therefore, emissions for the dual fuel source were not increased according to fuel switching.

Actual growth factors applied to each point source are presented in Appendix 8.2.a. Most probable case point source emissions distribution for 1995 appear in Figure 19. Fugitive emissions from point source unpaved yards were left at 1976 emission values since no projection data were available.

3.2 Area Sources

Most probable and worst case growth rates for area sources were determined using the following methodologies:

Paved Road Dust

Total suspended particulate (TSP) emissions from paved roads depend on vehicle miles traveled (VMT) and frequency of rainfall greater than .01 inches. VMT projection for 1985 were obtained from the Oregon Department of Transportation (ODOT). Their computerized forecasting model (SAPOLLUT) produced emissions and VMT per grid using a complicated link-node and landuse category list of inputs. Further description of this model is in Appendix 8.2.c.

ODOT's 1985 VMT per grid were compared to OSU's 1976 VMT per grid and the rate of increase or decrease per year calculated. A straight line rate of change between 1976 and 1985 was assumed which required interpolation and extrapolation to obtain the changes for

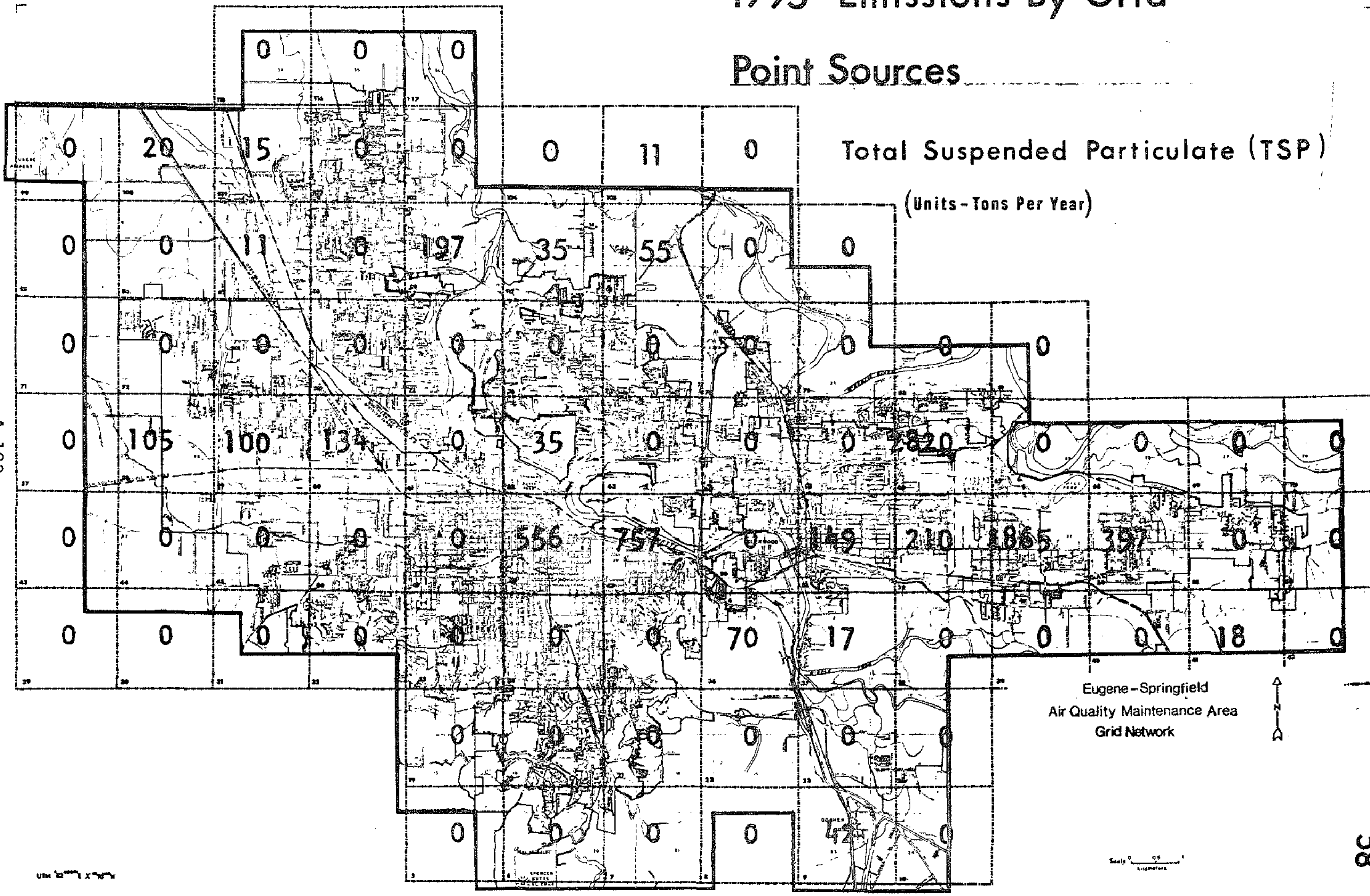
Figure 19

1995 Emissions By Grid

Point Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)



3. EMISSION PROJECTIONS, Continued

1980, 1990, and 1995.

Because 1976 paved road dust emissions are calculated using specific 1976 rainfall data, a correction is necessary for other years. A rainfall factor (RF_1) for most probable conditions was computed by taking the ratio of entrainment days in an average year, 1969, (246) to entrainment days in 1976 (254) or .97. Worst case entrainment days turned out to be the same as 1976 so the worst case rainfall factor (RF_2) was 1.00.[6]

Growth factors for paved road dust emissions were produced on a grid by grid basis by combining changes in VMT and rainfall factors.

Whenever two independent studies are conducted in the same area there are bound to be some discrepancies in results. Ten grids were found to have less VMT in 1985 than in 1976. Most of these differences were small and could be written off as changes in transportation patterns. In cases where VMT's were decreasing at a rate such that in future years there would be no VMT in that grid, 1985 VMT was extended to 1990 and 1995. Actual growth factors used in paved road dust projections are in Appendix 8.2.b. The resulting 1995 most probable paved road dust distribution of emissions is depicted in Figure 20.

Motor Vehicles

Motor vehicle projections were calculated using a methodology similar to that used for paved road dust. ODOT's model output of emissions per grid for 1985 were compared to OSU's 1976 emissions per grid. A straight line increase or decrease between the two years was assumed and appropriate growth factors per grid calculated (see Appendix 8.2.c). Figure 21 displays a map showing 1995 most probable motor vehicle emissions per grid.

There are no immediate plans for future transportation projects that would drastically reduce or increase traffic volumes inside the AQMA boundary. This fact implies most probable is also worst case; in the sense that there is no method of increasing traffic not already accounted for under most probable conditions.

Figure 20

1995 Emissions By Grid

Paved Road Dust

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

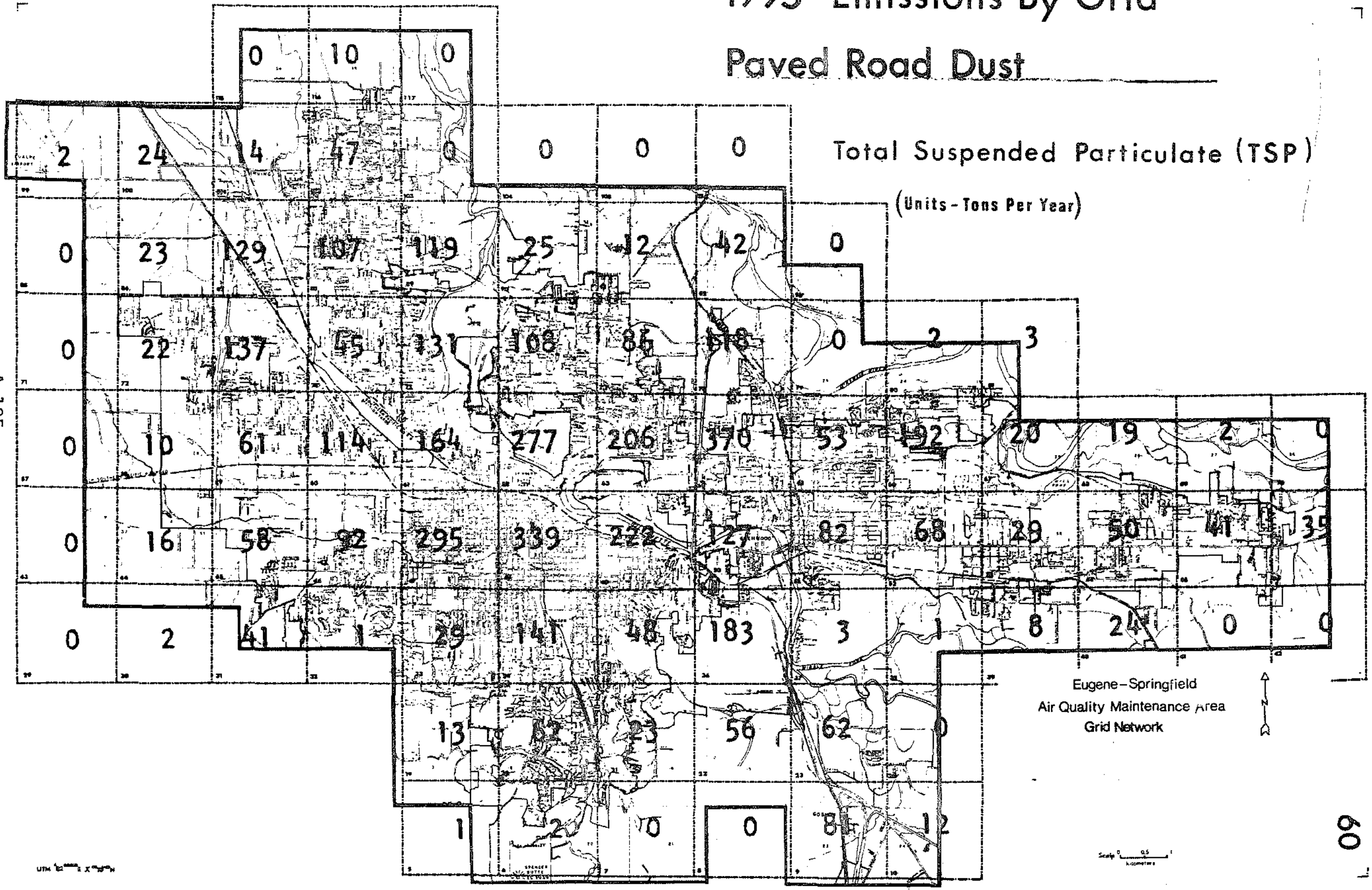


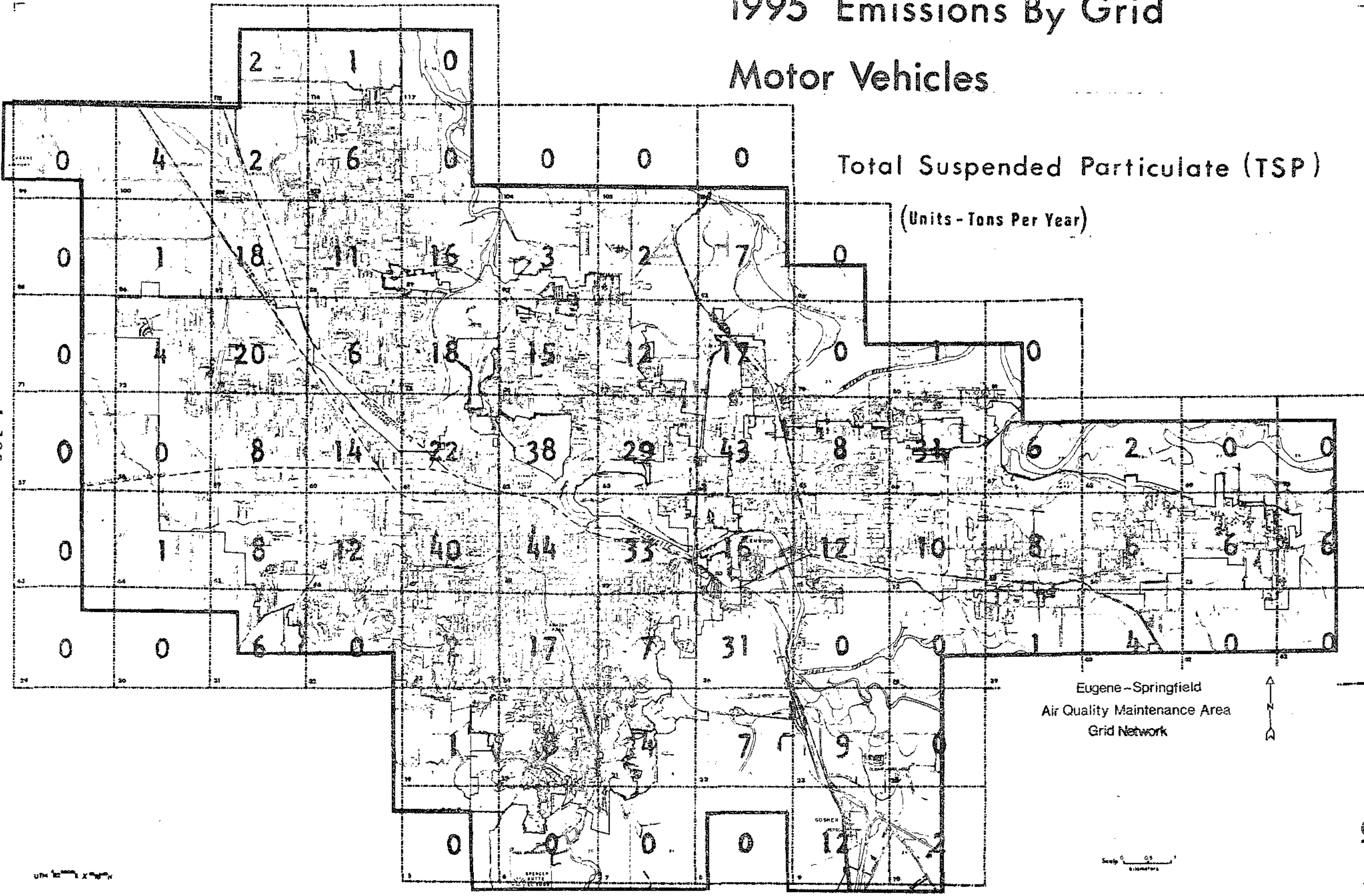
Figure 21

1995 Emissions By Grid

Motor Vehicles

Total Suspended Particulate (TSP)

(Units - Tons Per Year)



3. EMISSION PROJECTIONS, Continued

Residential Space Heating

Future residential space heating emissions are dependent upon housing increases, amount of heating required, and type of fuel used in new housing starts.

The number of new housing units can be estimated using population projections. Population projections per census tract were obtained from LCOG for the year 2000.[8] Straight line interpolations between 1970 and 2000 LCOG data were made to obtain populations for intermediate years of interest. Population growth factors for projection years are presented in Table 13.

A best approximation of the amount of heating necessary in a year is comparison of heating degree days. Local climatology data for Eugene were surveyed to determine the number of heating degree days.[6] For the most probable case factor, a ten year average of heating degree days (DD) was divided by number of degree days in 1976. Worst case degree day factor was calculated similarly using the historical worst number of degree days instead of a ten year average.

$$\text{Most Probable:} \quad \frac{\text{10 yr. avg. DD}}{\text{1976 DD}} = .96$$

$$\text{Worst Case:} \quad \frac{\text{Historical worst DD}}{\text{1976 DD}} = 1.05$$

Fuel use distribution of new housing was obtained from estimations by Eugene Water and Electric Board (EWEB). The trend in new housing is to use electricity for space heating. EWEB estimated more than 90% of new houses are using electricity at present and that 90% would be a conservative figure for future. years.

The remaining 10% of housing starts had to be broken down into distillate oil and natural gas percentages. Using the PIAQMA distribution of fuel use as a guide, resulting percentages are:[9]

NEW HOUSING FUEL USE DISTRIBUTION

Fuel	Eugene	Portland
Electricity	90%	59%
Natural gas	9%	39%
Distillate Oil	1%	2%

TABLE 13

POPULATION GROWTH FACTORS
(relative to 1976)

CENSUS TRACT	1980	1985	1990	1995
2	1.09	1.22	1.35	1.48
10	1.02	1.04	1.07	1.10
17	1.09	1.22	1.35	1.48
18	1.27	1.69	2.07	2.46
19	1.06	1.15	1.24	1.32
20	1.14	1.35	1.54	1.74
21	1.18	1.47	1.74	2.00
22	1.17	1.43	1.67	1.91
23	1.02	1.28	1.48	1.59
24	1.08	1.21	1.33	1.46
25	1.35	1.89	2.39	2.90
26	1.24	1.61	1.95	2.29
27	1.02	1.05	1.08	1.11
28	1.01	1.04	1.06	1.08
29	1.47	2.21	2.90	3.58
30	1.27	1.69	2.07	2.46
31	1.13	1.33	1.52	1.70
32	1.04	1.10	1.15	1.21
33	1.02	1.04	1.07	1.10
34	1.03	1.07	1.11	1.15
35	1.13	1.32	1.50	1.68
36	1.21	1.53	1.82	2.12
37	1.02	1.04	1.07	1.10
39	1.12	1.31	1.49	1.67
42	1.10	1.26	1.40	1.55
43	1.07	1.18	1.28	1.38
44	1.21	1.54	1.85	2.16
45	1.05	1.12	1.18	1.25
48	1.02	1.05	1.08	1.10
49	1.03	1.08	1.13	1.17
50	1.09	1.24	1.38	1.51
52	1.16	1.40	1.63	1.86
53	1.10	1.25	1.39	1.53
54	1.16	1.40	1.63	1.86

3. EMISSION PROJECTIONS, Continued

Combining these three elements for changes in residential space heating, tables in Appendix 8.2 illustrate most probable and worst case projected growth factors for both distillate oil and natural gas. Examples of how these factors were calculated are:

Most probable - distillate oil, census tract (CT) #2, 1980

Population growth = 9% (from Table 12)
% of growth using oil = 1%
DD factor = .96
Growth factor = [1.00 + (.01) (.09)] .96 = .96

Worst Case - (conditions same as above)

DD factor = 1.05
Growth factor = [1.00 + (.01) (.09)] 1.05 = 1.05

Commercial Space Heating

Growth factors for commercial space heating were based on fuel use patterns and variations in heating season. EWEB indicated the trend in new commercial establishments is toward electric heating at about 75% of new sources. Residual oil use in commercial space heating will not increase significantly. Northwest Natural Gas Co. produced a study on commercial demand of natural gas in Oregon.[21] There is a 12.5% projected growth in demand from 1975 to 1980 and 24% growth from 1975 to 1985. Projection past these years were not available.

Variations in heating season were estimated using the same degree day factors developed in residential space heating. Table 14 displays all the factors included in growth factor calculations for this category.

TABLE 14

COMMERCIAL SPACE HEATING GROWTH FACTORS

(relative to 1976)

	Most Probable				Worst Case
	1980	1985	1990	1995	1995
Residual Oil					
% of new sources	1	1	1	1	1
DD	.96	.96	.96	.96	1.05
Growth factor	.97	.97	.97	.97	1.06
Natural Gas					
% of new sources	13	24	24	24	24
DD	.96	.96	.96	.96	1.05
Growth factor	1.08	1.19	1.19	1.19	1.30

3. EMISSION PROJECTIONS, Continued

Open Burning and Field Burning

For the most probable case, open burning will be prohibited after 1980 according to state regulations. Open burning emissions were allocated on a population basis. If their emissions were to continue past 1980, a worst case growth factor would be the population growth of the census tract (Table 13).

As state regulations stand now regarding field burning, 180,000 acres will be authorized to be burned in 1978. In 1976, 195,000 acres will be burned. Neither the state legislature nor the Environmental Quality Commission has determined how much acreage will be authorized to be burned for years following 1978. Therefore, using best available information the following growth factors were employed:

	1976	1978	All Projection Years
acres burned ($x10^3$)	195	180	180
growth factor	1.00	.92	.92

Field burning growth factors were applied only to census tracts containing burned acres in 1976, since future burned acreages will most likely be in these same areas. Open and field burning particulate emissions occurring inside the AQMA for 1995 are in Figure 22

Wood Space Heating

Population changes and heating season variations were the basis for wood space heating frowth factors. Population growth per census tract was the same as the figures listed in Table 13. These were combined with degree day factors used in the other space heating categories. Resulting distribution of emissions for 1995 is in Figure 23. There was no information, such as heating stove sales, or wood cutting permits, which could quantify the trend toward wood as a heating fuel.

Orchard Pruning

Both OSU Extension Service and LCOG expressed the opinion that orchard acreages will probably decline in the AQMA in future years with increased land development. But neigher source had figures at hand to back up the opinion. Therefore, TSP emissions for orchard pruning remained the same as 1976 levels.

Figure 22

1995 Emissions By Grid

Field Burning and Open Burning

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

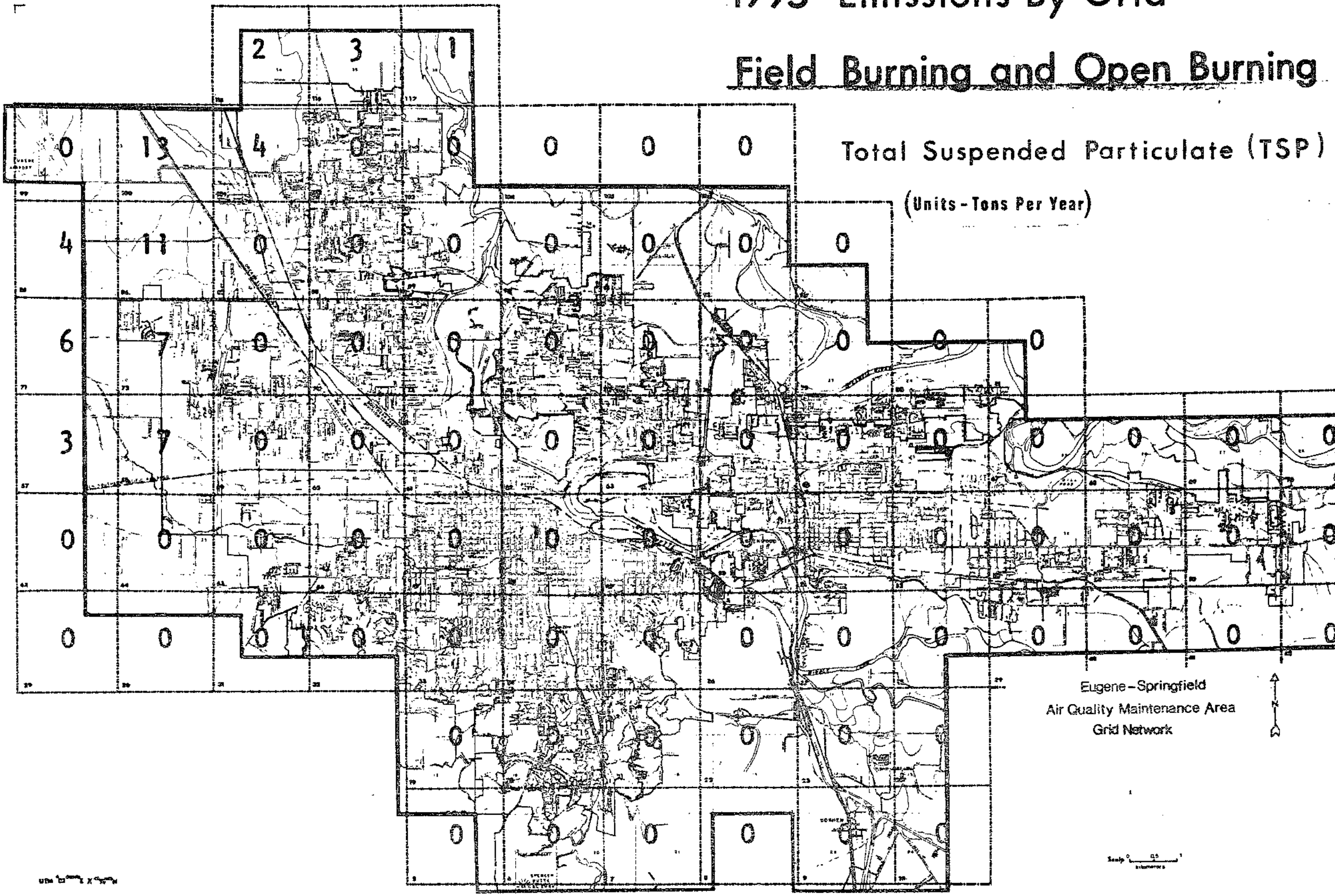


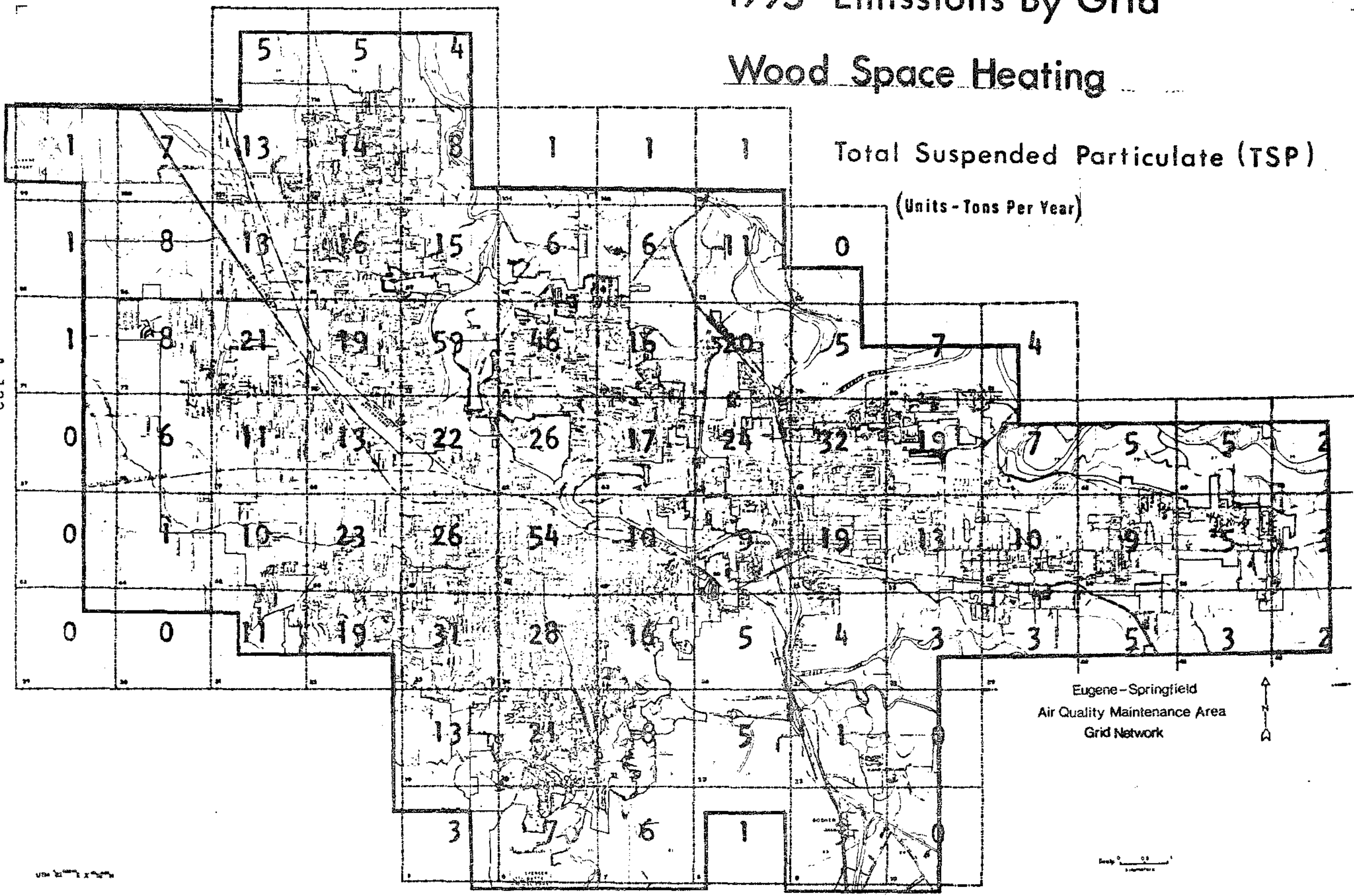
Figure 23

1995 Emissions By Grid

Wood Space Heating

Total Suspended Particulate (TSP)

(Units - Tons Per Year)



3. EMISSION PROJECTIONS, Continued

Railroads and Aircraft

Contacts at Southern Pacific Railroad stated operations are not expected to increase in the AQMA. Railroad emissions were left at 1976 values for all future years.

Aircraft growth factors were calculated from increased operations projections. The "Airport Master Plan Report - Mahlon Sweet Field" projects landing and take-off operations (LTO) through 1990.[22] Table 15 best describes how growth factors were calculated using weighted percent growth of air carrier and general aviation operations.

Aircraft growth factors were applied only to the grids containing the airport.

Unpaved Road Dust

Two predominant factors in unpaved road dust emission calculations are traffic volumes and rainfall. Growth factors for this category were developed by combining these two contributors. Improvement plans for paving streets in both cities are not definite at this time and cannot be relied on to reduce unpaved road emissions. Traffic volume increases were extrapolated from ODOT's 1985 total AQMA VMT per year and OSU's 1976 AQMA VMT per year. The rainfall factors calculated in the paved road dust section also applied to unpaved road dust emissions.

The resulting emission distribution for 1995 is in Figure 24 and growth factors are:

UNPAVED ROAD DUST EMISSIONS

	1980	1985	1990	1995	1995WC
% growth in VMT/yr	11	27	42	57	57
Most probable - RF_1	.97	.97	.97	.97	.97
Worst case - RF_2					1.00
Growth factor	1.08	1.23	1.38	1.52	1.57

Small Point Sources

Small point source projections were made using LCOG employment

TABLE 15

AIRCRAFT OPERATIONS PROJECTIONS

(relative to 1976)

% OF EMISSIONS		1980	1985	1990	1995[1]
70	Air Carrier - LTO[2]/yr	1700	2200	2800	3400
	- % growth	31	69	115	162
24	General Aviation - LTO/yr	205000	255000	323000	391000
	- % growth	28	59	102	144
6	Military - LTO/yr	1000	1000	1000	1000
	- % growth	-33	-33	-33	-33
	Weighed % growth	28	62	105	148

1 = straight line extrapolation of data between 1985 and 1990

2 = landing and take-off operations

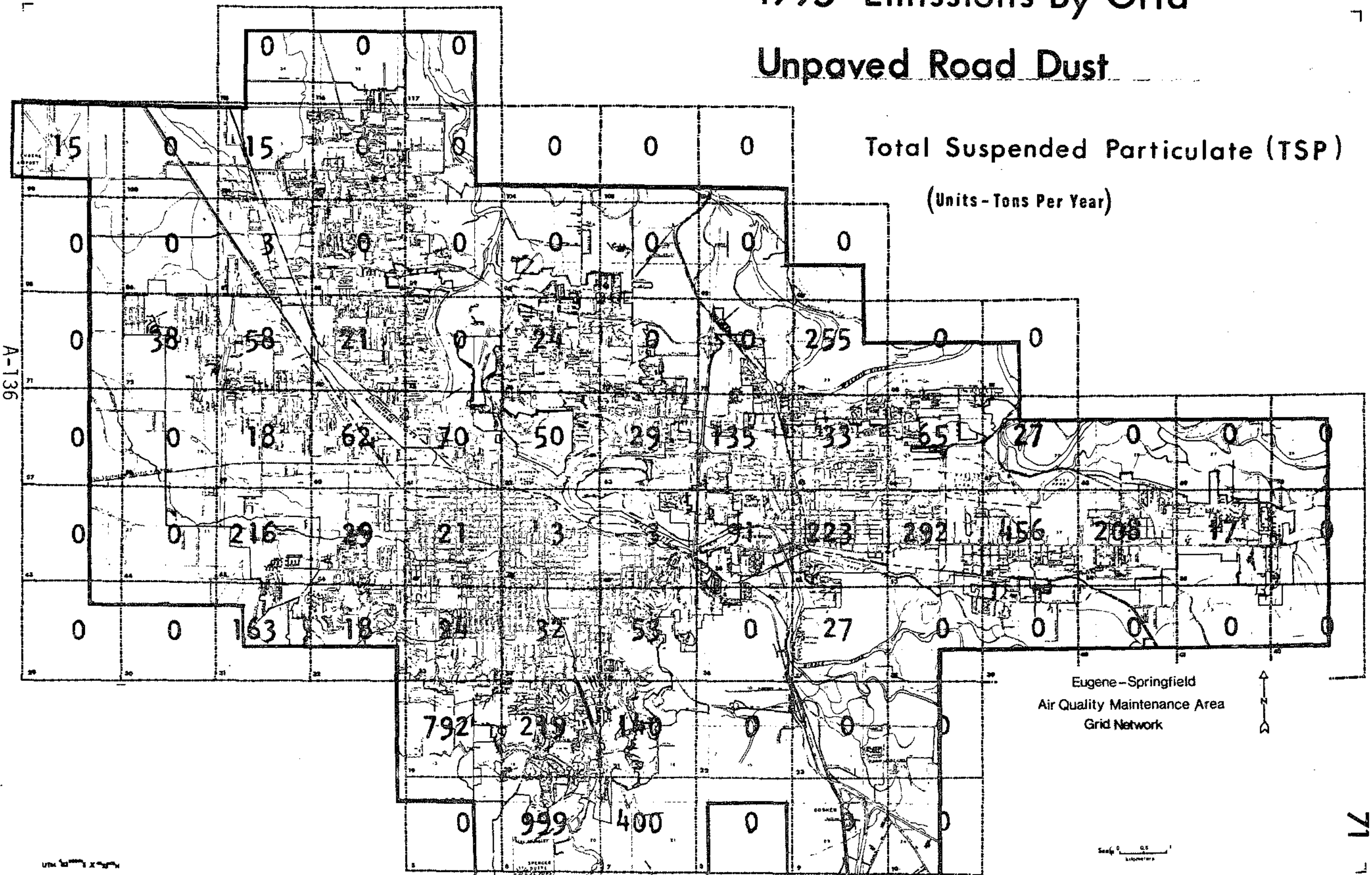
Figure 24

1995 Emissions By Grid

Unpaved Road Dust

Total Suspended Particulate (TSP)

(Units - Tons Per Year)



3. EMISSION PROJECTIONS, Continued

projections for each census tract by SIC.[20] Straight line interpolation of LCOG data between 1970 and 2000 was used to obtain intermediate year projections as presented in Table 16. These projections were applied directly to census tracts containing only one SIC.

For census tracts containing more than one SIC small point source, a weighted percentage (by emission total) of each growth factor was calculated. The resulting growth factors are in Appendix 8.2.e. Projection by this method was completed under the assumption that future small point sources would locate on lands zoned for commercial or industrial use. These lands would be close to or in grids already containing small point sources, making emissions growth in these grids a reasonable approximation.

No additional information was available to indicate a difference between most probable and worst case projections. Therefore, 1995 most probable and worst case emissions are identical. The resulting distribution of 1995 emission is in Figure 25.

Agricultural Tilling and Off-Highway Vehicles

LCOG's general feeling about agricultural lands in the AQMA is that acreages will decline. Their agricultural employment projections (Table 16) support this concept.[20] For the most probable case, growth projections using agricultural employment figures were developed. It is recognized that a projection of declining agricultural activity may run counter to the LCDC statewide goal of preserving agricultural lands. The worst case assumption for air qualtiy is that acreages will remain the same as 1976, making 1995 worst case and 1976 agricultural tilling and off-highway vehicle emissions the same.

The spatial distribution of most probable 1995 TSP emissions for this category are located on the map in Figure 26.

TABLE 16

EMPLOYMENT PROJECTIONS
(relative to 1976)

LCOG CATEGORY	SIC's	GROWTH FACTOR 1980	1985	1990	1995
MNCN	14--	1.04	1.09	1.14	1.20
MFEM	20--, 24--, 28-- 32--, 33--, 34--	1.09	1.20	1.31	1.44
NMEM	43--, 47--, 49--	1.10	1.22	1.35	1.48
WHSL	50--	1.12	1.27	1.42	1.58
GAF	55--, 57--	1.12	1.27	1.43	1.58
CMSF	65--, 86--	1.13	1.28	1.44	1.60
PQSV	91--	1.14	1.33	1.51	1.69
EDUC	82--	1.19	1.42	1.65	1.89
AGRI	Agriculture	1.00	0.99	0.97	0.96

Figure 25

1995 Emissions By Grid

Small Point Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

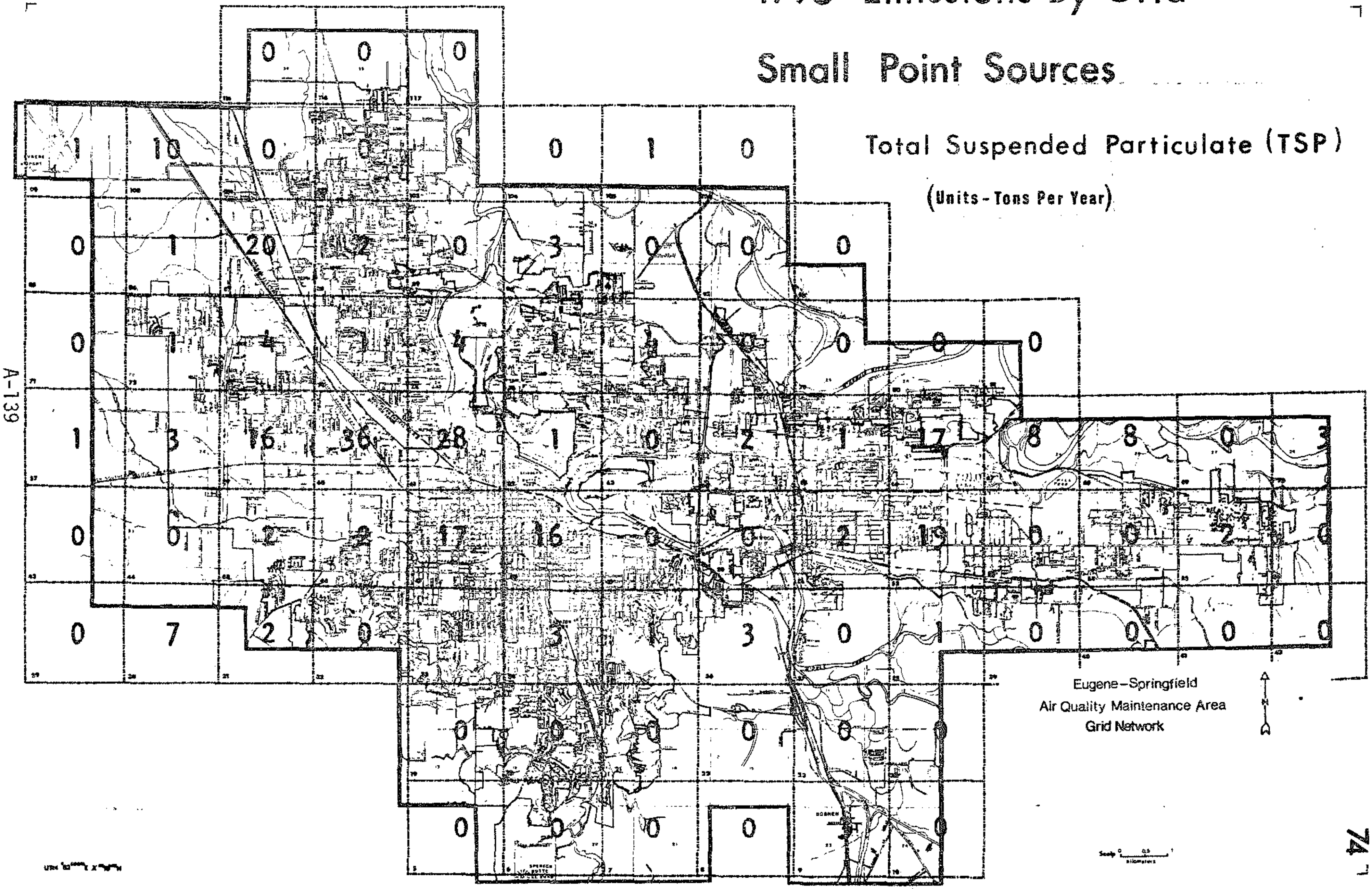


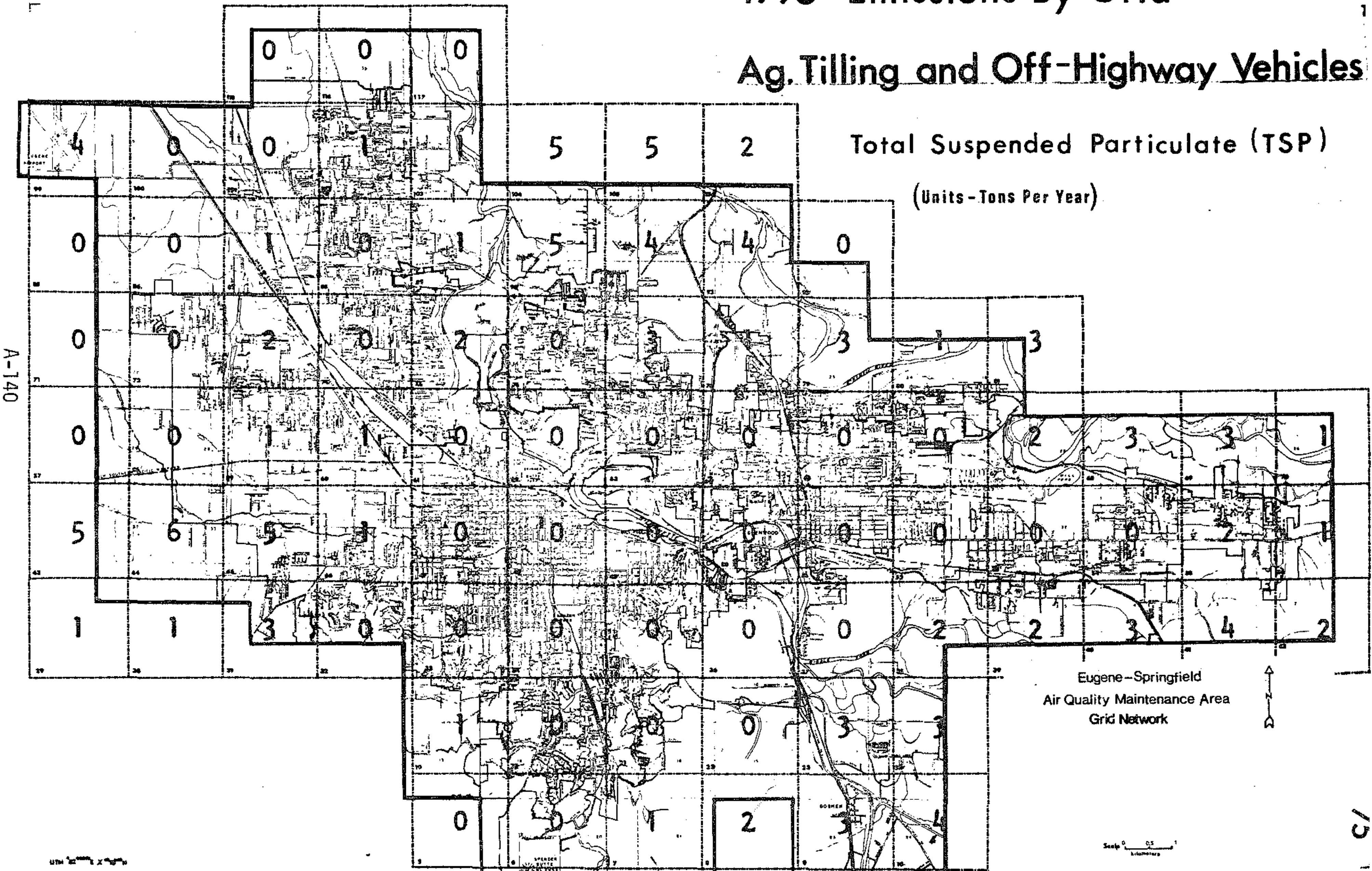
Figure 26

1995 Emissions By Grid

Ag. Tilling and Off-Highway Vehicles

Total Suspended Particulate (TSP)

(Units - Tons Per Year)



4. ALLOCATION AND PROJECTION RESULTS

As a summary, total suspended particulate emissions allocation and projection methods for the Eugene-Springfield AQMA are compiled in the following tables. The dominant allocation parameters for each source category are presented in Table 17. In Table 18 appear the assumptions and methods used to make projections and to differentiate between most probable and worst case conditions.

Resulting distributions of TSP emissions for the projection years are in figures 27 through 42. The grid maps in figures 27 through 32 show the distribution of total TSP emissions (from point and area sources) for 1974, 1980, 1985, 1990, 1995 and 1995 (Worst Case). Figures 33 through 38 show the distribution of area source TSP emissions for 1974, 1980, 1985, 1990, 1995, and 1995 (Worst Case). Finally, figures 39 through 42 show the distribution of point source TSP emissions for 1980, 1985, 1990, and 1995 (Worst Case).

Projected TSP emission totals presented in Table 19 show a 24% increase in 1995 most probable emissions over 1976 levels. This trend is due to increasing area source emissions. Most probable point source projections indicate a decline (-3%) over present figures. In 1976 area sources contribute about 49% of particulate emissions in the AQMA. Projections show this contribution will rise to over 61% in 1995 under most probable conditions.

The increasing trend is due to the emissions from four area source categories, which comprise four of the top five contributors. The five largest categories are point sources, unpaved road dust, paved road dust, wood space heating and motor vehicles. In 1976 through 1995 these categories totaled over 97% of particulate emissions. Under assumptions set forth in this study, these five categories will remain the major TSP contributors in all future years of interest.

TABLE 17

PARTICULATE EMISSION ALLOCATION METHODS

SOURCE CATEGORY	ALLOCATED TO GRIDS BY:
Point Source:	
Process Equipment	UTM Coordinates
Unpaved Yards	UTM Coordinates & Traffic Counts
Area Sources:	
Paved road dust	Vehicle miles traveled
Motor vehicles	Vehicle miles traveled
Residential space heating - distillate oil	Owner occupied households per CT & population
Residential space heating - natural gas	Owner occupied households per CT & population
Commercial space heating - residual oil	Surface heating area per boiler
Commercial space heating - natural gas	Surface heating area per boiler
Open burning & field burning	Population & acreages burned
Wood space heating	Owner occupied households per CT & population
Orchard pruning	Acreages of orchards
Railroads & aircraft	Miles of track & airport location
Unpaved road dust	Vehicle miles traveled
Small point sources	Located by address
Agricultural tilling & off highway vehicles	Agricultural acreages

TABLE 18

PARTICULATE EMISSION PROJECTION METHODS AND ASSUMPTIONS

SOURCE CATEGORY	GROWTH FACTOR PROJECTION METHOD	ASSUMPTIONS MOST PROBABLE (MP)	ASSUMPTIONS WORST CASE (WC)	REFERENCE
Point Sources:				
Timber related	Timber harvest	Decline	Same as 1976	Beuter Report
Other	Production capacity	Increase up to maximum capacity	All at max. capacity	LRAPA
Area sources:				
Paved road dust	VMT	Straight line between 1976 & 1985	Same as MP	OSU-ODOT
	Rainfall	Average year data	Dry year data	LCD
Motor vehicles	VMT	Straight line between 1976 & 1985	Same as MP	OSU-ODOT
Residential space htg.	Population	Straight line between 1970 & 2000	No unaccounted influx of people	LCOG
	Fuel use	% of new households using what fuel in future yrs	Same as MP	EWEB
	Heating degree days	Average heating season	Coldest heating season	LCD
Commercial space htg.	Fuel use	% of new buildings using what fuel in future yrs	Same as MP	NNG & EWEB
	Heating degree days	Average heating season	Coldest heating season	LCD
Open burning & field burning	Population	OB eliminated after 1980	OB increases according to population	LCOG
	Acres burned	Decline in acres burned	FB same as MP	Law
Wood space heating	Population	straight line between 1970 & 2000	Same as MP	LCOG
	Heating degree days	Average heating season	Coldest heating season	LCD

TABLE 18, CONTINUED

SOURCE CATEGORY	GROWTH FACTOR PROJECTION METHOD	ASSUMPTIONS MOST PROBABLE (MP)	WORST CASE (WC)	REFERENCE
Orchard pruning	No growth	No expected increase or decline in acreage	Same as MP	LCES
Railroads & aircraft	No growth - RR	RR - no expected increase in operations	Same as MP	SPRR
	LTO's - AC	AC - operations increase	Same as MP	MSF
Unpaved road dust	VMT	Straight line increase between 1976-85 totals	Same as MP	OSU-ODOT
	Rainfall	Average year data	Dry year	LCD
Small point sources	Employment	Straight line between 1976 & 2000	Same as MP	LCOG
		Growth expected in same SIC & same location	Same as MP	
Agricultural tilling & off-highway vehicles	Employment decline	Straight line between 1976 & 2000	Same as 1976	LCOG
	Agricultural acreages	Expected decrease in acres	No decrease in acres	LCES

ABBREVIATIONS:

LRAPA Lane Regional Air Pollution Authority
VMT Vehicle miles traveled
OSU Oregon State Universtiy
ODOT Oregon Dept. of Transportation
LCD local climatological data
LCOG Lane Council of Governments
EWEB Eugene Water & Electric Board
OB Open burning
FB Field burning
LCES Lane County Extension Service
SPRR Southern Pacific Railroad
MSF Mahlen Sweet Field
SIC Standard Industrial Classification
AC Aircraft

TABLE 19

AQMA PROJECTED TOTAL SUSPENDED PARTICULATE EMISSION TOTALS

(TONS/YEAR)

SOURCE CATEGORY	1976	1980	% [1] GROWTH	1985	% GROWTH	1990	% GROWTH	1995 [2]	% GROWTH	1995 [3]	% GROWTH
Point Sources:											
Process equipment	8064.5	8201.8	2	8330.0	3	7874.2	-2	7466.4	-7	8768.6	9
Unpaved yards	156.7	156.7	0	156.7	0	156.7	0	156.7	0	156.7	0
Subtotal	8221.2	8358.5	2	8486.7	3	8030.9	-2	7623.1	-7	8925.3	9
Area Sources:											
Paved road dust	2829.0	3180.0	12	3730.0	32	4329.0	53	4940.0	75	5090.0	80
Motor vehicles	566.2	583.7	3	601.5	6	639.9	13	678.2	20	678.2	20
Residential space htg. - distillate oil	11.5	11.1	-3	10.6	-8	11.1	-3	11.2	-3	12.1	5
Residential space htg. - natural gas	5.9	5.8	-2	5.8	-2	5.9	0	6.0	2	6.5	10
Commerical space htg. - residual oil	3.4	3.4	0	3.4	0	3.4	0	3.4	0	3.6	6
Commercial space htg. - natural gas	0.5	0.5	0	0.6	20	0.6	20	0.6	20	0.6	20
Open burning & field burning	72.4	61.0	-16	61.0	-16	61.0	-16	61.0	-16	72.4	0
Wood space htg.	556.5	602.2	3	714.2	28	815.6	47	918.1	65	1016.7	83
Orchard pruning	10.0	10.0	0	10.0	0	10.0	0	10.0	0	10.0	0
Railroads & aircraft	39.6	40.6	3	41.6	5	43.9	11	46.1	16	46.1	16
Unpaved road dust	3528.0	3810.0	8	4339.0	23	4869.0	38	5359.0	52	5540.0	57
Small point sources	173.8	191.9	10	213.1	23	234.5	35	260.3	50	260.3	50
Agricultural tilling & off-highway vehicles	123.1	123.1	0	121.8	-1	119.0	-3	117.7	-4	123.1	0
Subtotal	7919.9	8623.3	9	9852.6	24	11152.9	41	12411.6	57	12859.6	62
Total	16141.1	16981.8	5	18339.3	14	19183.8	19	20034.7	24	21784.9	35

1. all growth percentages are relative to 1976
2 most probable
3 worst case

Figure 27

1974 Emissions By Grid
Point and Area Sources

Total Suspended Particulate

(Units - Tons Per Year)

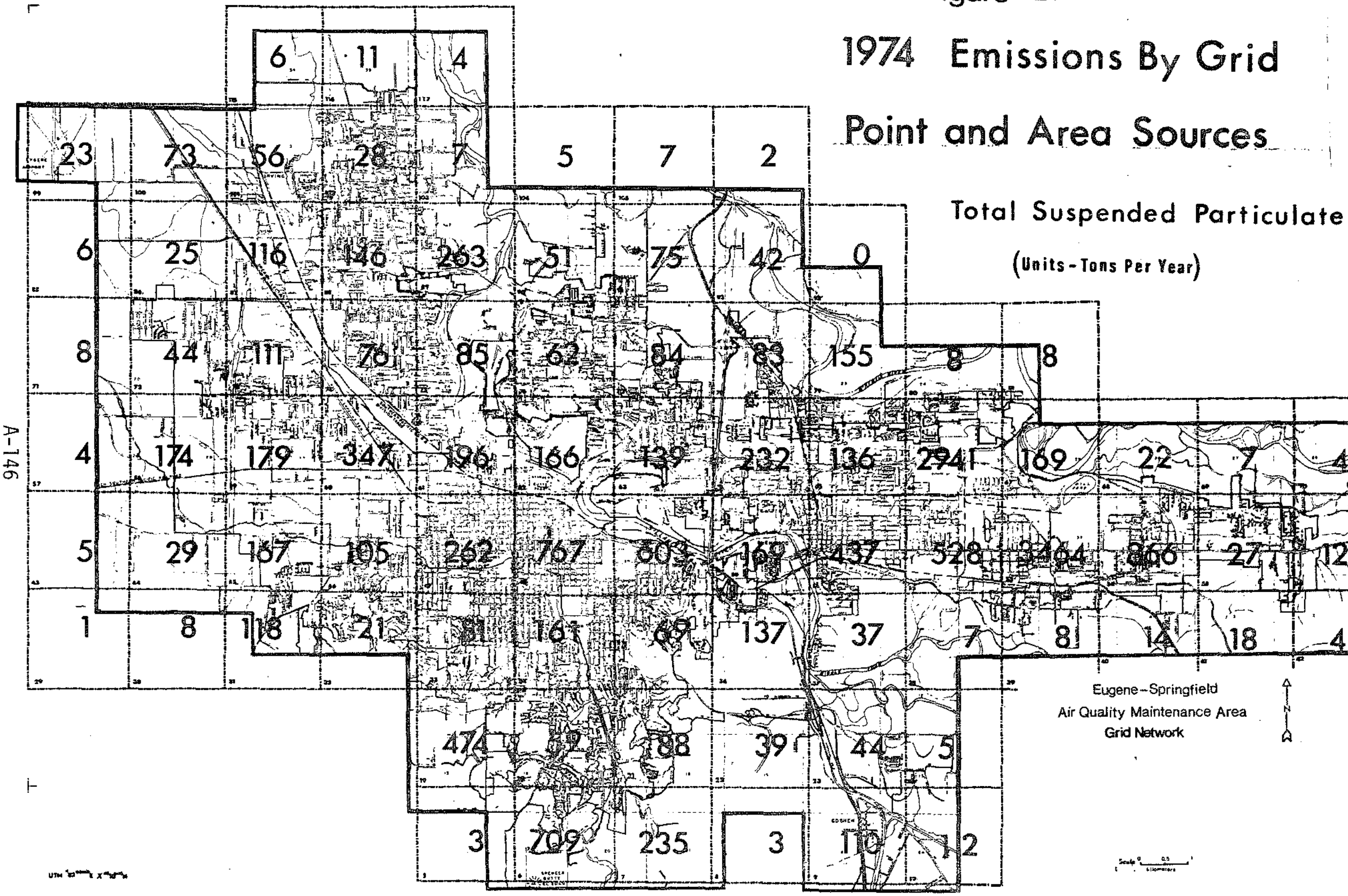


Figure 28

1980 Emissions By Grid

Point and Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

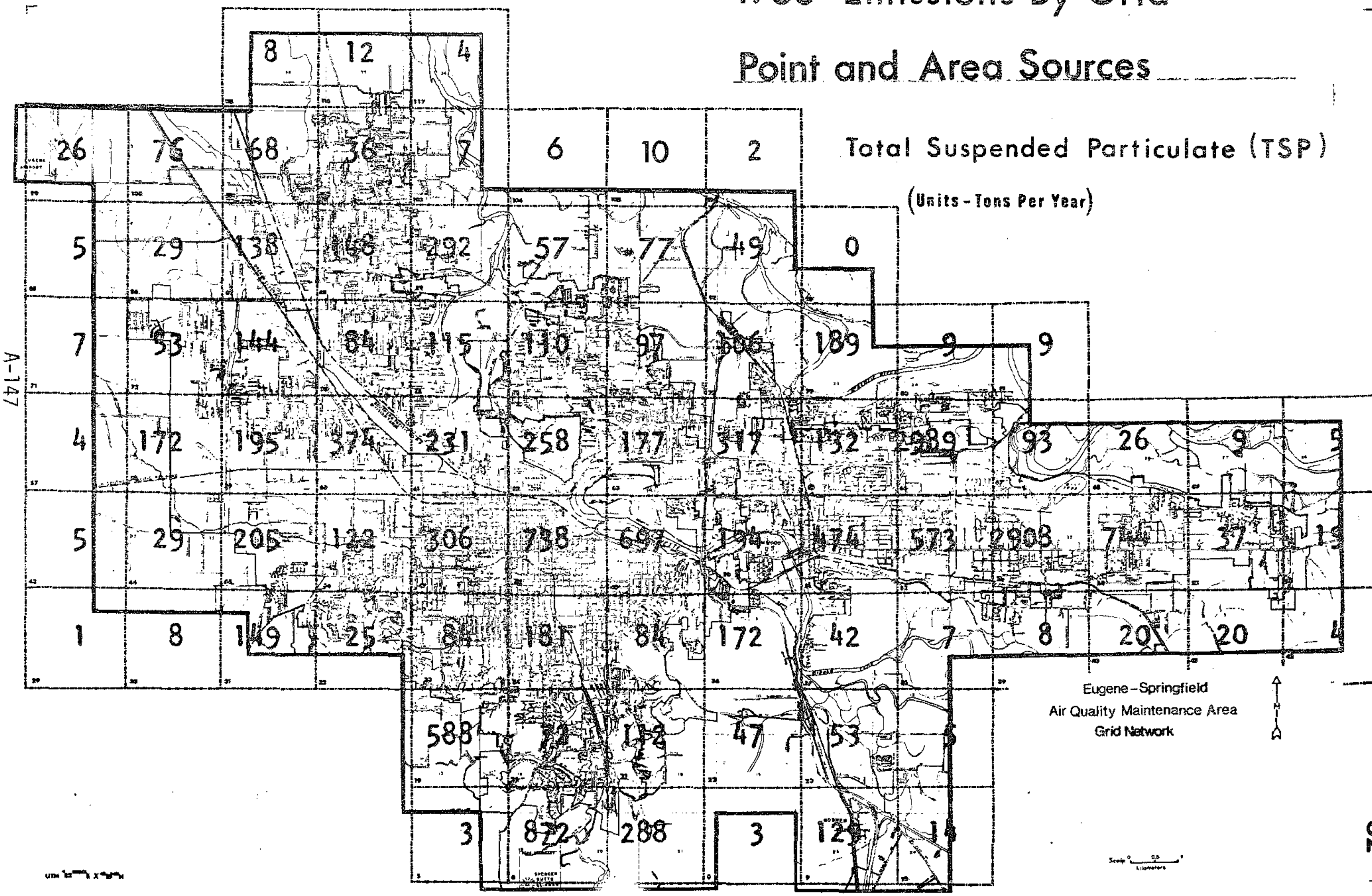


Figure 29

1985 Emissions By Grid

Point and Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

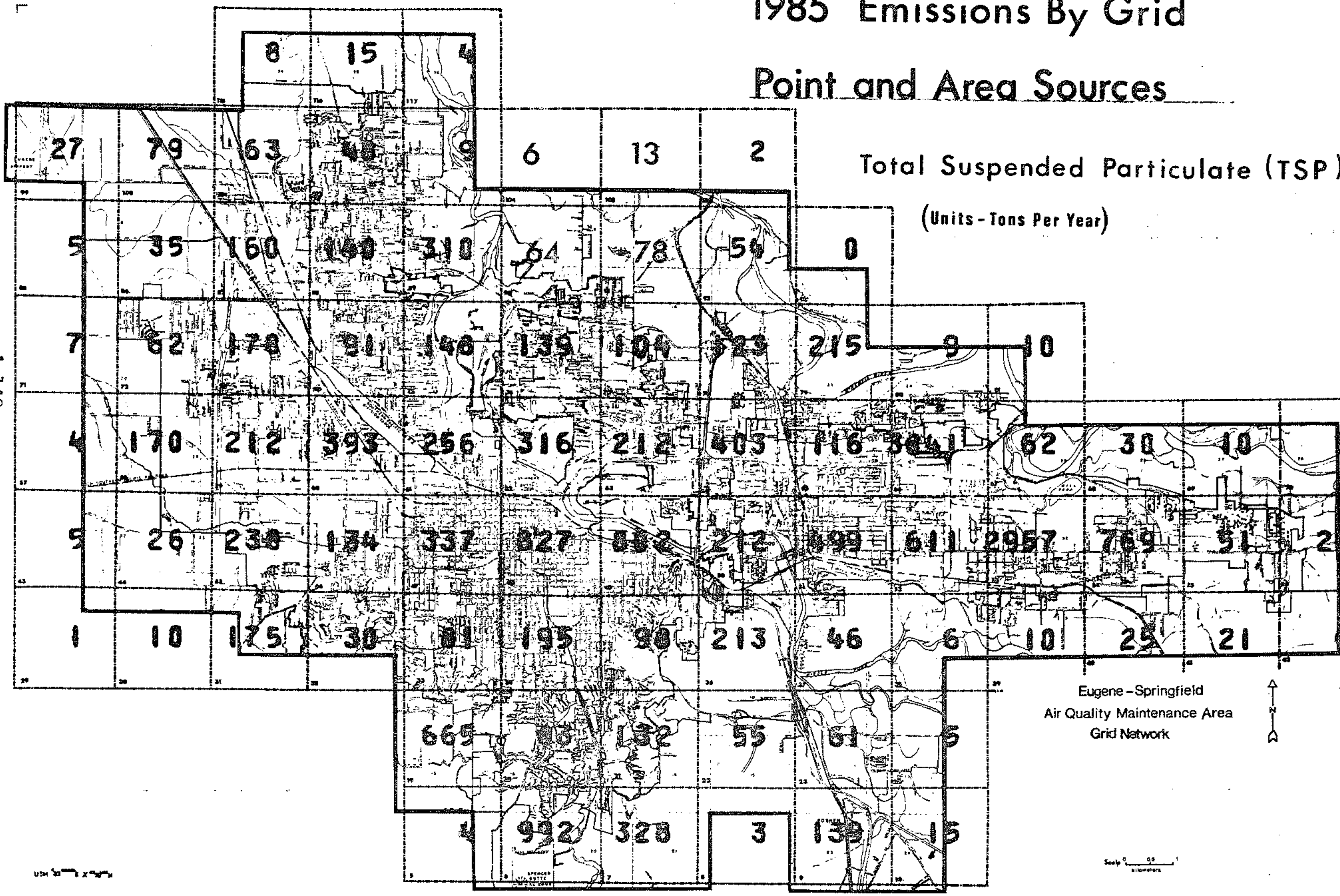


Figure 30

1990 Emissions By Grid

Point and Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

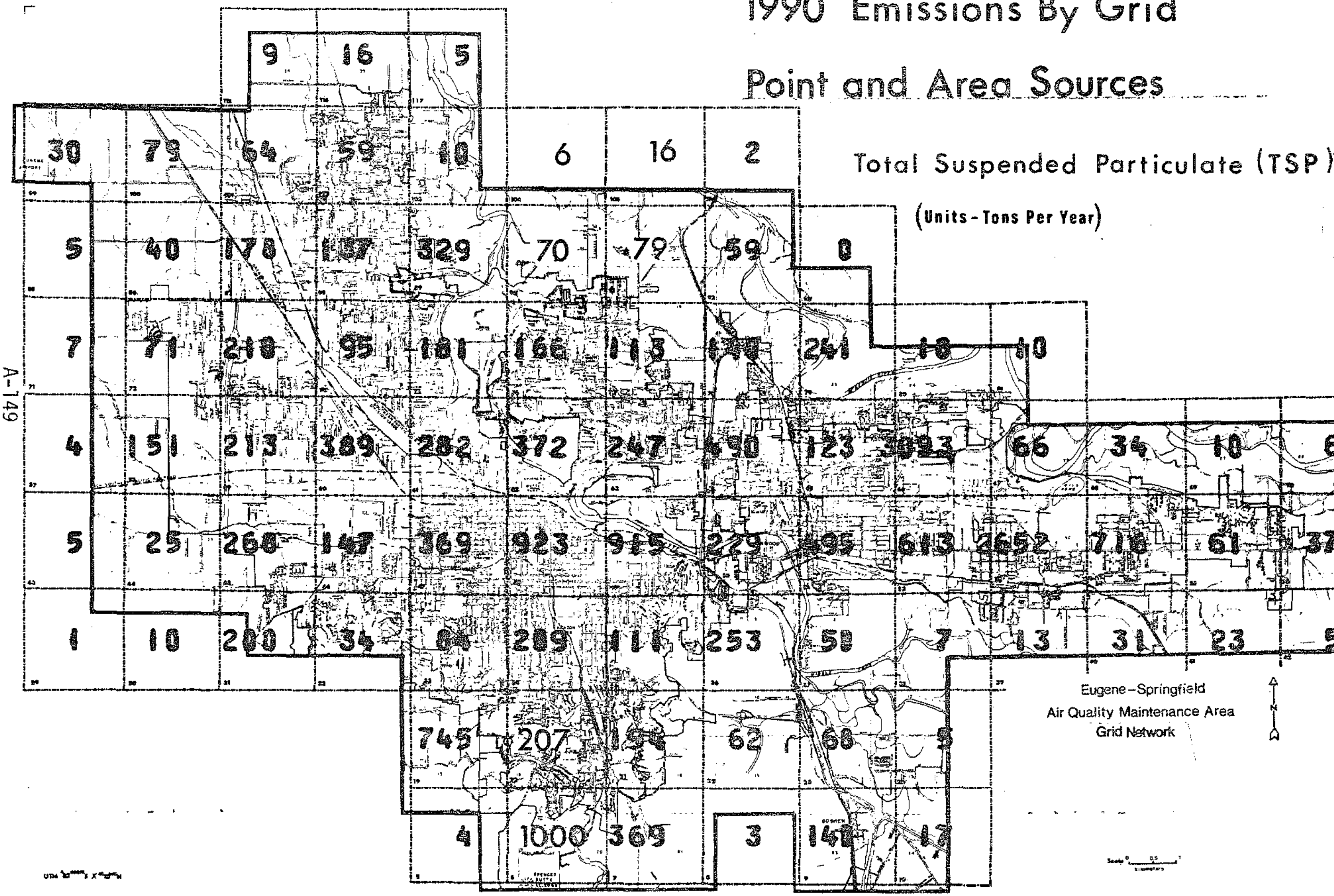


Figure 31

1995 Emissions By Grid
Point and Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

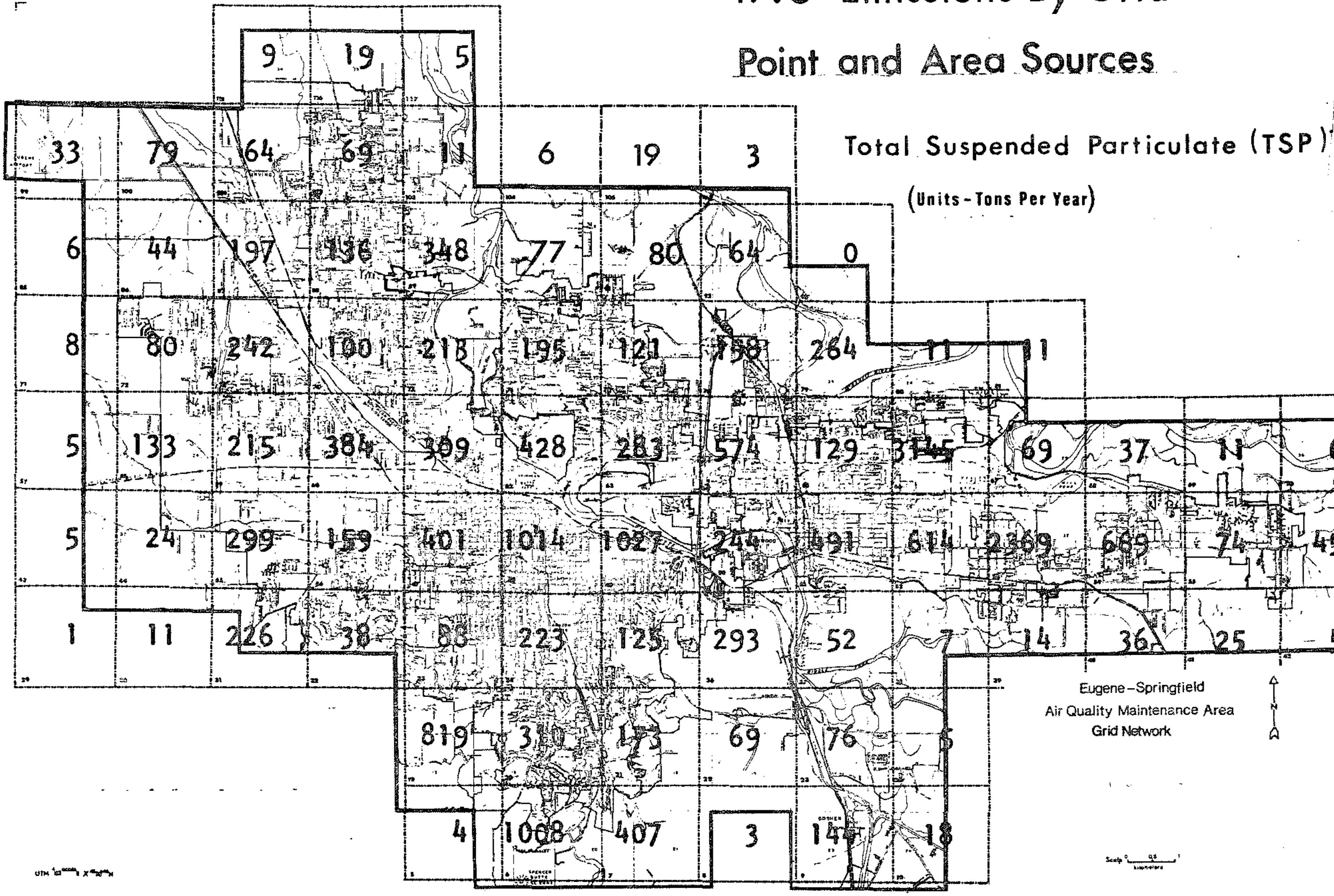


Figure 32

1995 Emissions By Grid

Point and Area Sources (Worst Case)

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

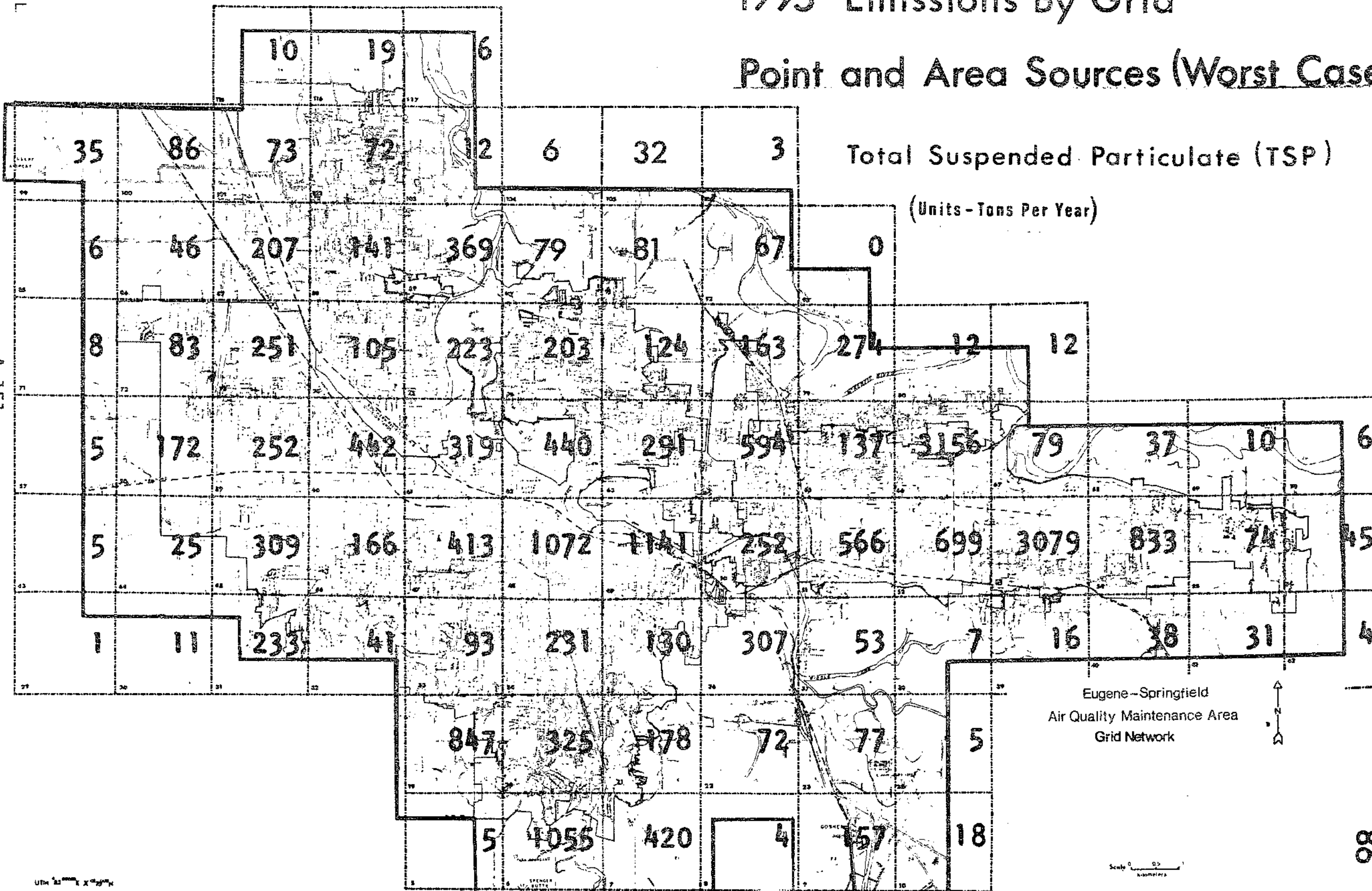


Figure 33

1974 Emissions By Grid

Area Sources

Total Suspended Particulate

(Units - Tons Per Year)

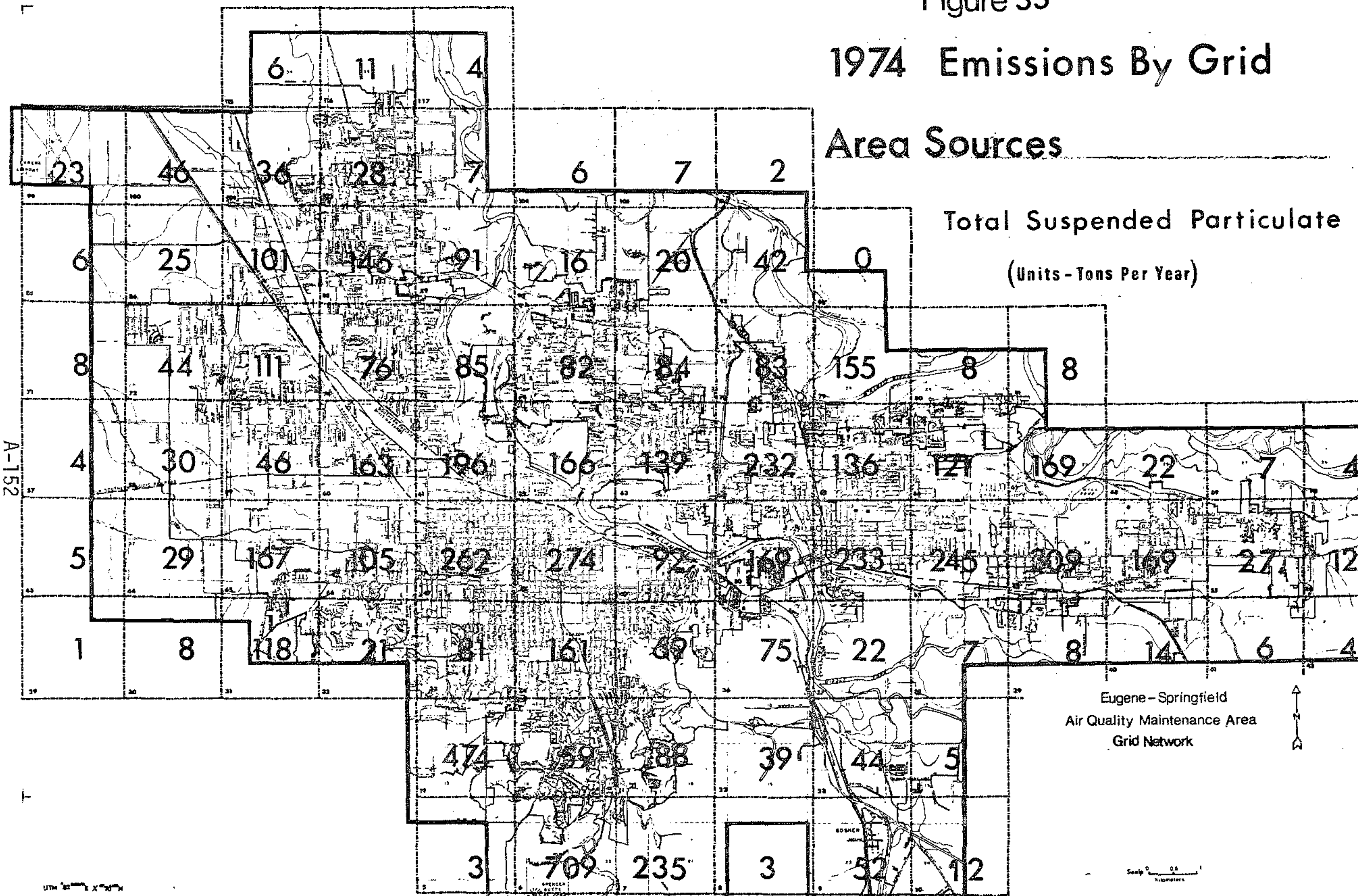


Figure 34

1980 Emissions By Grid

Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

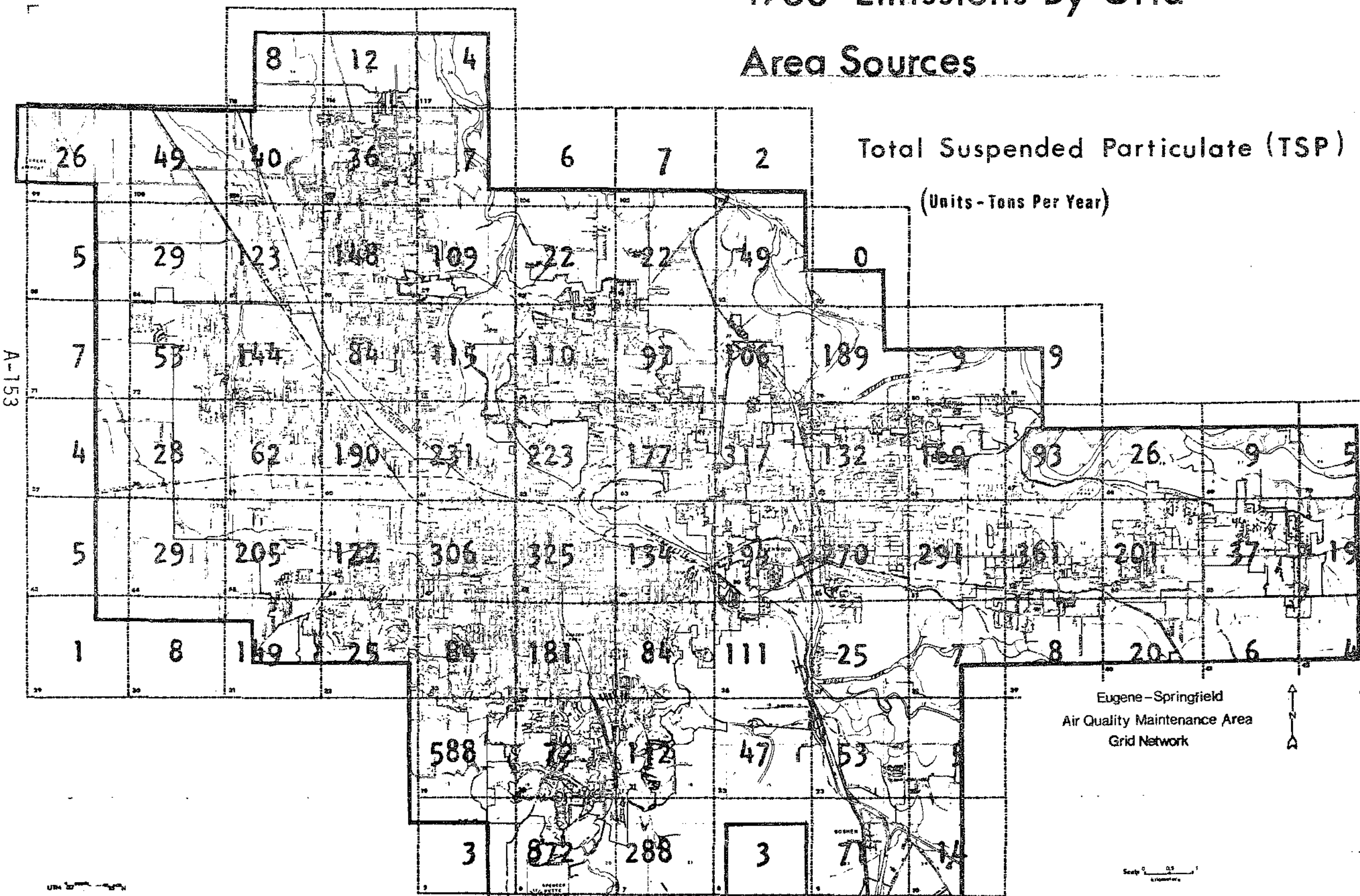


Figure 35

1985 Emissions By Grid

Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

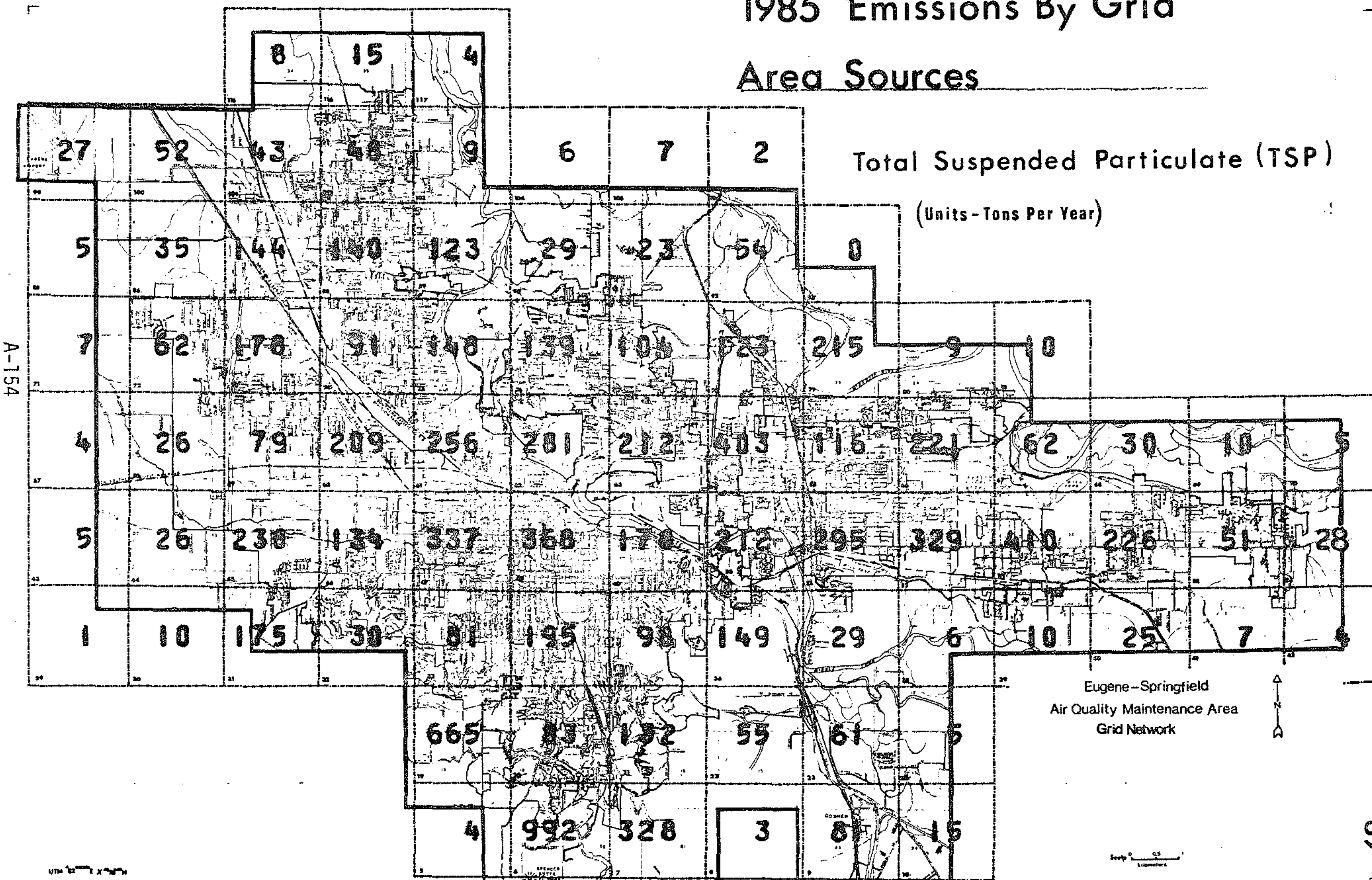


Figure 36

1990 Emissions By Grid

Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

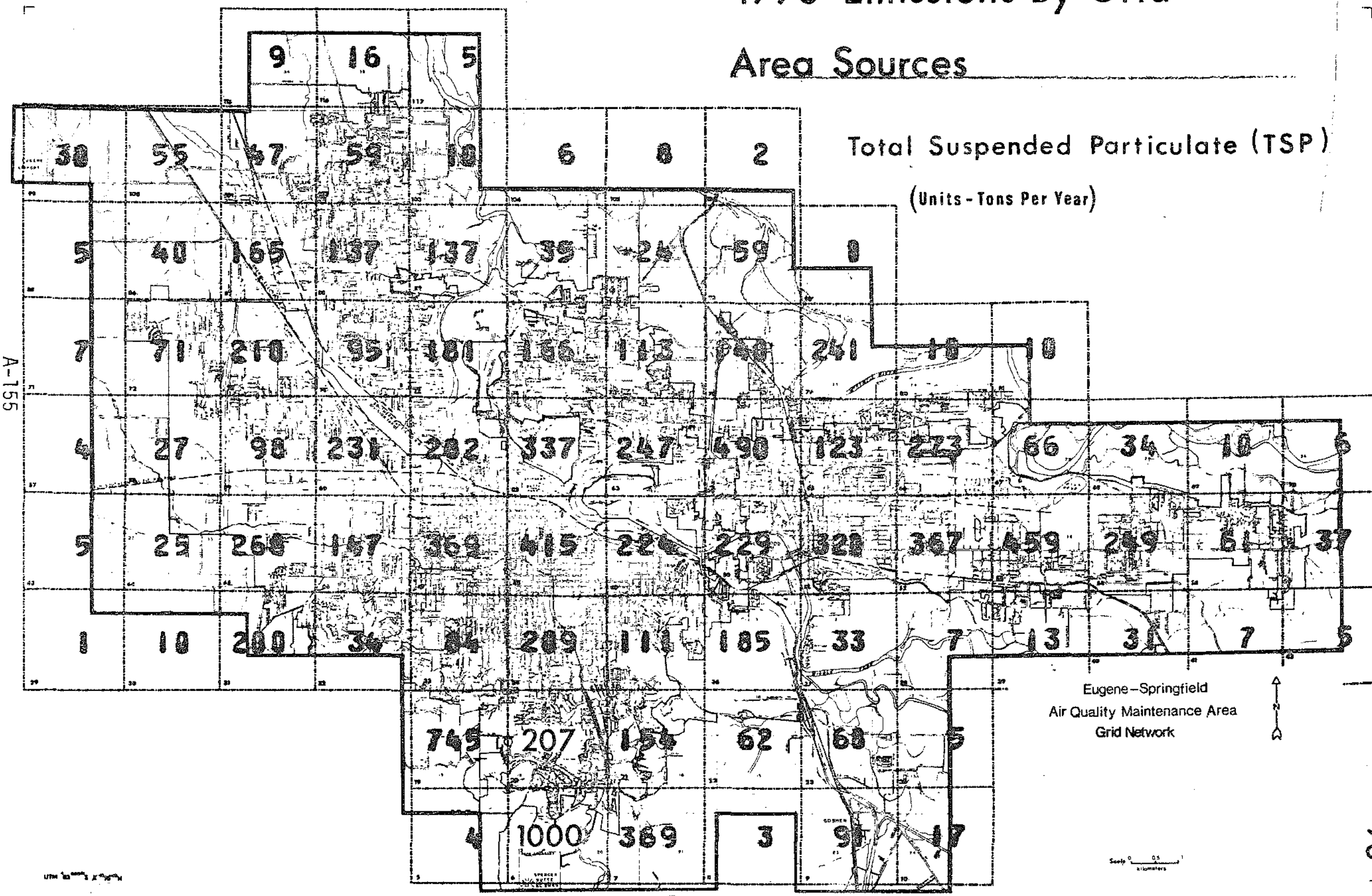


Figure 37

1995 Emissions By Grid

Area Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

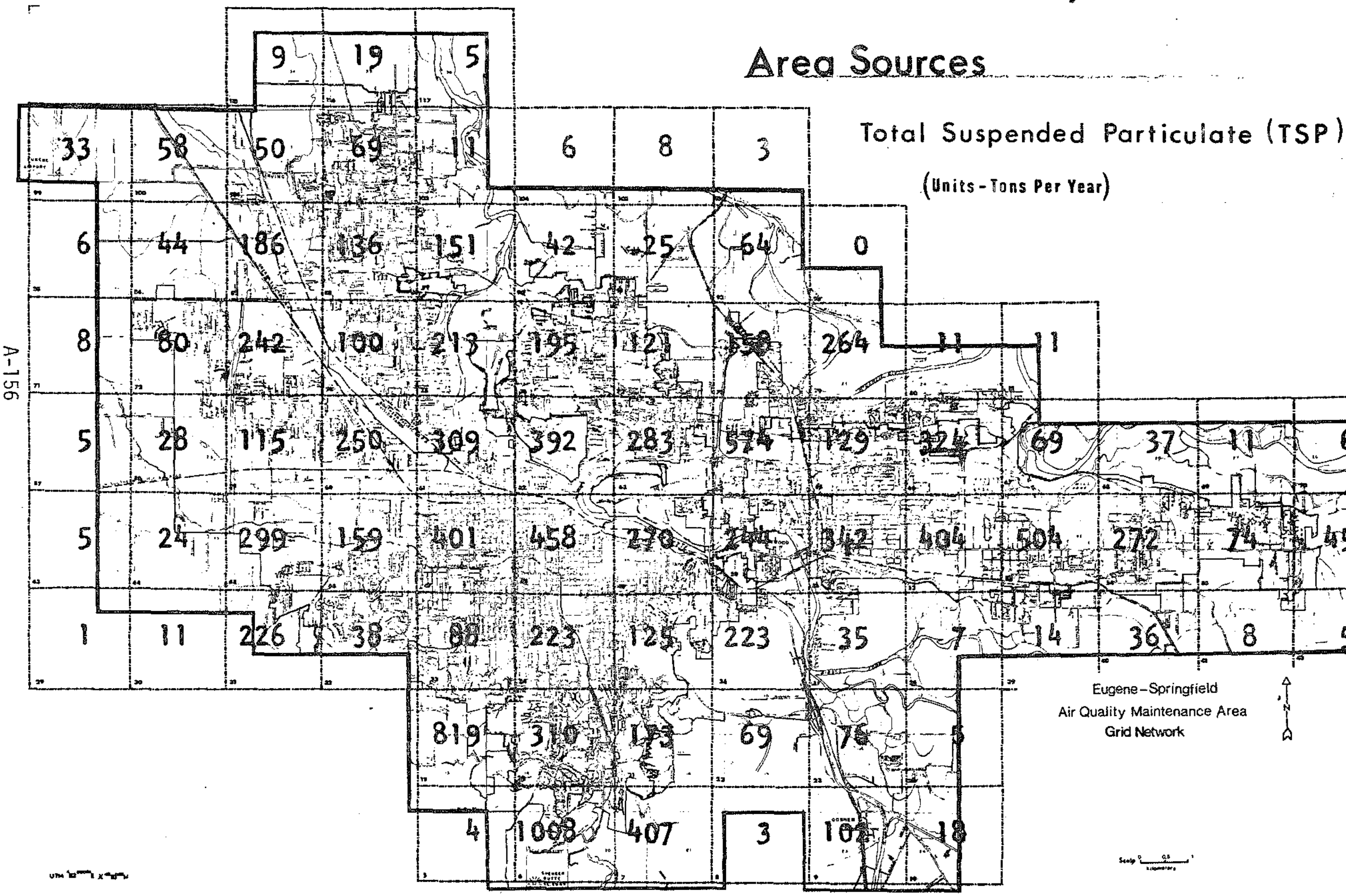


Figure 38

1995 Emissions By Grid

Area Sources (Worst Case)

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

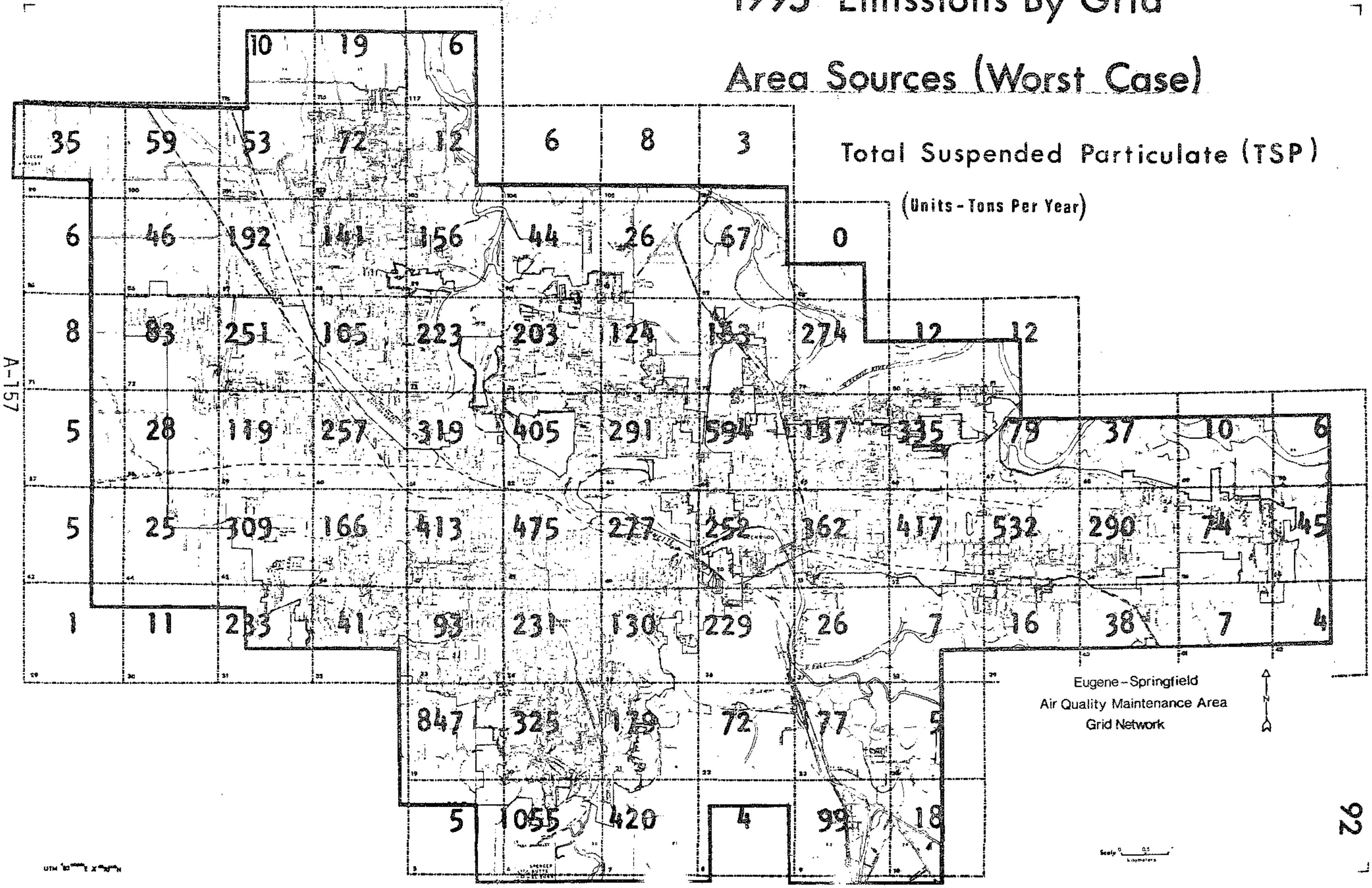


Figure 39

1980 Emissions By Grid

Point Sources

Total Suspended Particulate (TSP)

(Units - Tons Per Year)

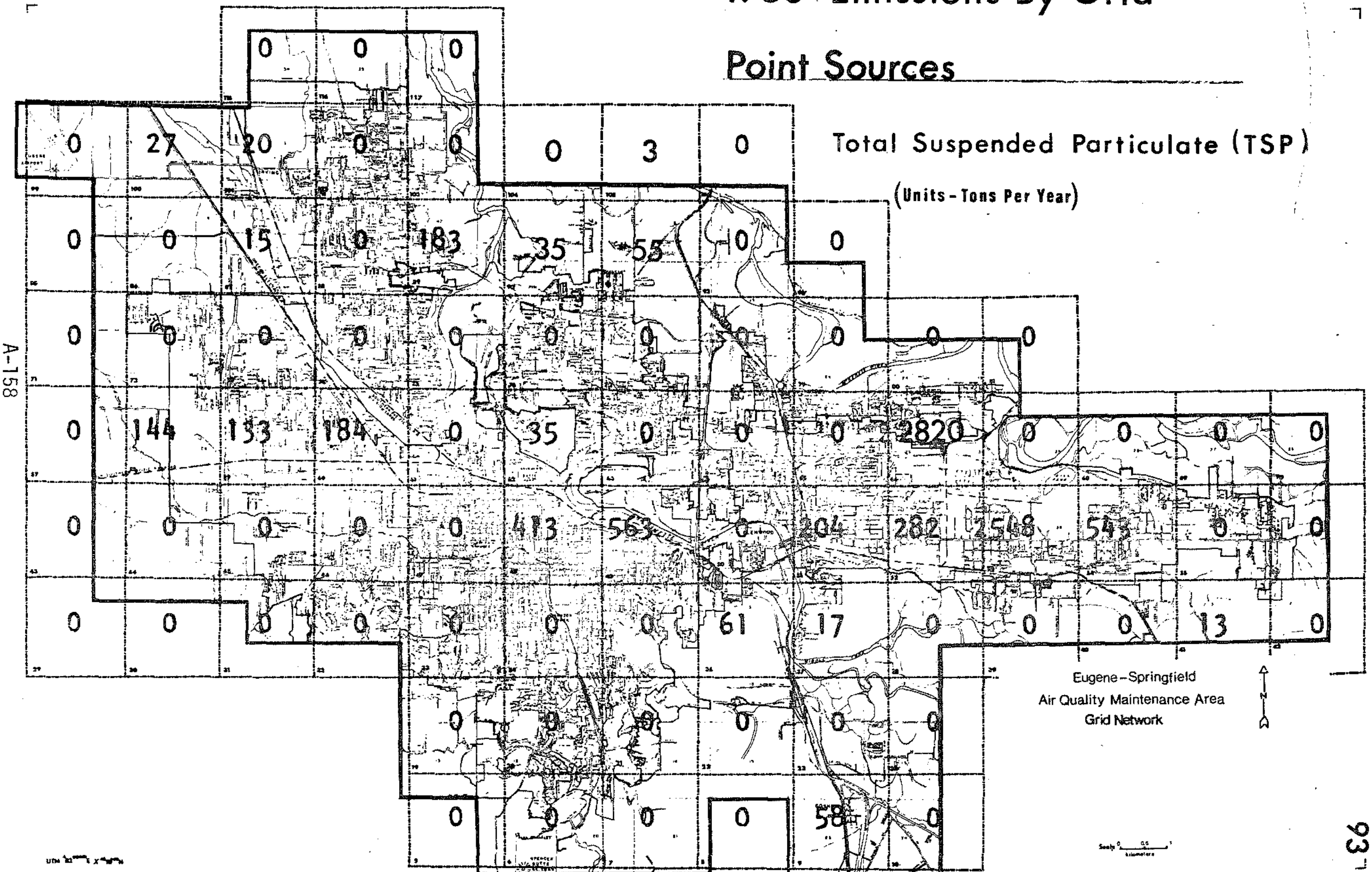


Figure 40

1985 Emissions By Grid

Point Sources

Total Suspended Particulate

(Units - Tons Per Year)

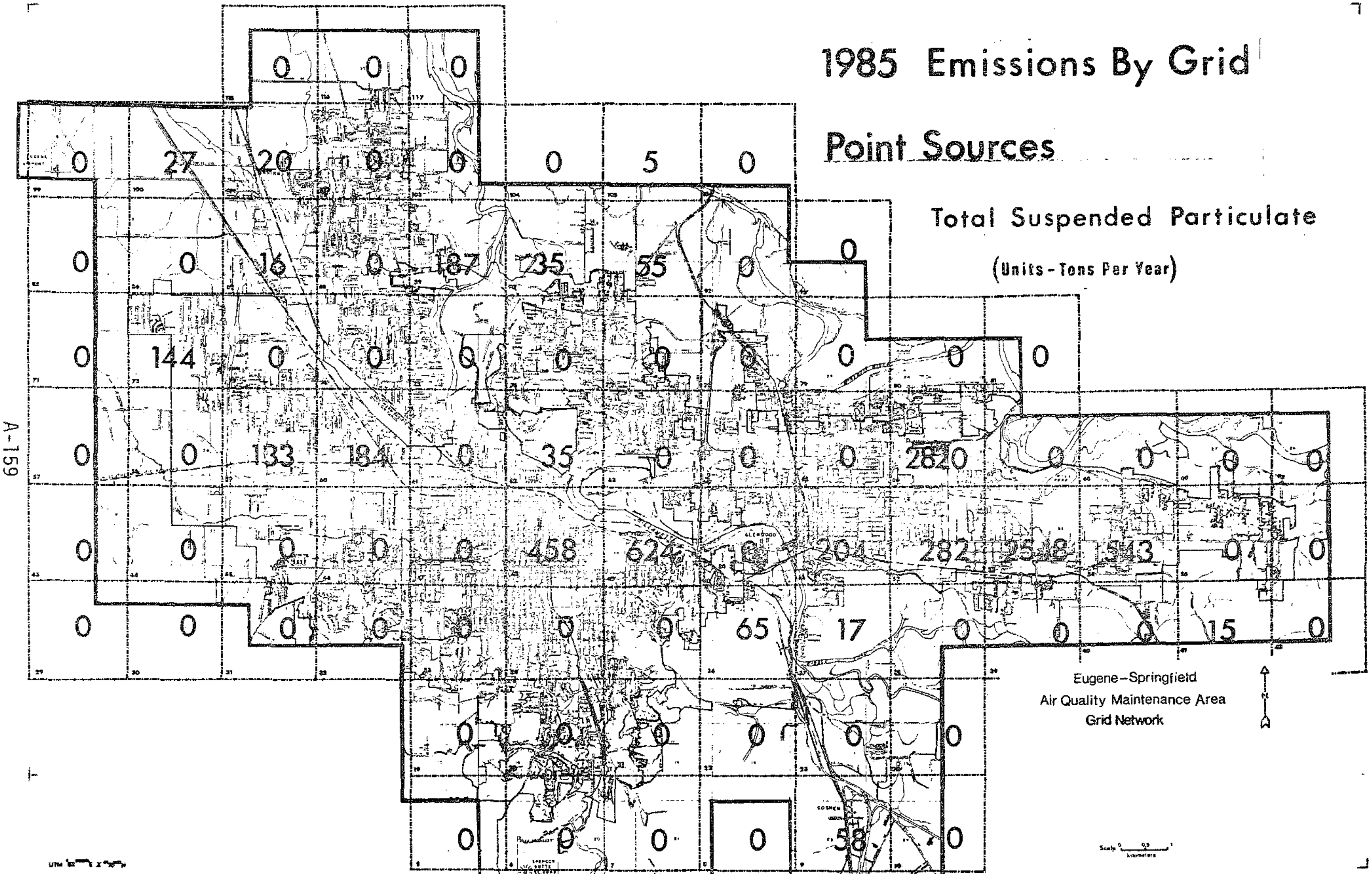


Figure 41

1990 Emissions By Grid

Point Sources

Total Suspended Particulate

(Units - Tons Per Year)

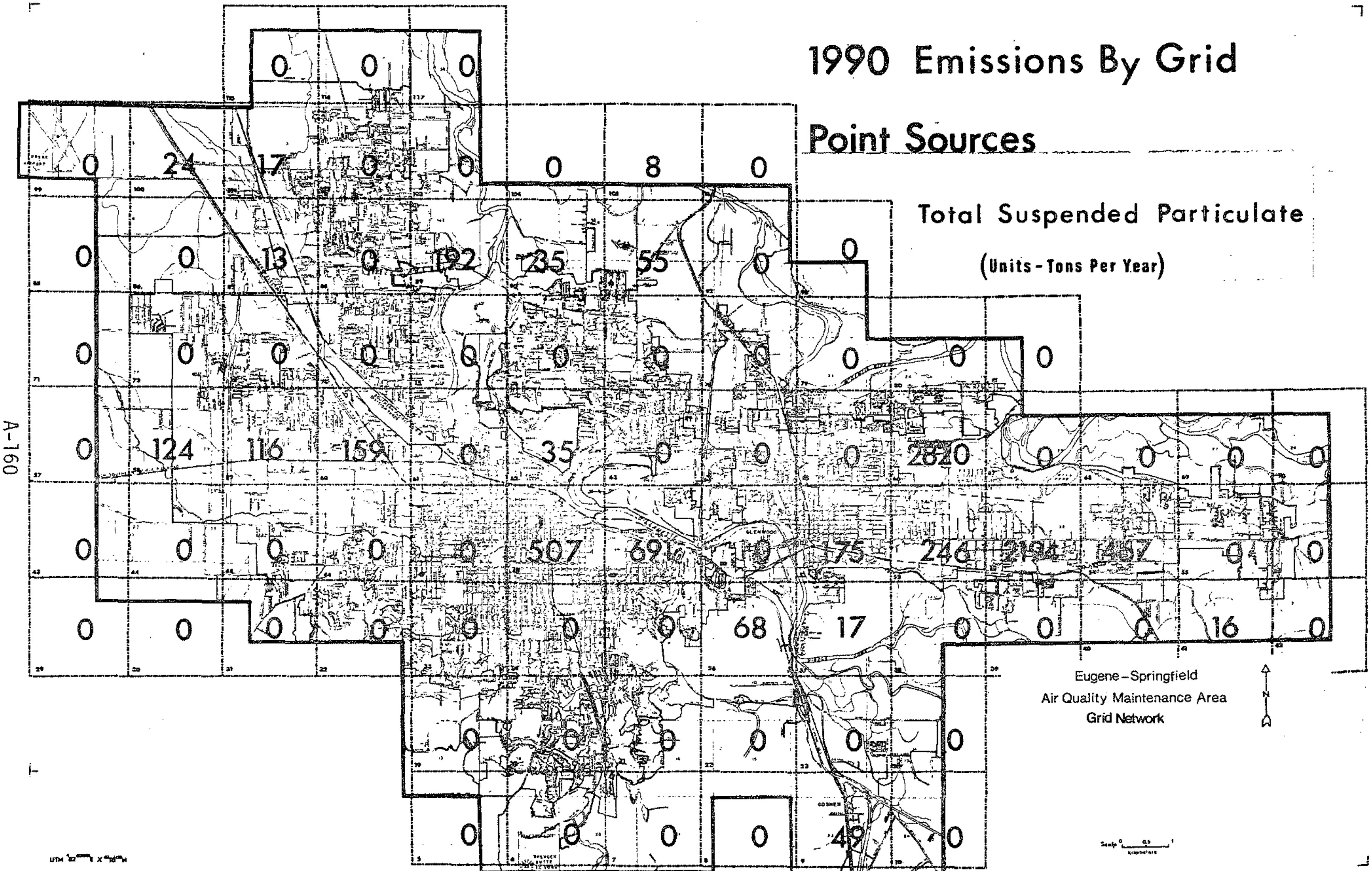


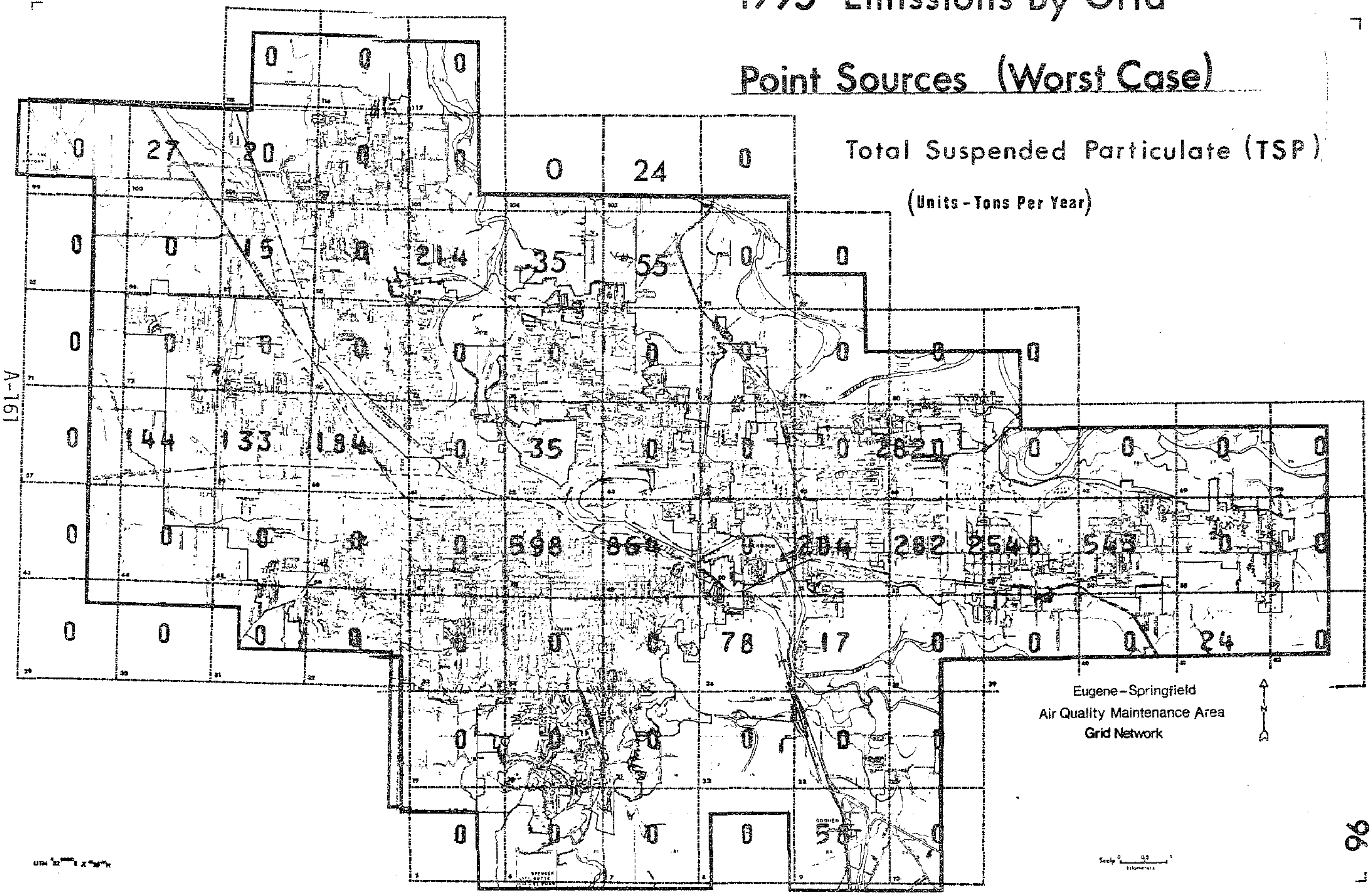
Figure 42

1995 Emissions By Grid

Point Sources (Worst Case)

Total Suspended Particulate (TSP)

(Units - Tons Per Year)



5. UPDATE METHODOLOGY

As a continuous part of the AQMA process, factors having important influences on TSP emission sources need to be monitored. These include emission factors, demographic data updates and additional source information.

As was found in Table 19, the five categories totaling the majority of TSP emission are:

- point sources
- paved road dust
- motor vehicles
- wood space heating
- unpaved road dust

Although it is reasonable to expect that all area source categories will be updated once every five years or so, monitoring of the above groups on an annual basis should assure reasonable tracking of AQMA emissions growth. Routine incorporation of emission changes into the emission inventory and continual surveillance of point source emissions are recommended.

Although monitoring of variables used to assign emissions to grids is necessary, the most important influence on emissions is changing emission factors. Dramatic changes in emission inventory tabulations can occur as research modifies emission factors. This is especially true for the "new" categories such as paved and unpaved road dust or wood space heating. Emission factor reviews are an important part of the data base update.

The paved road dust and motor vehicle categories are trackable by the same growth parameter, vehicle miles traveled (VMT). After 1980 census data are available, grid-by-grid ODOT VMT allocations can be made and compared to work completed in this study to make certain population distributions have followed assumed growth with no significant changes in travel patterns. Periodic checks on grid-by-grid VMT growth on a 5-year schedule should sufficiently monitor these sources. (Further improvements to the paved road dust category are mentioned in Section 6 of this report.)

Wood space heating is projected on an emissions-per-capita basis, making population the growth parameter of interest. Defini-

5. UPDATE METHODOLOGY, Continued

tive new population data will not be available until the 1980 census. Future planning studies may provide new estimates, but currently most area studies rely on the population information source used in this area. Development of information sources that indicate trends in wood use rates should be explored. Sources, such as; wood cutting permits or heating stove sales, did not have sufficient data for trend calculation at the time this report was completed. In future updates more data may be available.

As with the VMT-dependent sources, only a single scale-up of grid totals should be considered until 1980 census data provides a rationale for a new gridwise allocation of wood space heating emissions.

The best parameter for tracking unpaved road dust emissions is VMT. Currently, there is no information source which monitors VMT on unpaved roads inside the AQMA. It is difficult tracking information which is not available. Improvements in this area are recommended in Section 6 of this report.

All other area sources can be updated according to parameters mentioned in Table 20. Until the modeling phase of AQMA planning is complete, impact of these sources on receptor concentrations is unknown. But their individual contribution to total AQMA emissions is not as significant as the previously discussed categories.

TABLE 20

DATA BASE UPDATING PARAMETERS

SOURCE CATEGORY	UPDATING PARAMETER	REFERENCE
Point sources	Continuous monitoring	LRAPA
Area sources:		
Paved road dust	VMT	ODOT
Motor vehicles	VMT	ODOT
Residential space htg.	Popultation	1980 census
Commercial space htg.	New boiler listings	Dept. of Commerce
Open burning	Regulation changes & population	Oregon Congress
Field burning	Regulation changes & acres burned	Oregon Congress
Wood space htg.	Population	1980 census
Railroads	Operations changes	Southern Pacific
Aircraft	Operations changes	Mahlon Sweet Field
Unpaved road dust	VMT (on unpaved roads)	
Small point sources	Continuous monitoring	LRAPA
Agricultural tilling	Land use or crop changes	Extension Services
Off-highway vehicles	Vehicle types change	Dept. of Motor Vehicles - Fuel Tax Division

6. RECOMMENDED DATA IMPROVEMENTS

For improvements to most of the TSP emission source categories, DEQ and LRAPA need only be aware of emission factor changes, new information sources, and the update parameter monitoring of Table 20. As always, emission inventory data are constantly in need of re-evaluation. Results of LRAPA field compliance inspection programs must be routinely incorporated into the emissions inventory for point sources.

Unfortunately, the three area source categories contributing the largest amounts of TSP in the AQMA also have the most data improvements required. Paved road dust, wood space heating and unpaved road dust are the newest and least verified of all the categories. Priority should be given to improvements in these categories.

Improvement or confirmation of emission factors for paved road dust is of great importance. When more studies are available, review all emission factor parameters and corrections. Give attention to rainfall, particle resuspension, particle size, dust loading, and their effect on emission rates. Emissions from uncurbed streets is even higher than curbed. Cataloging streets by curbed/uncurbed classifications would provide a more representative emission total per grid. A check should be made into EPA's final equation when it is published along with all of their assumptions and corrections.

Because household wood burning was a significant TSP area source, an in-depth study of wood burning practices in the AQMA more sophisticated than the telephone survey may be useful. Development of an emission factor (from published EPA figures or from actual source testing) for heating stoves and fireplaces would improve the level of confidence of TSP estimates. Identification of a reliable parameter which estimates the trend toward wood in home heating would aid in projecting.percent wood use in new housing.

Before listing improvements to the unpaved road dust category, consideration should be given to the following area. Time and money necessary to obtain and maintain a detailed data base for unpaved roads will be quite extensive. This effort might be better

6. RECOMMENDED DATA IMPROVEMENTS, Continued

spent on development and implementation of a control strategy that would alleviate the TSP source.

Two areas were found to have information lacking in the unpaved road dust category. They are emission factor variables and traffic counts. Optimum data necessary for unpaved road dust calculations are:

1) percent silt (as measured by dry sieve method) for every road link
2) average speed on every link
3) vehicles mix to obtain a wheel correction
4) traffic counts (ADT per link)
5) estimation of how long the links take to dry out after a rain

Unless a computer file is to be made to keep track of data changes, optimum conditions will not be maintained for every link. But this category is significant enough to warrant sampling procedures that will obtain average values for each area. Traffic counts are important enough to have counts for every link, not only for allocation but projection as well.

Because of the impact of TSP emissions from unpaved roads, future studies should include information collection for other unpaved parking facilities. This data should contain size, location and relevant traffic parameters necessary for emission calculation.

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7.2 Personal Contacts

- -- Robert Shull and Robert Layton, Civil Engineering Dept., OSU
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- -- Karen Zidell, Bureau of Governmental Research, Salem
- -- Robert Shelby, Airport Manager, Mahlon Sweet Field, Eugene
- -- Ken Williams, Lane County Transportation Department, Eugene
- -- Thomas Jones, Engineering Division, Eugene Dept. of Public Works
- -- Michael Copely, Lane County Planning Dept., Eugene
- -- Michael Kelly, Springfield Public Works Dept., Springfield
- -- Thomas Lanchaster, Lane County Transportation Dept., Eugene
- -- Ray Costello, Salem Division of Aeronautics, Salem
- -- Thomas Santi, Eugene Water Electric Board, Eugene
- -- Dave Coon, Springfield Utilities Board, Springfield
- -- Charles Mann, Environmental Protection Agency - Research and Development, Research Triangle Park, North Carolina

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-- Jack Smith, Northwest Natural Gas Co., Portland

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-- Robert Helling, Maintenance Division, Eugene Dept. of Public Works

-- William Ursfeld, Oil & Heat Institute

-- Oregon Department of Environmental Quality, Air Quality Control Division, Portland

-- Lane Regional Air Pollution Authority, Eugene

8.1.a. Paved Road Dust

EMISSION FACTOR CALCULATIONS

DATA:	SITE NO.	@ 10 m G/VMT	SITE NO.	@ 10 m G/VMT
PEDCo[23]	3	2.98	34	1.54
	4	2.83	37	5.15
	7	1.65	38	4.31
	10	7.99	39	3.15
	12	2.13	40	3.38
	13	3.38	41	7.84
	16	1.99	42	2.38
	18	1.32	43	5.68
	20	0.42	45	5.01
	22	1.62	47	1.84
	23	6.66	49	6.88
	25	1.10	50	1.23
	26	5.36	51	4.45
	27	2.87	52	1.89
	28	16.67	54	8.12
	29	5.86	56	7.69
	30	6.44	57	4.31
	31	1.46	average	4.21
MRI[2]	3	6.77	15	8.63
	5	9.03	16	4.51
	6	5.45	average	6.88

CALCULATIONS:

a) weighted average:

PEDCo 35 x 4.21 = 147.35

MRI 5 x 6.88 = 34.40

181.75 ÷ 40 = 4.544 g/vmt

8. APPENDICES

8.1 Emission Allocation

8.1.a Paved road dust
8.1.b Motor vehicles
8.1.c Residential space heating
8.1.d Wood space heating
8.1.e Unpaved road dust
8.1.f Small point sources
8.1.g Unpaved yards and 1974 point sources
8.1.h Operating schedules
8.1.i Fugitive dust emission sources

8.2 Emission Projections

8.2.a Point sources
8.2.b Paved road dust
8.2.c Motor vehicles
8.2.d Residential space heating
8.2.e Small point sources

8.3 Characterization of Analysis Techniques Used in This Study

8.1.a. Paved Road Dust, Cont.

b) 4.544 g/vmt total vehicle particulate
-.325 g/vmt exhaust particulate
-.003 g/vmt H_2SO_4
-.200 g/vmt tire wear
4.016 g/vmt paved road dust particulate

c) Corrections:

Rainfall 1976 → $\frac{(365 - 111)}{(356)}$ = .696

1974 → $\frac{(365 - 138)}{365}$ = .622

<30 μm particule size ≃ 90%

d) actual emission factor used in allocation

1976 e =0.9 (4.016) (.696) = 2.52 g/vmt

1974 e =0.9 (4.0160 (.622) = 2.25 g/vmt

Miscellaneous Information

1. PEDCo (at 10m) and MRI data were plotted on log-probability paper (emission rate vs. cumulative frequency). The data plotted almost in a straight line indicating a log-normal distribution. Comparison of this plot and a plot of PEDCo data alone showed almost no difference in line placement. This non-skewing of the line justified including MRI data as part of the same data set as PEDCo data (at 10 meters downwind). This was not the case when combining MRI and PEDCo (at 30 meters downwind) data. Because there is no information as to which data is more correct, the combined data set was used in calculations.

2. The MRI report included a particle size study indicating 90% by weight of particles sampled were less than 30 microns. PEDCo data show that about 23% of emissions fall out by 30 meters downwind. No particle sizing was available for PEDCo figures. The MRI 90% correction was used in this analysis for

8.1.a. Paved Road Dust, Cont.

the following reasons:

a) AQMA study is to measure total suspended particulate and the 30 μm cutoff was used in the unpaved road dust category.

b) MRI work is just as valid as PEDCo study at present (if analysis used PEDCo data (at 30 meters), could not include MRI as part of same data set).

c) Emission Inventory emissions report include <30 μm particles.

3. EPA's fugitive dust source control guidelines report includes a rainfall factor in areas where rainfall is significant. Because the AQMA is in Oregon and the EPA document suggests it, the rainfall factor was incorporated into this emission factor calculation. When EPA's report on the paved road dust emission factor is published, special attention should be given to this factor.

8.1.b Motor Vehicles

OREGON STATE UNIVERSITY

1976 VEHICLE MILES TRAVELED ALLOCATION

GRID NO.	$x10^6$ VMT/YR	GRID NO.	$x10^6$ VMT/YR	GRID NO.	$x10^6$ VMT/YR
(99) 1,8	1.34	(33) 5,3	12.63	(64) 8,5	36.50
(30) 2,3	0.30	(47) 5,4	60.39	(78) 8,6	18,56
(44) 2,4	6.09	(61) 5,5	31.87	(92) 8,7	9,28
(58) 2,5	4.65	(75) 5,6	17.04	(23) 9,2	10,12
(72) 2,6	3.15	(89) 5,7	20.63	(37) 9,3	0.50
(86) 2,7	2.88	(6) 6,1	1.19	(51) 9,4	22.31
(100) 2,8	5,42	(20) 6,2	10.69	(65) 9,5	25.53
(31) 3,3	4,03	(34) 6,3	31.99	(38) 10,3	0.59
(45) 3,4	7.94	(48) 6,4	63.18	(52) 10,4	13.17
(59) 3,5	3.98	(62) 6,5	32.46	(66) 10,5	15.98
(73) 3,6)	17.81	(76) 6,6	14.50	(80) 10,6	0.58
(87) 3,7	19.75	(90) 6,7	1.56	(39) 11,3	1.19
(101) 3,8	3.42	(7) 7,1	0.09	(53) 11,4	10.63
(32) 4,3	0.40	(21) 7,2	0.97	(67) 11,5	39.16
(46) 4,4	21.10	(35) 7,3	6.64	(81) 11,6	0.58
(60) 4,5	23.08	(49) 7,4	22.32	(40) 12,3	2.43
(74) 4,6	10.81	(63) 7,5	29.69	(54) 12,4	10.64
(88) 4,7	36.32	(77) 7,6	18.84	(68) 12,5	2.88
(102) 4,8	4.66	(91) 7,7	3.33	(55) 13,4	3.22
(116) 4,9	1.22	(22) 8,2	10.12	(69) 13,5	0.44
(5) 5,1	0.16	(36) 8,3	19.74	(56) 14,4	2.48
(19) 5,2	2.58	(50) 8,4	28.69	(10) 10,1	1.98
				(9) 9,1	13.20

8.1.c Residential Space Heating

POPULATION GROWTH PER CENSUS TRACT

CT	1970	2000	FRACTION OF GROWTH PER YEAR	CT	1970	2000	FRACTION OF GROWTH PER YEAR
10	321	369	.005	36	2294	6347	.059
18	2618	8684	.077	37	3529	4171	.005
19	6017	9214	.017	38	5691	6953	.007
20	4154	9041	.039	39	2328	4741	.035
21	4388	11366	.053	40	2273	3770	.022
22	2703	6604	.048	41	4233	5558	.010
23	5090	9756	.031	42	2117	3971	.029
24	7070	12084	.024	43	6127	9774	.020
25	2342	9424	..10	44	7326	20623	.061
26	2169	6574	.068	45	5281	7341	.013
27	3428	4047	.006	46	3362	4237	.009
28	4524	5025	.004	47	3961	4524	.005
29	4042	20498	.136	48	4386	5174	.006
30	2684	8892	.077	49	4416	5649	.009
31	4997	10488	.037	50	3864	7048	.027
32	4958	6651	.011	51	3825	4369	.005
33	7080	8051	.005	52	1653	3874	.045
34	5095	6269	.008	55	2122	3902	.028
35	1987	4111	.036	54	3330	7858	.045

8.1.d. Wood Space Heating

SURVEY OF RESIDENTIAL USE

OF WOOD AS FUEL

Telephone List
Sequence No.__________

Circle number or fill in appropriate responses.

#1	1) Natural gas (continue) 2) Electricity (continue) 3) Oil (continue) 4) Propane (continue) 5) Wood (skip to #3) 6) Other__________________ (continue)	WHAT IS THE MAIN TYPE OF FUEL USED TO HEAT YOUR HOME?
#2	1) Yes (continue) 2) No (skip to #6)	DO YOU BURN ANY WOOD IN YOUR HOME AT ALL?
#3	1) Fireplace (continue) 2) Heat-o-lator (continue 3) Heating Stove (continue) 4) Furnace (skip to #5) 5) Other __________________ (skip to #5)	WHAT TYPE OF UNIT DO YOU USE TO BURN WOOD?
#4	_________Fireplaces (continue) _________Stoves (continue)	HOW MANY FIREPLACES OR STOVES DO YOU USE IN YOUR HOME TO BURN WOOD?
#5	_________Cords (continue)	ABOUT HOW MANY CORDS OF WOOD DID YOU BURN IN THE PAST YEAR?
#6	_________Dollars (continue) (Do not ask if answer to #1 is 2 or 5)	WHAT IS YOUR AVERAGE ANNUAL FUEL BILL, EXCLUDING WOOD (THIS IS ASKED TO DERIVE INFORMATION ABOUT COUNTY RESIDENTIAL FUEL USAGE)?
#7	1) Own (continue) 2) Rent (continue)	DO YOU OWN OR RENT THE PLACE IN WHICH YOU ARE LIVING?
#8	1) Eugene 2) Goshen 3) Springfield	WHAT TOWNS DO YOU LIVE IN? (NOTE: TOWNS ARE LISTED ALPHABETICALLY)

8.1.e. Unpaved Road Dust

TRAFFIC COUNTS FOR UNPAVED
STREETS IN SPRINGFIELD, ORE.

Site	AQMA Grid	Set Out Date/Time	Pick Up Date/Time	Volume	Remarks
Water St. between West F and West G St.	50	8-30/0915	8-31/0915	102	
Water St. between West H and West I St.	50	8-30/0945	8-31/0940	200	
Laura St. between West I and West J St.	50	8-30/1000	8-31/0955	25	Single Lane - no houses
Water St. between West I and West J St.	50	8-30/1020	8-31/1020	150	
Hartman St. between Harlow and Darlene St.	64	8-30/1045	8-31/1050	77	
Quarry St. East of South 4th St.	51	8-31/0930	9-1/0935	15	Dead end street
J St. between North 9th and North 10th St.	51	8-31/0950	9-1/0945	31	
13th St. between L and Centennial	65	8-31/1015	9-1/1005	0	No occupied [illegible]us
17th St. between Roland and South A St.	52	8-31/1045	9-1/1035	611	
South B St. between South 14th and South 15th St.	51	8-31/1115	9-1/110	206	
Scott St. between North 18th and North 21st St.	66	9-1/1055	9-2/0955	238	
South A St. between 20th and 21st St.	52	9-1/1030	9-2/1025	122	
34th St. between Industrial and Olympic St.	66	9-1/1045	9-2/1035	258	
C St. between North 34th and North 35th St.	52	9-1/1100	9-2/1045	572	
34th St. between Oregon and Virginia	52	9-1/1115	9-2/1115	362	
Camellia St. between 44th and 46th St.	53	9-6/0905	9-7/0900	133	

8.1.c. Unpaved Road Dust, Continued

Site	AQMA Grid	Set Out Date/Time	Pick Up Date/Time	Volume	Remarks
North A St. between 40th and 41st St.	53	9-6/0920	9-7/0915	96	
Oregon St. between 37th and 38th St.	53	9-6/0925	9-7/0920	80	
41st St. between Commercial and Main St.	53	9-6/0940	9-7/0925	195	
37th St. between Kathryn and Industrial	67	9-6/0955	9-7/0935	189	
D St. between 49th and 51st St.	54	9-7/0950	9-8/0955	148	Partially oiled
A St. between 54th and 55th St.	54	9-7/1000	9-8/1005	241	Dead end 55th not a thru stree
52nd Place between McKenzie Hwy. and Daisy	54	9-7/1010	9-8/1015	256	
60th between F St. and G St.	55	9-7/1045	9-8/1050	117	
47th St. between McKenzie Hwy and Bluebelle	53	9-7/1105	9-8/1110	155	

8.1.e Unpaved Road Dust, Continued

Traffic volumes on county road

GRID #		MILES/GRID	ADT
(1,8)	8	.32	40
(3,3)	31	.53	270
(3,4)	45	.64	200
(3,7)	87	.02	125
(3,8)	101	.11	125
(5,2)	19	.81	850
(6,1	6	9.66	110
(7,1)	7	.64	550
(9,3)	37	.47	125
(9,6)	79	.56	400

8.1.f. Small Point Sources

The following pages list the majority of small point sources included in this report:

NAME	EI #	SIC#	1976 EMISSIONS (T/YR)
Adams Elementary School	200002	8211	0.2
Borden, Inc.	200510	2821	0.3
Bailey Hill Elem. School	200513	8211	0.2
Chembond Corp.	201221	2821	0.8
Centennial Elem. School	201237	8211	0.8
Churchill High School	201239	8211	1.0
Douglas Gardens Elemen.	202115	8211	0.3
Dunn Elem. School	202117	8211	0.2
Eugene Concrete Pipe Co.	202514	3272	0.4
Eugene Sand & Gravel	202516	3273	2.0
Education Center Dist. 45	202520	8211	0.6
Edison Elem. School	202521	8211	0.2
First Christian Church	202801	8661	0.2
Ireco Industries, Inc.	204004	3361	1.1
Jefferson Jr. High	204206	8211	0.5
Laurel Hill Elem. School	204717	8211	0.2
Lincoln Elem. School	204718	8211	0.3
Lane Towers	204721	7261	
Meadowlark Elem. School	205104	8211	0.2
Monsanto Co.	205112	2821	0.6
McKenzie Willamette Hospital	205117	4961	0.4
Moffit Elem. School	205124	8211	0.2
Maple Elem. School	205125	8211	0.4
McKenzie School Dist. 68	205129	8211	0.5
North Eugene High School	205804	8211	1.0
J.O. Olsen Mfg. Co.	206106	2431	
Pierce Corp.	206405	3444	0.3
Page Elem. School	206412	8211	0.5
Ellis Parker Elem. School	206415	8211	0.2

8.1.f. Small Point Sources, Continued

NAME	EI #	SIC#	1976 EMISSIONS (T/YR)
River Road Elem.	207063	8211	0.3
States Veneer	207451	2435	8.0
Southern Pacific Tra.	207468	4789	5.5
Springfield School Dist.	207477	8211	0.3
Santa Clara Elem. School	207479	8211	0.2
Silver Lea Elem. School	207480	8211	0.2
Spring Creek Elem. School	207481	8211	0.2
Thurston Jr. High School	208251	8211	0.5
Willamette High School	208863	8211	1.0
Washington Elem. School	208886	8211	0.1
Westmoreland Elem. School	20887	8211	0.3
Whiteaker Elem. School	208888	8211	0.2
Willagillespie Elem. School	208889	8211	0.2
Willakenzie Elem. School	208890	8211	0.2
J.H. Baxter Co.	200502	2491	3.3
Benge Paving	200531	1442	2.4
Cascadian Co., Inc.	201202	2421	6.6
Cabax Mills - Mill B	201217	2430	7.5
Cuddeback Lumber Co.	201219	2421	8.5
Gem Lumber Co.	203106	2421	7.9
Giustina Lumber	203107	2421	4.2
Gheen Irrigation Works	203109	3479	1.4
Gregory Lumber Co.	203112	2421	2.0
Huntington Woodindin	203504	2421	1.8
Lane Feed & Seed	204708	2048	6.9
Lane Plywood Core Plant	204709	2430	1.0
Lane Cedar Prod.	204715	2429	1.9
Louvring & Akins	204727	3295	5.0
Mazama Timber Prod.	205114	2430	2.1
Oregon Industrial Prods.	206101	2421	5.4
Oregon Wood Prods.	206102	2421	1.0

8.1.f. Small Point Sources, Continued

NAME	EI #	SIC#	1976 EMISSIONS (T/YR)
Oregon Cedar Products Co.	206105	2421	7.9
RC Parsons Redimix	206411	3273	1.0
Joe Romania Chev.	207059	5511	0.3
States Veneer Unisphere	207452	2435	6.2
Sheldon High School	207457	8211	1.1
Star Wood Products	207466	2421	6.9
South Eugene High School	207478	8211	2.0
Shur Way Rock Prod.	207486	1442	6.3
Triangle Veneer	208250	2430	5.9
Tangfeldt Wood Products	208253	2421	1.3
Trus Joist Corp.	208256	2439	6.7
Wildish Concrete #1	208877	3273	2.0
Zip-O-Log Mills, Inc.	209550	2421	4.0
Zip-O-Log Veneer Sawmill	209552	2421	2.5

8.1.g. Unpaved Yards and 1974 Point Sources

A. Point Source unpaved yard traffic

1) Simpson Extruded Plastics - ID# 9001
15 cars/day, 200 ft/car, 5 days/week
1 truck, 700 ft, 2 times/week

2) Southern Pacific Railroad - ID# 9002
45 cars/day, 100 ft/car, 2 times/day

3) Eugene Sand & Gravel - Escavation Site - ID# 9003
12 trucks/hour, 18 wheels, 40 mph, 1000 ft

4) R.C. Parsons Redimix - ID# 9004
4 trucks/hour, 1000 ft, 8 hr/day, 5 day/week

5) States Veneer - Unisphere - ID# 9005
trucks-20 trips/day, 20 ft/trip, 4 wheels
trucks-15 trips/day, 600 ft/trip, 8 wheels

6) Georgia Pacific - ID# 9006
92 trips/day, 1/2 mi/trip, 91 days/year

7) Eugene Concrete & Pipe - ID# 9007
1/2 mi/trip, 10 mph, 8 hr/day

8) Delta Sand & Gravel - ID# 9008
trucks, 300 trips/day, 10 hr/day, 5 day/week, 2000 ft, 15 mph, 18 wheels
trucks, 60 trips/day, 10 hr/day, 5 day/week, 5000 ft, 8 mph

9) Georgia Pacific-Irving - ID# 9009
log truck 33 trucks/day, 400 ft, 5 mph
veneer truck 7/day, 300 ft, 10 mph
bark truck, 2/week, 300 ft, 10 mph

8.1.g. Unpaved Yards and 1974 Point Sources, Continued

18. Zip-O-Log Veneer / Zip-O-Sawmill - ID# 9018, Cont.
100 FLT trips/day, 260 day/year, 1/10 mi
14 trucks/day, 260 day/year, 1/10 mi
400 cars/day, 260 day/year, 1/10 mi
8 trucks/day, 260 day/year, 1/5 mi

B. 1974 Point Sources

Point sources and their TSP emissions for 1974 are identical to 1976 point sources except for the following 11 sources:

EI #	ID #	SOURCE	1974 EMISSIONS (T/YR)
208850	2331	Weyerhauser Co.	686.6
208850	2332	Weyerhauser Co.	567.5
208850	2333	Weyerhauser Co.	117.6
202505	0710	EWEB	493.6
205139	1541	Morse Bros.	0.0
205800	1562	National Metallurgical	20.0
208851	2341	Wildish Sand & Gravel	21.0
203103	0911	Georgia Pacific-Irving	2.4
203103	0912	Georgia Pacific-Irving	5.8
208867	2471	Weyerhauser	62.6
208867	2472	Weyerhauser	551.0

8.1.h. Operating Schedules

The following tables list Area Source operating schedules for 1974, 1976, Most Probable Case and Worst Case.

8.1.g. Unpaved Yards and 1974 Point Sources, Continued

10. Eugene Sand & Gravel - ID# 9010
25 trucks, 300 trips, 7 mph, 1000 ft.
20 trucks, 68 loads, 5 mph, 500 ft.
3 excavators, 135 loads, 10 mph, 1200 ft
1 loader, 100 trips/day, 10 mph, 1000 ft/trip
operation - May, June, July, Aug., 1/2 Sept.

11. Huntington Wood Industries - ID# 9011
18 wheels, 26/day, 1/2 mile
10 wheels, 20/day

12. Chembond - ID# 9012
18 wheels 85 trucks/day, 1 mi.

13. Morse Bros. Asphalt - ID# 9013
10 trucks, 20 trips/day, 1600 ft, 15 mph, 10 wheels
1 truck, 45 trips/day, 1800 ft, 20 mph, 18 wheels

14. Wildish Sand & Gravel - ID# 9014
11 trucks/day, 1.5 mi

15. Phillips Forest Products - ID# 9015
6 trucks/day, 1/2 mi, 18 wheels
9 log trucks/day, 1/2 mi, 18 wheels

16. Moon Trucking - ID# 9016
2 trips/day, 25 trucks, 1000 ft, 250 days/year

17. Central Mfg. - ID# 9017
6 trucks/day, 2 trips, 0.1 mi, 250 days/year

18. Zip-O-Log Veneer / Zip-O-Sawmill - ID# 9018
40 log truck/day, 260 day/year, 1/2 mi
20 log haulers/day, 260 day/year, 1/8 mi

1974 OPERATING SCHEDULE (% OF YEAR)

AREA SOURCE CATEGORY	HR	DY	WK	J	F	M	A	M	J	J	A	S	O	N	D
Paved road dust	24	7	52	5.7	4.8	6.1	6.6	9.2	11.0	10.0	13.2	13.2	11.0	5.7	3.5
Motor vehicles	24	7	52	7.1	7.5	8.2	8.1	8.2	8.9	8.9	9.4	8.9	8.6	8.4	7.8
Residential space heating - distillate oil	24	7	52	19.6	15.0	11.7	9.0	6.7	2.1	0.8	0.4	0.6	7.6	11.9	14.6
Residential space heating - natural gas	24	7	52	19.6	15.0	11.7	9.0	6.7	2.1	0.8	0.4	0.6	7.6	11.9	14.6
Commercial space heating - residual oil	24	7	52	19.6	15.0	11.7	9.0	6.7	2.1	0.8	0.4	0.6	7.6	11.9	14.6
Commercial space heating - natural gas	24	7	52	19.6	15.0	11.7	9.0	6.7	2.1	0.8	0.4	0.6	7.6	11.9	14.6
Open burning & field burning	12	7	52	0.2	0.2	0.6	2.9	2.9	0	18.1	27.1	27.1	18.1	1.4	1.4
Wood space heating	24	7	52	19.6	15.0	11.7	9.0	6.7	2.1	0.8	0.4	0.6	7.6	11.9	14.6
Orchard pruning	12	7	52	0	30	30	30	0	0	0	0	0	0	0	0
Railroads & Aircraft	24	7	52	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Unpaved road dust	24	7	52	5.7	4.8	6.1	6.6	9.2	11.0	10.0	13.2	13.2	11.0	5.7	3.5
Small point sources	8	7	52	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Agricultural tilling	12	7	52	0.3	0.3	0.4	0.3	29.1	14.8	9.8	14.8	29.1	0.4	0.3	0.3

1976 OPERATING SCHEDULE (% OF YEAR)

AREA SOURCE CATEGORY	HR	DY	WK	J	F	M	A	M	J	J	A	S	O	N	D
Paved road dust	24	7	52	6.7	5.5	6.3	5.9	8.3	9.8	11.1	8.3	10.6	9.4	8.7	9.4
Motor vehicles	24	7	52	8.2	8.1	8.2	8.1	8.2	8.9	8.9	9.4	8.9	8.6	8.4	7.8
Residential space heating - distillate oil	24	7	52	14.7	13.8	13.2	9.9	6.6	4.4	0.2	0.8	1.1	7.1	10.8	17.4
Residential space heating - natural gas	24	7	52	14.7	13.8	13.2	9.9	6.6	4.4	0.2	0.8	1.1	7.1	10.8	17.4
Commercial space heating - residual oil	24	7	52	14.7	13.8	13.2	9.9	6.6	4.4	0.2	0.8	1.1	7.1	10.8	17.4
Commercial space heating - natural gas	24	7	52	14.7	13.8	13.2	9.9	6.6	4.4	0.2	0.8	1.1	7.1	10.8	17.4
Open burning & field burning	12	7	52	0.2	0.2	0.6	2.9	2.9	0	18.1	27.1	27.1	18.1	1.4	1.4
Wood space heating	24	7	52	14.7	13.8	13.2	9.9	6.6	4.4	0.2	0.8	1.1	7.1	10.8	17.4
Orchard pruning	12	7	52	0	30	40	30	0	0	0	0	0	0	0	0
Railroads & Aircraft	24	7	52	8.3	8.3	8.3	8.8	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Unpaved road dust	24	7	52	6.7	5.5	6.3	5.9	8.3	9.8	11.1	8.3	10.6	9.4	8.7	9.4
Small point sources	8	7	52	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Agricultural tilling	12	7	52	0.3	0.3	0.4	0.3	29.1	14.8	9.8	14.8	29.1	0.4	0.3	0.3

MOST PROBABLE OPERATING SCHEDULE (% OF YEAR)

AREA SOURCE CATEGORY	HR	DY	WK	J	F	M	A	M	J	J	A	S	O	N	D
Paved road dust	24	7	52	3.3	6.1	10.2	7.7	8.1	10.2	12.6	12.6	8.9	7.3	8.9	4.1
Motor vehicles	24	7	52	7.1	7.5	8.2	8.1	8.2	8.9	8.9	9.4	8.9	8.6	8.4	7.8
Residential space heating - distillate oil	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	9.7	1.6	1.9	7.9	13.0	14.1
Residential space heating - natural gas	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	9.7	1.6	1.9	7.9	13.0	14.1
Commercial space heating - residual oil	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	9.7	1.6	1.9	7.9	13.0	14.1
Commercial space heating - natural gas	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	9.7	1.6	1.9	7.9	13.0	14.1
Open burning & field burning	12	7	52	0.2	0.2	0.6	2.9	2.9	0	18.1	27.1	27.1	18.1	1.4	1.4
Wood space heating	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	0.7	1.6	1.9	7.9	13.0	14.1
Orchard pruning	12	7	52	0	30	40	30	0	0	0	0	0	0	0	0
Railroads & Aircraft	24	7	52	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Unpaved road dust	24	7	52	3.3	6.1	10.2	7.7	8.1	10.2	12.6	12.6	8.9	7.3	8.9	4.1
Small point sources	8	7	52	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Agricultural tilling	12	7	52	0.3	0.3	0.4	0.3	29.1	14.8	9.8	14.8	29.1	0.4	0.3	0.3

WORST CASE OPERATING SCHEDULE (% OF YEAR)

AREA SOURCE CATEGORY	HR	DY	WK	J	F	M	A	M	J	J	A	S	O	N	D
Paved road dust	24	7	52	6.7	5.5	6.3	5.9	8.3	9.8	11.1	8.3	10.6	9.4	8.7	9.4
Motor vehicles	24	7	52	7.1	7.5	8.2	8.1	8.2	8.9	8.9	9.4	8.9	8.6	8.4	7.8
Residential space heating - distillate oil	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	0.7	1.6	1.9	7.9	13.0	14.1
Residential space heating - natural gas	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	0.7	1.6	1.9	7.9	13.0	14.1
Commercial space heating - residual oil	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	0.7	1.6	1.9	7.9	13.0	14.1
Commercial space heating - natural gas	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	0.7	1.6	1.9	7.9	13.0	14.1
Open burning & field burning	12	7	52	0.2	0.2	0.6	2.9	2.9	0	18.1	27.1	27.1	18.1	1.4	1.4
Wood space heating	24	7	52	17.5	12.0	13.2	9.4	5.9	2.8	0.7	1.6	1.9	7.9	13.0	14.1
Orchard pruning	12	7	52	0	30	40	30	0	0	0	0	0	0	0	0
Railraods & Aircraft	24	7	52	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Unpaved road dust	24	7	52	6.7	5.5	6.3	5.9	8.3	9.8	11.1	8.3	10.6	9.4	8.7	9.4
Small point sources	8	7	52	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Agricultural tilling	12	7	52	0.3	0.3	0.4	0.3	29.1	14.8	9.8	14.8	29.1	0.4	0.3	0.3

8.1.i Fugitive Dust Emission Sites

Eugene Hi-vol Sites

All major fugitive dust sources in a 1 km radius of four hi-volume sampler locations were identified using 1974 black and white aerial photographs. The results of this survey are presented in the following pages. Aerial maps of each site are preceded by a list of fugitive sources for that site. The letters in the list correspond to locations on the map. Source areas (ft^2) are only approximate.

FUGITIVE DUST SOURCES

Site No. 2 (2018035) - Eugene Commerce Building

a. Alleys between blocks unpaved

b. County fairgrounds ≃ 60000 ft^2 unpaved

c. Point source (gravel) just north of Willamette River ≃ 75000 ft^2

d. Point source (gravel) just south of river ≃ 60,000 ft^2

e. Point source yards along river (≃ 53,000 ft^2) and by railroad tracks

f. Unpaved parking along southside of railroad (≃ 70,000 ft^2)

g. Point source open lot (2500 ft^2)

h. Point source yard (≃ 7500 ft^2)

i. Railroad yard (40,000 ft^2)

j. Point source yards (≃ 115,000 ft^2)

MISC.

The following sources could not be shown on the map.

k. Skinner Butte open area - no veg. (≃ 80,000 ft^2)

l. Point source yards (≃ 60,000 ft^2)

m. Point source yards (≃ 74,000 ft^2)

n. Point source yards (≃ 50,000 ft^2) around Delta


SITE NO. 2
EUGENE COMMERCE
BUILDING

FUGITIVE DUST SOURCES

Site No. 3 (2018038) - Westmoreland School, Eugene

a. Unpaved lots (≈ 37500 ft^2)
b. Unpaved roads (≈ 2100 ft)
c. Yard (≈ 120,000 ft^2)
d. Abundance of housing construction
e. Point source yards (≈ 60,000 ft^2)
f. Dirt trail area of (≈ 50,000 ft^2)
g. Parking lot (≈ 4000 ft^2)
h. Point source yards (≈ 240,000 ft^2)
i. Point source lot (≈ 30,000 ft^2)
j. Open dirt lot (≈ 30,000 ft^2)
k. Point source yards (≈ 133,000 ft^2)
l. Point source yards (≈ 60,000 ft^2)
m. Point source lots (≈ 105,000 ft^2)
n. Unpaved road (≈ 900 ft)
o. Point source yards (≈ 100,000 ft^2)
p. Point source lots (≈ 120,000 ft^2)
q. Point source yard (≈ 150,000 ft^2)

SITE NO. 3
WESTMORELAND SCHOOL
EUGENE

FUGITIVE DUST SOURCES

Site No. 5 - 2018053 - Edgewood School, Eugene

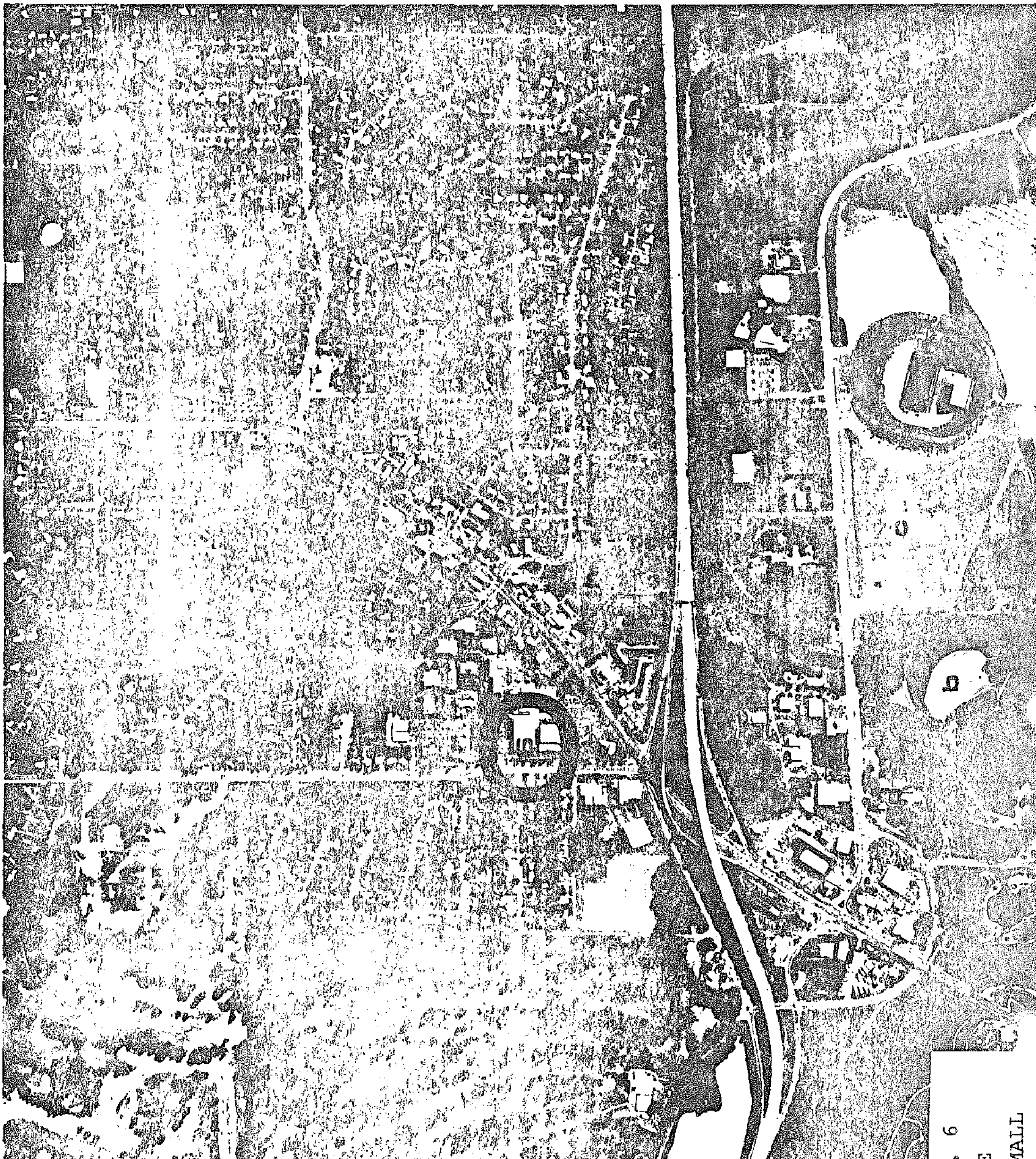
a. Open lot (≃ 40,000 ft^2)
b. Unpaved roads (≃ 600 ft^2)
c. Unpaved parking (≃ 30,000 ft^2)
d. Open lot (≃ 88,000 ft^2)
e. Open lots (≃ 63,000 ft^2)
f. Unpaved roads (≃ 2,000 ft)
g. Unpaved roads

SITE NO. 5
EDGEWOOD SCHOOL
EUGENE

FUGITIVE DUST SOURCES

Site No. 6 - 2018054 - Eugene Oakway Mall

a. Traveled dirt trails in area of (≃ 315,000 ft^2)
b. Open lots (≃ 125,000 ft^2)
c. Dirt trails over (≃ 70,000 ft^2)
d. Point source yards (≃ 120,000 ft^2)
e. Open lots (≃ 300,000 ft^2)
f. Point source yard (≃ 11,000 ft^2) plus unpaved road (≃ 500 ft)
g. Point source yards (≃ 35,000 ft^2)
h. Unpaved road (≃ 1200 ft)


SITE NO. 6
EUGENE
OAKWAY MALL

8.1.i. Fugitive Dust Source Sites (cont.)

A different format for identifying fugitive sources was used for Springfield. The 1 km radius circle around each site was divided into nine different sections. The fugitive source listing preceding each map, labels each section by a letter and brief description as to general land use. Following this description are the fugitive sources found in that section. Section and source locations are displayed in the map following each listing.

FUGITIVE DUST SOURCES

Site No. 7 - 2033037
Springfield Library

a. Open area with covering vegetation
   1 - point source yard (≈ 250,000 ft^2)
   2 - unpaved roads (≈ 1950 ft)

b. River and residential area
   1 - two lots (≈ 530,000 ft^2)

c. Open-industrial area
   1 - point source yeard (≈ 460,000 ft^2)
   2 - unpaved roads

d. Commercial-industrial area
   1 - point source lot (≈ 450,000 ft^2) next to railroad
   2 - gravel roads running by point source

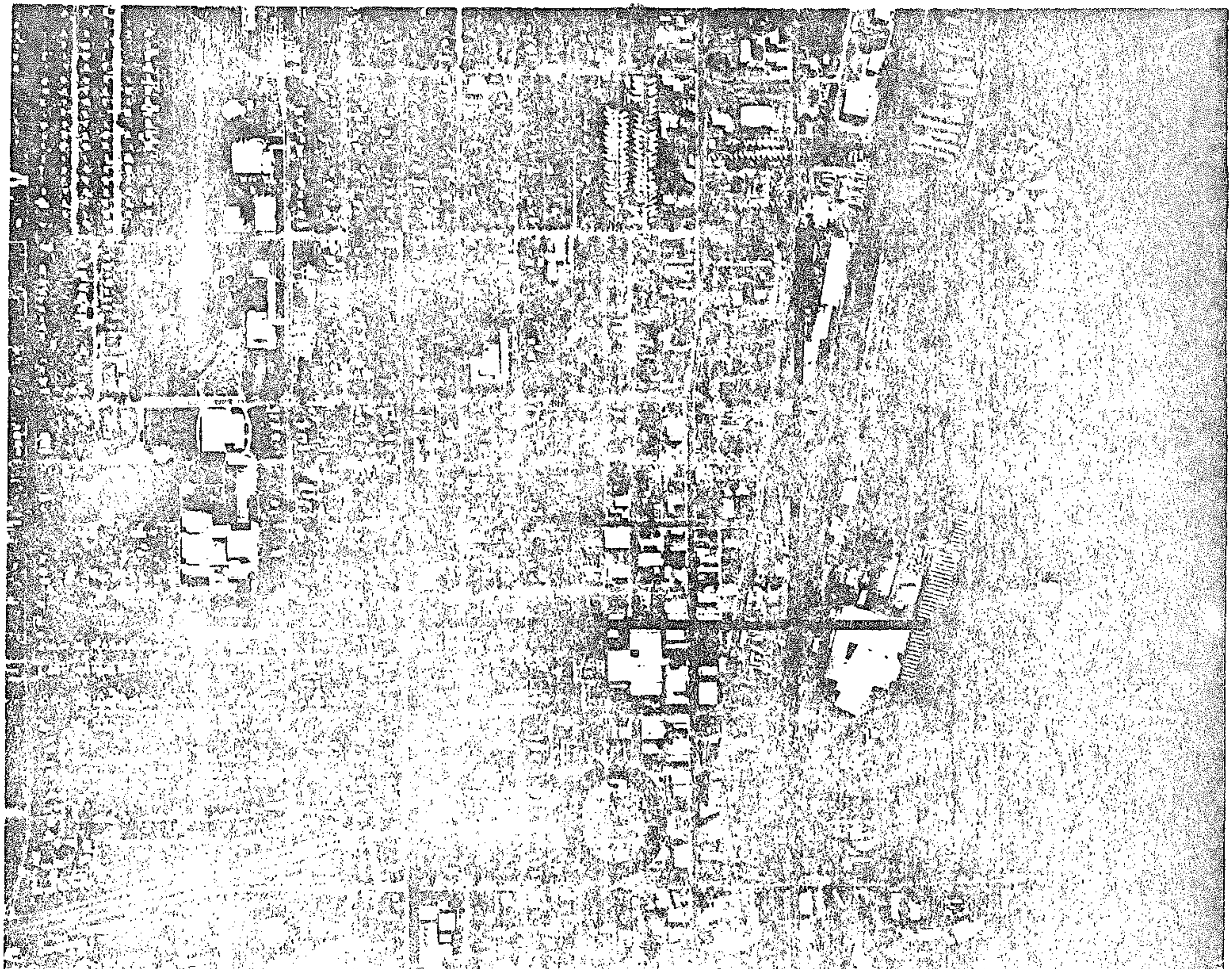
e. Commercial-residential area
   1 - some gravel driveways
   2 - some gravel alleys between blocks

f. River - open area
   1 - lots (≈ 450,000 ft^2)
   2 - dirt roads running through lots
   3 - point source yard (≈ 200,000 ft^2)

g. Residential area
   - few gravel alleys and driveways

h. Residential-commercial area
   - no major fugitive sources

i. Kelly Butte
   1 - lots (≈ 26,000 ft^2)
   2 - unpaved roads (≈ 2600 ft)


SITE NO. 7
SPRINGFIELD LIBRARY

FUGITIVE DUST SOURCES

Site No. 8 - 2033039
Thurston High School

a. Open - residential area

b. Open - residential area
   1 - dirveways are gravel
   2 - one noticeable lot (≃ 40,000 ft^2)

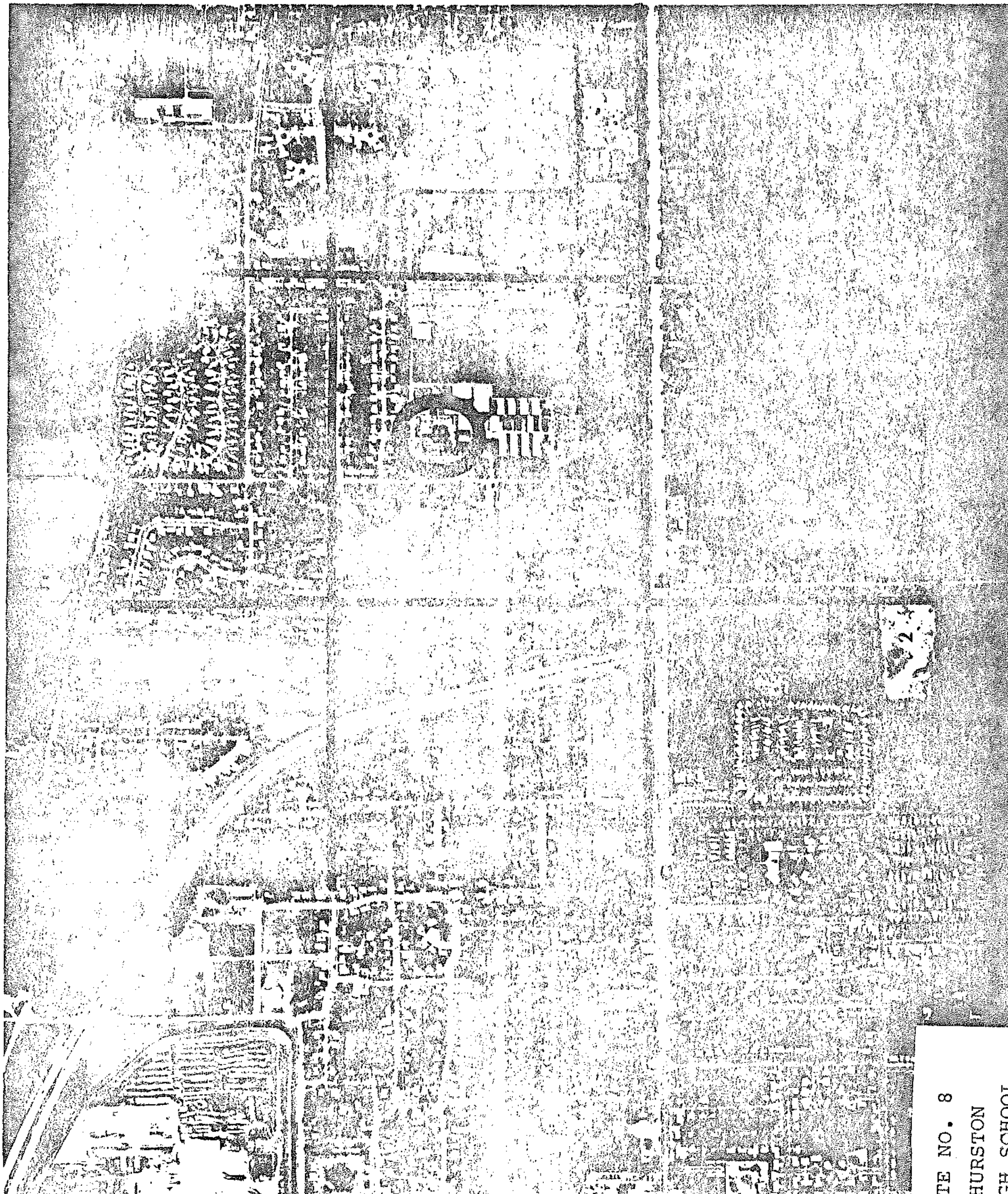
c. Open - residential area
   1 - some gravel roads and driveways
   2 - unpaved lot (≃ 300,000 ft^2)

d. Residential area- open area
   - about one quarter of roads are gravel and one half of area open with vegetation

e. Residential
   1 - high school with gravel parking lot (≃ 20,000 ft^2)

f. Residential - agricultural area

g, h, i. Open - agricultural area
   - few gravel roads


SITE NO. 8
THURSTON
HIGH SCHOOL

FUGITIVE DUST SOURCES

Site No. 9 - 2033052
N. 18th St. (DMV)

a. Residential area
   - some small vacant lots

b. Residential area
   - some open lots

c. Residential area (with park and school)

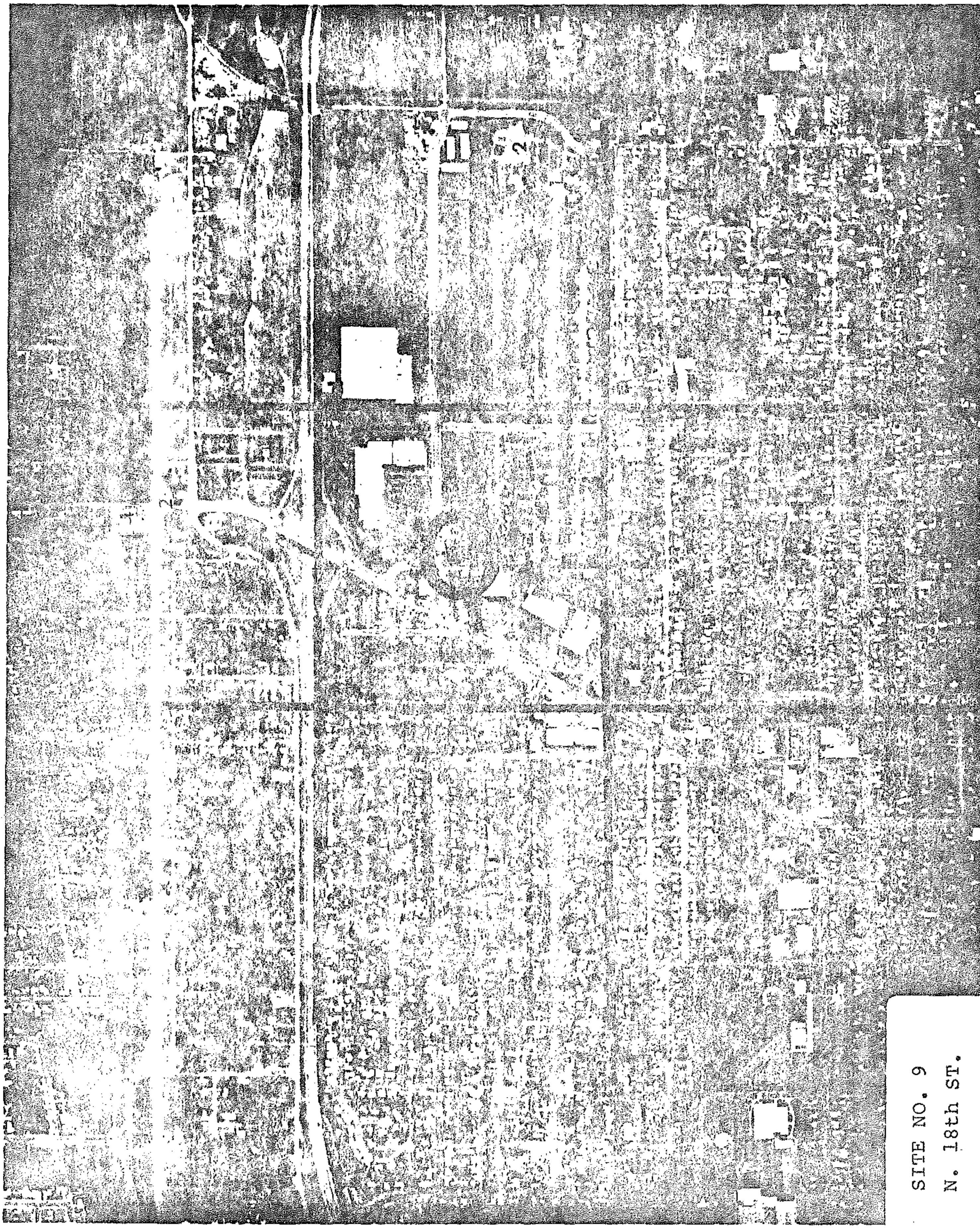
d. Residential, industrial & agricultural area
   1 - point source yeard (≈ 250,000 ft^2)
   2 - lot around airport (≈ 450,000 ft^2)
   3 - agricultural operations (≈ 1,000,000 ft^2)

e, f. Commercial - residential areas
   - no major fugitive sources

g. Agricultural area
   1 - some unpaved roads
   2 - 1/4 mi of dirt road

h. Residential area (with Freeway)
   1 - gravel parking lot for church
   2 - gravel driveways

i. Residential area
   - one dirt road


SITE NO. 9
N. 18th ST.

FUGITIVE DUST SOURCES

Site No. 10 - 2033035
Springfield Shops

a. Industrial area
   1 - point source yards (≈ 1,000,000 ft^2)
   2 - vacant lots
   3 - unpaved roads

b. Industrial area
   1 - gravel roads
   2 - point source yard (≈ 640,000 ft^2)

c. Industrial - open area
   1 - point source yard (≈ 1,200,000 ft^2)
   2 - unpaved road (≈ 1 mi.)

d. Industrial area
   1 - point source yards (≈ 2,400,000 ft^2)
   2 - gravel roads to yards

e. Industrial, commercial & residential area
   1 - point source yard (≈ 1,200,000 ft^2)
   2 - gravel roads and parking lots

f. Residential - commercial area
   1 - residential gravel driveways
   2 - few small vacant lots
   3 - point source yard

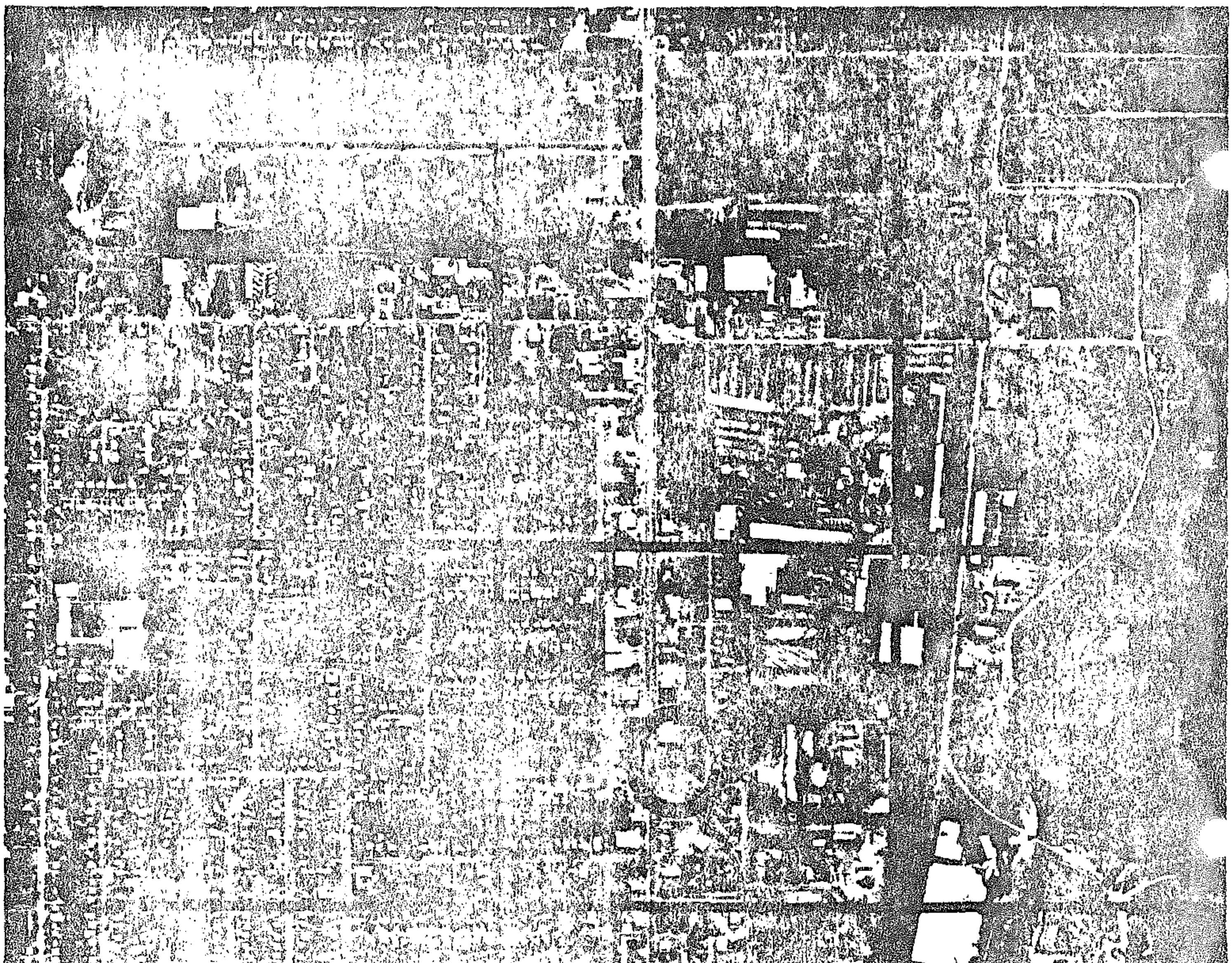
g. Residential - industrial area
   1 - lots (≈ 470,000 ft^2)
   2 - point source yard

h. Residential area
   1 - lots
      (same area as site no. 9-b)

FUGITIVE DUST SOURCE, Continued

Site No. 10

i. Residential area (with park & school)
   -(same area as site no. 9-c)



SITE NO. 10
RINGFIELD SHOPS

FUGITIVE DUST SOURCES

Site No. 11 - 2033056
Springfield - 28th & C Sts.

a. Residential and agricultural area

1 - open lots (≈ 649,000 ft^2)

b. Industrial use

1 - point source log yard (≈ 2,100,000 ft^2)

2 - point source yard (≈ 240,000 ft^2)

3 - gravel roads running to point source

- same (area as site No. 10-d)

- miscellaneous observation - about 1/4 of this section is unpaved with traffic

c. Commercial and residential use

1 - point source yard (≈ 1,200,000 ft^2)

2 - gravel roads and parking

- (same area as site no. 10-e)

d. Residential use

1 - some small lots

e. Residential and industrial use

1 - open lots (≈ 740,000 ft^2)

2 - point source yards

3 - gravel driveways

- (same area as site no. 10-g)

f. Residential area

1 - open lots

- (same area as site no. 10-h and no. 9-b)

g. Industrial and residential use

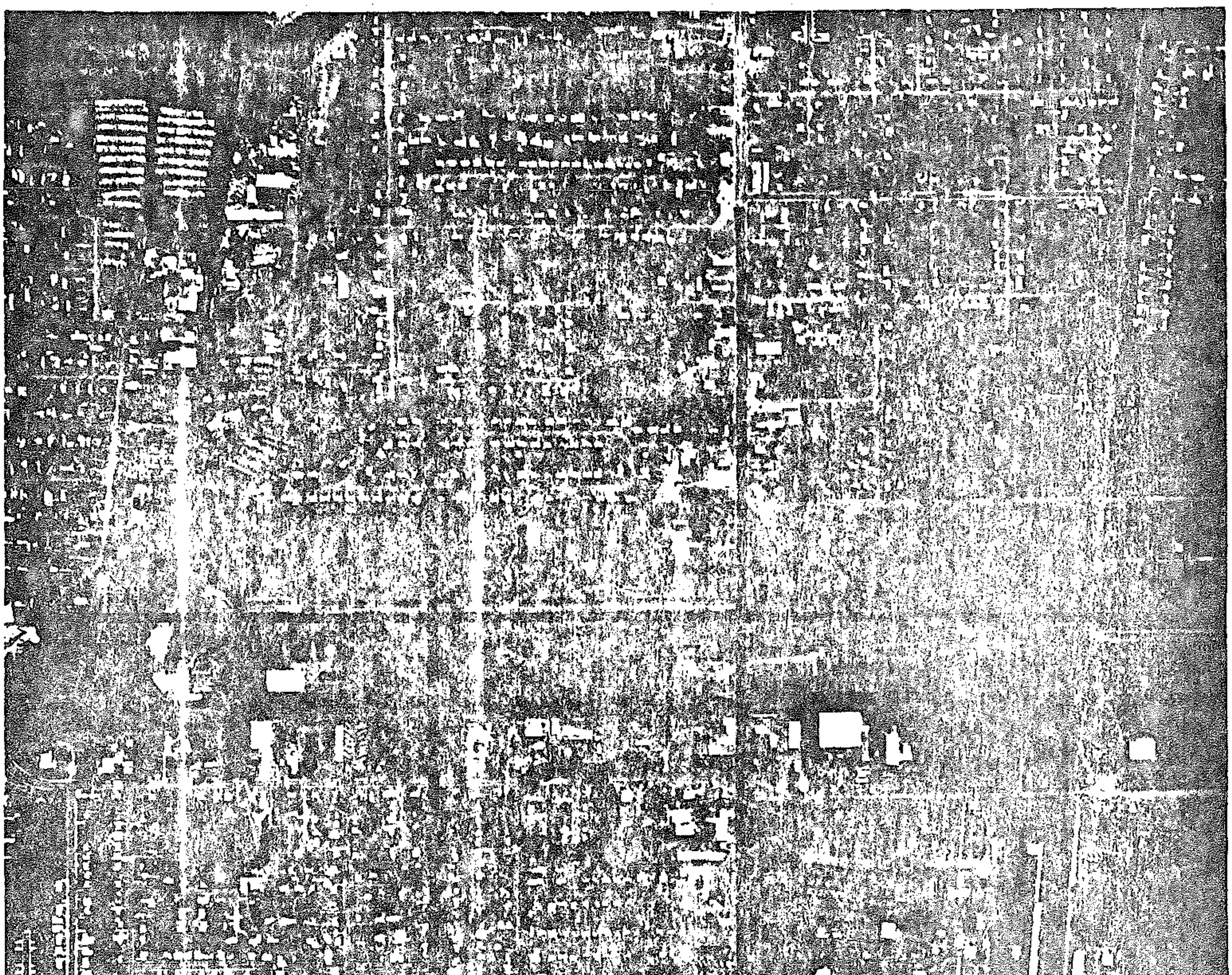
1 - point source yard (≈ 1,690,000 ft^2)

2 - open lot (≈ 450,000 ft^2)

FUGITIVE DUST SOURCES, Continued
Site No. 11

h. Industrial and open areas
   1 - point source yard (≃ 110,000 ft^2)
   2 - point source yards

i. Residential, industrial and agricultural area
   - point source yard (≃ 250,000 ft^2)
   - (same area as site no. 9-d)



SITE NO. 11
SPRINGFIELD
28th & C STS.

8.2 PROJECTIONS

8.2.a Point Source

GROWTH FACTORS (relative to 1976)

EI #	1980	1985	1990	1995	1995 WC
202119	1.04	1.09	1.14	1.20	1.67
202500	1.09	1.20	1.31	1.41	1.41
202505	1.10	1.22	1.35	1.48	1.59
202524	1.04	1.09	1.14	1.20	1.29
205139	1.09	1.20	1.31	1.33	1.33
207465	1.09	1.10	1.10	1.10	1.10
208557	1.10	1.22	1.35	1.48	1.69
208851	1.09	1.20	1.29	1.29	1.29
208871	1.09	1.20	1.27	1.27	1.27
208892	1.04	1.09	1.14	1.20	1.40
208893	1.04	1.09	1.14	1.20	1.43
208896	1.09	1.20	1.31	1.44	2.00
205800	1.00	1.00	1.00	1.00	1.00
204402	1.00	1.00	1.00	1.00	1.00
All others	1.00	1.00	0.86	0.73	1.00

New source - Bioenergy Mfg. Corp. - EI #200541, SIC #2499,
ID #3011

8.2.b Paved Road Dust

The following data sheets show vehicle miles traveled growth per grid. Paved road dust growth factors were calculated by taking 0.97 times each factor for most probable case. 1995 worst case paved road dust growth factor is based on 1.00 times the VMT growth factor for that year.

seton, johnson & odell, inc.
consulting engineers
317 s.w. alder street
portland, oregon 97204
(503) 226-3921

Project Eugene-Springfield

Date

By Category - Paved Road Dust

VMT growth factors

(relative to 1976)

CT	GRID #	1980	1985	1990	1995		
---	1,1						
---	1,2						
10	1,3 29						
10	1,4 43						
10	1,5 57						
10	1,6 71						
10	1,7 85						
10	1,8 99	.78	.51	.51	.51		
---	1,9						
---	2,1						
---	2,2						
10	2,3 30	1.25	1.57	1.88	2.20		
10	2,4 44	.92	.89	.82	.82		
25	2,5 58	.82	.69	.69	.69		
25	2,6 72	1.27	1.60	1.94	2.27		
25	2,7 86	1.36	1.80	2.25	2.69		
24	2,8 100	1.08	1.17	1.27	1.36		
---	2,9						
---	3,1						
---	3,2 31						
44	3,3 45	1.49	2.05	2.64	3.22		
43	3,4 59	1.27	1.61	1.95	2.29		
43	3,5 73	1.80	2.81	3.81	4.32		
26	3,6 87	1.30	1.68	2.06	2.44		
24	3,7 101	1.20	1.45	1.70	1.95		
24	3,8 115	1.07	1.15	1.24	1.32		
24	3,9						
---	4,1						
---	4,2 32						
44	4,3 46	.96	.92	.92	.92		
44	4,4 60	1.08	1.18	1.28	1.38		
43	4,5	1.12	1.26	1.41	1.55		

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Project Paved Road Dust (cont)

Date VMT Growth Factors

By

CT	GRID #		1980	1985	1990	1995		
27	4,6	74	1.07	1.16	1.25	1.34		
24	4,7	88	.96	.90	.90	.90		
23	4,8	102	1.47	2.06	2.65	3.24		
23	4,9	115	1.34	1.76	2.18	2.60		
54	5,1	5						
52	5,2	19	.88	.72	.72	.72		
53	5,3	33	.88	.72	.72	.72		
45	5,4	47	1.11	1.25	1.39	1.53		
42	5,5	61	1.11	1.25	1.39	1.53		
29	5,6	75	1.26	1.59	1.92	2.25		
23	5,7	89	1.13	1.29	1.45	1.61		
23	5,8	103						
23	5,9	117						
54	6,1	6	1.00	1.00	1.00	1.00		
54	6,2	20	1.17	1.39	1.60	1.82		
48	6,3	34	1.08	1.19	1.29	1.40		
39	6,4	48	1.14	1.32	1.50	1.68		
30	6,5	62	1.30	1.68	2.06	2.44		
29	6,6	76	1.25	1.56	1.87	2.18		
22	6,7	90	1.71	2.59	3.48	4.36		
--	6,9							
36	7,1	7	1.00	1.00	1.00	1.00		
50	7,2	21	2.4	4.23	6.03	7.82		
49	7,3	35	1.29	1.65	2.01	2.37		
37	7,4	49	1.45	2.01	2.57	3.13		
31	7,5	63	1.22	1.50	1.78	2.06		
31	7,6	77	1.08	1.17	1.27	1.36		
22	7,7	91	1.02	1.05	1.08	1.11		
22	7,8							
--	7,9							

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Project Paved Road Dust (cont)
Date VMT Growth Factors
By

CT	GRID #		1980	1985	1990	1995		
36	8,1	8						
36	8,2	22	1.16	1.36	1.56	1.76		
36	8,3	36	1.40	1.90	2.40	2.90		
32	8,4	50	1.07	1.16	1.25	1.34		
21	8,5	64	1.41	1.93	2.44	2.96		
21	8,6	78	1.16	1.36	1.56	1.76		
21	8,7	92	1.09	1.21	1.32	1.44		
2	8,8	106						
--	8,9							
36	9,1	9	1.16	1.36	1.56	1.76		
17	9,2	23	1.16	1.36	1.56	1.76		
35	9,3	37	1.14	1.32	1.50	1.68		
33	9,4	51	1.04	1.08	1.13	1.17		
20	9,5	65	0.83	0.62	0.62	0.62		
2	9,6	79						
2	9,7	93						
--	9,8							
--	9,9							
17	10,1	10	1.16	1.36	1.56	1.76		
17	10,2	24	neg.	neg.	neg.	neg.		
35	10,3	38	0.83	0.62	0.62	0.62		
34	10,4	59	1.13	1.30	1.46	1.63		
20	10,5	66	1.55	2.23	2.92	3.60		
20	10,6	80	0.92	0.81	0.81	0.81		
--	10,7							
--	10,8							
--	10,9							
--	11,1							
--	11,2							
35	11,3	39	1.69	2.55	3.41	4.27		
19	11,4	53	1.13	1.31	1.48	1.65		
19	11,5	67	0.70	.32	.32	.32		

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Project Paved Road Dust (cont)
Date VMT Growth Factors
By

CT	GRID #	1980	1985	1990	1995		
20	11,6 81	1.15	1.33	1.58	1.70		
--	11,7						
--	11,8						
--	11,9						
--	12,1						
--	12,2						
35	12,3 40	1.44	1.98	2.53	3.07		
19	12,4 54	1.09	1.20	1.29	1.39		
18	12,5 68	1.21	1.47	1.73	1.99		
--	12,6						
--	12,7						
--	12,8						
--	12,9						
--	13,1						
--	13,2						
18	13,3 41						
18	13,4 55	1.69	2.55	3.41	4.27		
18	13,5 69						
--	13,6						
--	13,7						
--	13,8						
--	13,9						
--	14,1						
--	14,2						
18	14,3 42						
18	14,4 56	1.73	2.65	3.57	4.48		
18	14,5 70						
--	14,6						
--	14,7						
--	14,8						
--	14,9						

8.2.c Motor Vehicles

The following data sheets show growth factors used for all projection years.

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consulting engineers
317 s.w. alder street
portland, oregon 97204
(503) 226-3921

Project Eugene-Springfield

Date

By Category -

Motor Vehicle Growth Factors

(based on emission increases)

CT	GRID #	1976-85 GROWTH	GROWTH PER YEAR	1980	1985	1990	1995
--	1,1						
--	1,2						
10	1,3 29						
10	1,4 43						
10	1,5 57						
10	1,6 71						
10	1,7 85						
10	1,8 99	- .70	- .06	.68	.30	.3	.3
--	1,9						
--	2,1						
--	2,2						
10	2,3 30	0		1.0	1.0	1.0	1.0
10	2,4 44	- .37	- .03	.82	.63	.48	.33
25	2,5 58	- .49	- .04	.76	.51	.36	.11
25	2,6 72	.63	.06	1.36	1.63	1.84	2.20
25	2,7 86	- .13	- .01	.94	.89	.84	.79
24	2,8 100						
--	2,9						
--	3,1						
--	3,2						
44	3,3 31	.76	.07	1.42	1.76	2.05	2.40
43	3,4 45	.27	.02	1.12	1.27	1.42	1.57
43	3,5 59	1.10	.10	1.60	2.10	2.50	3.00
26	3,6 73	.39	.04	1.16	1.38	1.56	1.76
24	3,7 87	.22	.02	1.08	1.19	1.28	1.38
24	3,8 101	- .03	- .003	.98	.96	.94	.94
24	3,9 115						
--	4,1						
--	4,2						
44	4,3 32	0		1.0	1.0	1.0	1.0
44	4,4 46	- .05	- .005	.97	.94	.91	.88
43	4,5 60	- .01	- .0009	.99	.98	.97	.96

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Project Motor Vehicle Growth Factors
Date (Cont.)
By

CT	GRID #			1980	1985	1990	1995
27	4,6 74	- .07	- .006	.76	.91	.86	.81
24	4,7 88	- .25	- .02	.88	.47	.59	.45
23	4,8 102	.45	.04	1.19	1.42	1.65	1.89
23	4,9 116	.18	.02	1.07	1.15	1.23	1.32
54	5,1 5	0		1.00	1.00	1.00	1.00
52	5,2 19	- .73	- .07	.72	.37	.37	.37
53	5,3 33	- .41	- .04	.84	.58	.44	.24
45	5,4 47	.02	.002	1.00	1.01	1.01	1.02
42	5,5 61	.04	.004	1.00	1.01	1.01	1.02
29	5,6 75	.28	.03	1.11	1.25	1.39	1.54
23	5,7 89	.08	.007	1.02	1.06	1.09	1.12
23	5,8 103						
23	5,9 117						
54	6,1 6	0		1.00	1.00	1.00	1.00
54	6,2 20	.08	.008	1.03	1.07	1.10	1.14
48	6,3 34	- .07	- .006	.96	.92	.88	.84
39	6,4 48	.05	.005	1.01	1.03	1.05	1.06
30	6,5 62	.38	.04	1.15	1.34	1.53	1.72
29	6,6 76	.30	.03	1.12	1.26	1.41	1.56
22	6,7 90	1.14	.10	1.50	2.11	2.74	3.36
22	6,8						
--	6,9						
36	7,1 7	0		1.0	1.0	1.0	1.0
50	7,2 21	2.70	.25	2.17	3.64	5.10	6.57
49	7,3 35	.27	.03	1.11	1.26	1.40	1.54
37	7,4 49	.64	.06	1.27	1.62	1.96	2.30
31	7,5 63	.25	.02	1.10	1.22	1.34	1.47
31	7,6 77	- .01	- .0009	.99	.97	.95	.93
22	7,7 91	0		1.00	1.0	1.0	1.0
22	7,8						
--	7,9						

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Project Motor Vehicle Growth Factors

Date (Cont.)

By

CT	GRID #			1980	1985	1990	1995
36	8,1 8						
36	8,2 22	.07	.006	1.02	1.05	1.08	1.11
36	8,3 36	.71	.06	1.31	1.69	2.07	2.45
32	8,4 50	- .006	.96	.91	.87	.82	
21	8,5 64	.39	.04	1.16	1.36	1.55	1.75
21	8,6 78	.18	.02	1.07	1.15	1.24	1.32
21	8,7 92	.12	.01	1.05	1.11	1.16	1.22
2	8,8 106						
--	8,9						
36	9,1 9			1.06	1.13	1.20	1.27
17	9,2 23	.16	.01	1.06	1.13	1.20	1.27
35	9,3 37	0		1.0	1.0	1.0	1.0
33	9,4 51	- .08	- .007	.96	.91	.86	.81
20	9.5 65	- .49	- .05	.82	.50	.50	.50
2	9,6 79						
2	9,7 93						
--	9,8						
--	9,9						
17	10,1 10			1.06	1.13	1.20	1.27
17	10,2 24						
35	10,3 38	- .33	-0.3	.82	.61	.61	.61
34	10,4 52	.10	.01	1.04	1.08	1.12	1.16
20	10,5 66	.95	.09	1.40	1.91	2.41	2.92
20	10,6 80	.56	.06	1.21	1.47	1.73	1.99
--	10,7						
--	10,8						
--	10,9						
--	11,1						
--	11,2						
35	11,3 39	1.66	.15	1.67	2.50	3.33	3.97
19	11,4 53	1.06	.006	1.03	1.06	1.09	1.12
19	11,5 67	- .77	- .07	.65	.22	.22	.22

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consulting engineers

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Project Motor Vehicle Growth Factor

Date (Cont.)

By

CT	GRID #				1980	1985	1990	1995
20	11,6	81	0		110	1.0	1.0	1.0
--	11,7							
--	11,8							
--	11,9							
--	12,1							
--	12,2							
35	12,3	40	.65	.07	1.27	1.61	1.95	2.29
19	12,4	54	- .05	- .005	.97	.93	.88	.84
18	12,5	68	.11	.01	1.03	1.08	1.12	1.16
--	12,6							
--	12,7							
--	12,8							
--	12,9							
--	13,1							
--	13,2							
18	13,3	41						
18	13,4	55	1.04	.10	1.46	2.04	2.62	3.20
18	13,5	69						
==	13,6							
--	13,7							
--	13,8							
--	13,9							
--	14,1							
--	14,2							
18	14,3	42						
18	14,4	56	1.03	.09	1.44	1.99	2.54	3.09
18	14,5	70						
==	14,6							
--	14,7							
--	14,8							
--	14,9							

8.2.c. Motor Vehicles, (Cont.)

Oregon Department of Transportation (ODOT)
SAPOLLUT Computer Model Description

Oregon Department of Transportations' (ODOT) Special Area Analysis pollution model (SAPOLLUT) determines air pollutant emission and/or noise levels resulting from link volumes on a highway network. The model not only calculates emission levels for existing conditions, but projects levels for future years of interest.

Data required for each link of each network includes average daily traffic, length, area designation, road type, vehicle mix and capacity. If all of these data are not available, some internal default values can be used. Initially SAPOLLUT develops hourly and directional volumes on each link using input data. Next, vehicle miles of travel (VMT) are calculated for each hour and direction.

The pollutant emission levels usually calculated by SAPOLLUT are for carbon monoxide, hydrocarbons and nitrogen oxide. Options are available for the determination of total suspended particulate, oxides of sulfur and other pollutant emission levels also. Depending upon the pollutant, appropriate emission factors are applied to each link. Other corrections such as; vehicle speed, mix and deterioration are available when necessary.

SAPOLLUT output includes emissions (grams/vmt) or just VMT summed for the designated areas of interest. SAPOLLUT is an important tool in air quality and transportation analysis.

8.2.d. Residential Space Heating

Growth factors between census tracts did not vary greatly. In general, the growth factor ranges (relative to 1976) are:

	1980	1985	1990	1995	1995 WC
Distillate oil	.96	.96-.97	.96-.98	.96-.98	1.05-1.07
Natural gas	.96-1.00	.96-1.06	.97-1.12	.97-1.18	1.06-1.29

Census tract 29 had the greatest increase

8.2.e. Small Point Sources

The following data sheets present the projection factors used in this category relative to 1976.

seton, johnson & odell, inc.
consulting engineers

317 s.w. alder street
portland, oregon 97204
(503) 226-3921

Project Eugene-Springfield

Date

By Small Point Sources

Projection Factors

CT	TOTAL 1976 EMISSIONS	LARGEST CONTRIBU-TING SIC	1980	1985	1990	MP& WC 1995	
10	6.1	3	1.10	1.21	1.33	1.46	
18	10.1	2	1.06	1.14	1.21	1.30	
19	5.7	3	1.10	1.21	1.33	1.46	
20	11.6	3	1.12	1.26	1.41	1.57	
21	1.1	9	1.19	1.42	1.65	1.89	
22	3.0	3	1.09	1.20	1.31	1.44	
23	1.0	9	1.19	1.42	1.65	1.89	
24	21.8	3	1.10	1.21	1.33	1.46	
25	3.2	3	1.09	1.20	1.31	1.44	
26	2.5	9	1.15	1.33	1.55	1.71	
27	0.7	9	1.19	1.42	1.65	1.89	
28	0	--	1.0	1.0	1.0	1.0	
29	2.8	3	1.12	1.26	1.41	1.57	
30	0.7	3	1.09	1.20	1.31	1.44	
31	2.3	9	1.19	1.42	1.65	1.82	
32	0.2	3	1.09	1.20	1.31	1.44	
33	1.2	9	1.15	1.33	1.51	1.71	
34	13.2	3	1.09	1.20	1.31	1.45	
35	0.3	9	1.19	1.42	1.65	1.89	
36	4.4	3	1.09	1.20	1.31	1.44	
37	0.2	9	1.19	1.42	1.65	1.89	
38	0	--	1.0	1.0	1.0	1.0	
39	10.3	3	1.10	1.24	1.38	1.53	
40	0	--	1.0	1.0	1.0	1.0	
41	0	--	1.0	1.0	1.0	1.0	
42	18.0	3	1.11	1.24	1.37	1.55	
43	36.7	3	1.10	1.21	1.33	1.46	
44	1.9	9	1.14	1.32	1.49	1.67	
45	11.8	3	1.10	1.21	1.33	1.46	
46	0	--	1.0	1.0	1.0	1.0	
47	0	--	1.0	1.0	1.0	1.0	
48	1.7	9	1.17	1.37	1.58	1.79	

seton, johnson & odell, inc.
consulting engineers

317 s.w. alder street
portland, oregon 97204
(503) 226-3921

Project Eugene-Springfield

Date

By Small Point Sources

Projection Factors

(1976 base year)

CT	T/YR 1976	LARGEST SIC	1980	1985	1990	MP&WC 1995	
49	0.4	9	1.19	1.42	1.65	1.89	
50	0.2	9	1.19	1.42	1.65	1.89	
51	0	--	1.0	1.0	1.0	1.0	
52	0	--	1.0	1.0	1.0	1.0	
53	0.7	9	1.19	1.42	1.65	1.89	
54	0	--	1.0	1.0	1.0	1.0	

8.3 Characterization of Analysis Techniques Used In This Study

As a summary, the following table lists the category and allocation order and projection level attained in the Eugene-Springfield AQMA data base development as defined by the EPA documents Guidelines for Air Quality Maintenance Area Planning and Analysis, Vol. 7 and 13.

CATEGORY	ALLOCATION[a] (order)	PROJECTION[a] (level)
Point Sources	2	2
Area Sources		
paved road dust	2	2
motor vehicles	2	2
residential space heating, distillate oil	3	3
residential space heating, natural gas	3	3
commercial space heating, residual oil	3	2
commercial space heating, natural gas	3	2
open burning & field burning	1/3[b]	1/2[b]
wood space heating	3	3
orchard pruning	2	1
railroads & aircraft	2/3[b]	1/3[b]
unpaved road dust	2	2
small point sources	3	2
agricultural tilling & off-highway vehicles	2	1

NOTES:

a -- The highest allocation order or projection level is 3.

b -- The two components of this category were analyzed using separate methods. The first allocation or projection number corresponds to the first category component, etc.

Appendix 4.6.3.1--2

DEQ Summary of Talbott, Wong and Associates Survey

LRAPA Copy

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY — INTEROFFICE MEMO

TO: Eugene-Springfield TSP SIP File DATE: June 20, 1980

FROM: Bob Gay RK Gay

SUBJECT: Wood Space Heating TSP Emissions

Summary

This memo describes how wood space heating TSP emissions were estimated for the AQMA and distributed to 2 km grids for modeling. A telephone survey was used to estimate: (1) the percentage of AQMA households which burn wood; (2) the average number of cords burned per household, and; (3) the prevalence of wood burning devices.

EPA emission factors were used to translate this data into tons of TSP per household per year. This household emission factor was multiplied by the estimated number of households in the AQMA to obtain an AQMA-total for TSP emissions from this source. These total annual emissions were distributed to model grids using projections of total dwelling units per census tract, obtained from the Lane Council of Governments (LCOG). Short-term emissions rates (daily, monthly, seasonal) for this source also can be estimated for any year using heating degree days to indicate wood burning levels.

The analysis was based on telephone data corresponding to the 1978-79 heating season (July 1978-June 1979). This data was used to derive emission estimates for calendar years 1977, 1978, 1983, 1985 and 1987. Factors used to extrapolate the 1978-79 data to other years include: (1) trend factors in residential wood space heating; (2) LCOG's growth projections of total AQMA households, and (3) a relative Heating Season Severity Factor, based on heating degree days.

Results indicate wood space heating is one of the three largest area sources of TSP--over 1000 tons/year in the 1978 base year. Wood space heating apparently is experiencing rapid growth, complicating emission projections. Accordingly, future TSP emissions were projected in two ways: (1) using only the projected growth in total AQMA households; and (2) using higher growth figures associated specifically with trends toward increased use of wood for residential space heating. These two methods project 1987 TSP emissions at about 1350 and 2250 tons per year, respectively; or growth in TSP emissions from this source of 30 percent and over 115 percent, respectively.

The Telephone Survey

Talbott, Wong and Associates, Inc. of Portland recently completed for DEQ a telephone survey of wood space heating practices in three AQMAs - Portland/Vancouver, Eugene/Springfield, and Medford/Ashland. Their final report will discuss this and other aspects of fuel conversions which may affect air quality in these three areas. A preliminary report (Ref. 1) describes the wood space heating findings and calculations for Portland, with some data for Eugene and Medford. The telephone survey of the Eugene/Springfield AQMA was carefully designed to be representative of the entire area with ±5% reliability. If found the following levels of wood burning among the survey sample of 400 households:

50.25 percent of all (400) households burn some wood.
38.0 percent of all households had at least one fireplace.
10.25 percent of all households had at least one wood stove.
73.0 percent of all households sampled were single family dwellings
57.9 percent of all single family dwellings burned some wood.

Table I summarizes the 400 responses to the Eugene/Springfield survey by household type and by category of wood usage (cords burned per household). Table II shows the calculation of the average per household wood usage. Table III summarizes both the conversion of cords per household into TSP emissions per household and the AQMA-total TSP emissions, based on the estimated number of households in the AQMA for the 1978-79 survey period.

There is good consistency among the four estimates of AQMA-total TSP emissions based on household types. The most reliable AQMA-total is considered to be 1121 tons/year TSP. The totals in Table III are higher than those in Reference No. 1, due to a refinement in calculation methods utilized by Talbott, Wong.

Table I. Eugene/Springfield AQMA 1978-79 Wood Use By Household Type

		HOUSING TYPE				
			Multi-Family Dwelling			
Category		SFD	Duplexes	Condo	Apartments	Other
0	no wood use	99	19	2	46	25
1	less than .25 cord	14	0	0	0	0
2	.25-.49	15	0	0	0	0
3	.50-.99	23	0	1	0	0
4	1-1.99	47	3	1	1	0
5	2-2.99	25	0	0	0	0
6	3 cords or more	45	0	0	1	3
9	don't know/unsure	24	1	0	1	2
	Total 400*	292	23	4	50	30

*One questionnaire neglected to include information on Household type (No. 648)

Table II. Calculation of Cords/Household From Telephone Survey

Category	Response A	Response B	Calculation of Average Cords Burned By the "Average" AQMA Household[2]
0	192	192	192 x 0 = 0
1	15	17	17 x .125 = 2.125
2	15	17	17 x .37 = 6.29
3	24	28	28 x .745 = 20.86
4	52	60	60 x 1.485 = 89.1
5	25	29	29 x 2.485 = 62.125
6	49	57	57 x 3.0 = 171.0
9	28	0	
Totals	400	400	351.50

$\frac{351.5}{400}$ = 0.879 cords/household $\frac{351.5}{208}$ = 1.69 cords/average wood burning household

Category	Response A	Response B	Calculation of Average Cords Burned By Single Family Dwellings (SFD[2])
0	99	99	99 x 0 = 0
1	14	16	16 x .125 = 2.0
2	15	17	17 x .37 = 6.29
3	23	26	26 x .745 = 19.37
4	47	54	54 x 1.485 = 80.19
5	25	29	29 x 2.485 = 72.065
6	45	51	51 x 3.0 = 153.0
9	24	0	
Totals	292	292	332.92

$\frac{333}{292}$ = 1.14 cords/"average" SFD $\frac{333}{193}$ = 1.725 cords/wood burning SFD

1) In case B, Category 9 responses ("don't know") from wood burning households were allocated among Categories 1-6, based on case A distribution of responses in these categories.

2) Responses are multiplied by the mid point of the range (cords/year) associated with each category.

Table III. Conversion of Cords/Household into TSP Emissions/Household, and AQMA Total TSP Emissions for 1978-79 Survey Period.

Household Type[1]	Average Cords Per Household	X	Emission Factor[2] (tons TSP per cord burned)	TSP Emission = per household (tons/year)	Total X AQMA Household[3]	=	AQMA Total TSP from Wood Heating (tons/year)
HH	.879		.0192	.01688	66,420		1121
WBHH	1.69		.0192	.03245	66,420(.5025)		1083
SFD	1.14		.0192	.02189	66,420(.73)		1061
WBSFD	1.725		.0192	.03312	66,420(.73)(.579)		930

1. HH = average AQMA household; WBHH = average AQMA wood burning household; SFD = average single family dwelling; WBSFD = average wood burning SFD.

2. From Talbott, Wong report (Reference I.), as follows

$$.0201 - \frac{10.25}{38.0 + 10.25} (.0201 - .0158) = 0.0192$$

where .0201 and .0158 tons TSP/cord burned are EPA emission factors for fireplaces and wood stoves, respectively.

3. From Table VI, average LCOG total household projections for 1978 and 1979.

Analysis Area - Population, Household and Dwelling Unit Data

This analysis considers the AQMA to be essentially equivalent to the SMSA "Urban Area" (Lane County census tracts 18-54) in population, household and dwelling unit characteristics. Figure I shows that both the AQMA and SMSA are smaller than the "Metro Study Area" - the base area for the Metro Plan prepared for LCDC.

Seton, Johnsen and Odell (SJO) considered approximately the same area, with minor differences, in their previous AQMA report (Reference No. 2 also has approximately the same area as that of the regional transportation model (SAPollut), which is used to estimate the magnitude and distribution of two other major area sources of TSP pollution - paved road dust and vehicle exhaust emissions).

Table IV summarizes past measurements and future projections of total dwelling units (DU) per census tract (CT), as provided by LCOG. Attachment B contains the documentation for these DU/CT figures, including:

1. 1976, 1977 and 1978 DU/CT from LCOG's Metro Parcel File.

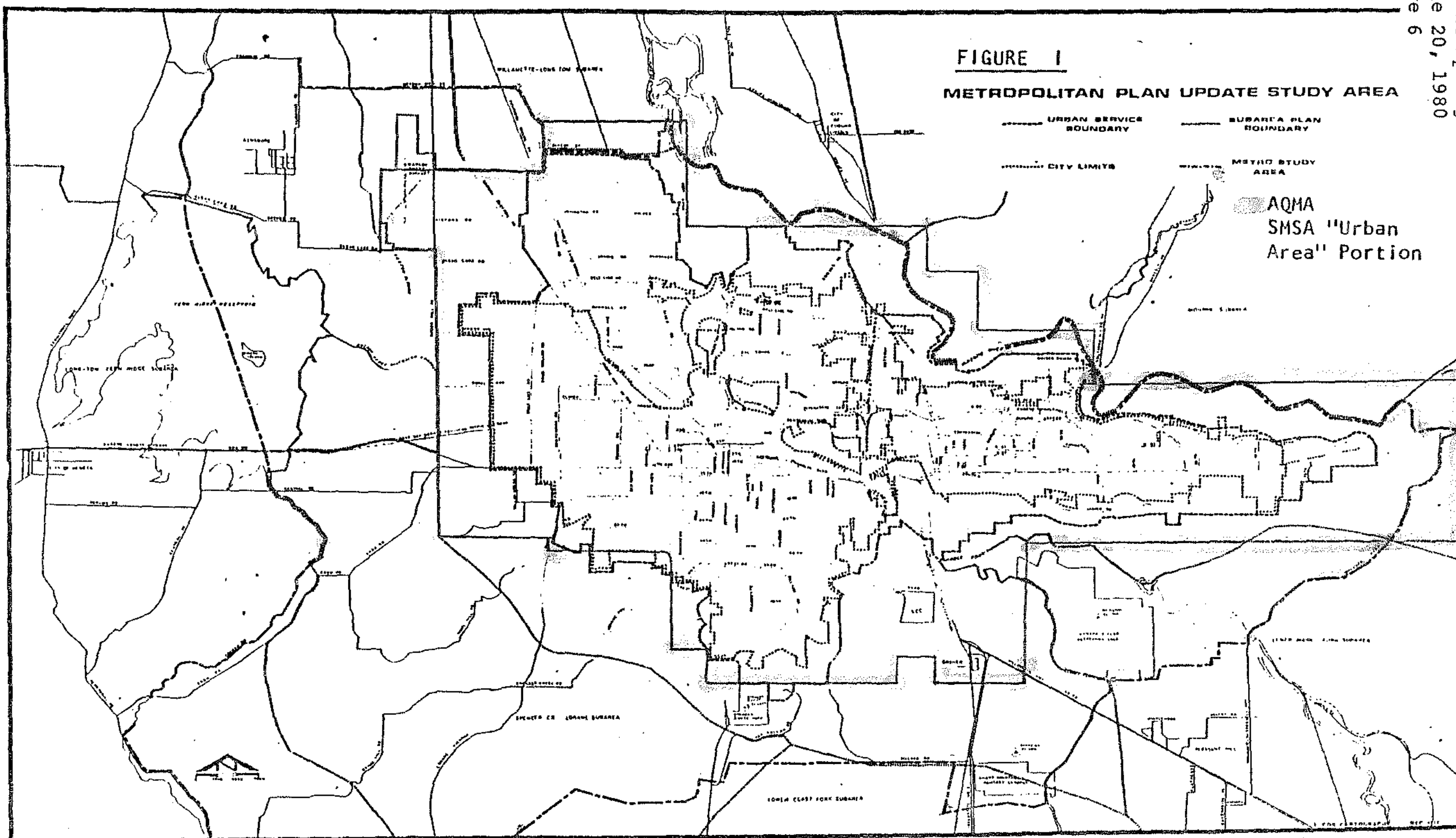
2. "1980 Population and Housing Estimates By Census Tract" prepared by LCOG in September 1979.

3. Year 2000 projections, based upon an October 24, 1976 DU/CT projection from the <u>2000 Transportation Plan,</u> which was updated by LCOG, at DEQ's request.

Other years - e.g., No. 1983, 1985, or 1987 in Table IV - were obtained by straight line extrapolation of the 1980 and year 2000 estimates.

The number of total AQMA households (Table V) was derived by subtracting an estimated vacancy rate of 2.5-4.0 percent from Table IV figures for total dwelling units. Based on discussions with LCOG staff, a 2.5 percent vacancy rate was assumed for 1975-80; 3.0 percent for 1981-1987; and 4.0 percent for the year 2000. This approach was used to estimate total households because: (1) recent dwelling unit estimates are available by census tract and; (2) the Metro Study Area (for which total household estimates are also available, though not by census tract) was significantly larger in area than the AQMA.

Table VI summarizes the estimates used in this analysis of AQMA household and population totals. Also shown, for comparison, are population and household totals for the Metro Study Area and the SJO report area. The more recent LCOG projections are significantly higher than those used by SJO for the AQMA. The increase in total households estimated for the AQMA results not only from higher population estimates, but also from projected decreases in average household size (persons/household).



Source: "Population, Households and Employment", by LCOG, February, 1978, page 5 (Ref. 3).

Table IV. AQMA Total Dwelling Units by Census Tract (DU/CT)

CENSUS T.	1976[1]	1977[1]	1978[1]	1980[2]	1983[4]	1985[4]	1987[4]	2000[3]
18	1495	1739	1757	2618	3549	4170	4791	8825
19	2980	3271	3428	3969	4119	4219	4318	4967
20	1859	1993	2014	2175	2526	2760	2993	4512
21	2698	2829	2925	2996	3340	3569	3798	5286
22	1236	1299	1358	1587	2279	2740	3202	6200
23	1898	1977	1880	2043	2425	2680	2934	4588
24	2612	2707	2712	2788	3172	3429	3685	5350
25	1249	1547	1665	2306	2871	3248	3624	6071
26	970	1009	1134	1349	1659	1865	2071	3412
27	989	1001	1005	1003	1093	1154	1214	1605
28	1547	1593	1603	1596	1685	1745	1804	2191
29	1987	2113	2216	2402	3208	3746	4284	7778
30	1056	1145	1197	1609	1759	1859	1959	2608
31	2222	2269	2376	2572	2654	2709	2763	3118
32	2053	2289	2340	2599	2622	2637	2652	2749
33	2735	2727	2743	2783	2797	2806	2815	2873
34	1941	1875	1929	2071	2117	2148	2179	2378
35	810	839	752	848	1207	1447	1686	3243
36	1185	1213	1158	1371	1487	1564	1641	2141
37	474	469	468	449	481	502	523	658
38	2781	2771	2456	2713	2775	2816	2857	3125
39	996	949	948	1219	1387	1498	1610	2336
40	1123	1121	1126	1335	1356	1370	1383	1473
41	1442	1447	1444	1462	1519	1557	1595	1842
42	1490	1506	1506	1575	1636	1676	1717	1980
43	1985	2103	2017	2373	2816	3112	3407	5328
44	3802	4271	4554	5750	6356	6759	7163	9786
45	2295	2540	2543	2810	2815	2818	2822	2843
46	1139	1151	1158	1216	1239	1254	1269	1368
47	1475	1497	1486	1545	1556	1563	1570	1616
48	1733	1841	1653	1909	1950	1977	2005	2182
49	1536	1537	1558	1599	1660	1701	1742	2008
50	1551	1644	1670	1823	1996	2111	2226	2972
51	1242	1272	1280	1301	1357	1395	1432	1675
52	753	786	814	862	1000	1091	1183	1779
53	830	855	852	917	981	1023	1065	1341
54	1381	1558	1753	1738	2141	2409	2677	4422
Total	61,550	64,753	65,478	73,281	81,590	87,127	92,659	128,630

[1]LCOG Metro Parcel File (Ref. 5). Attachment B

[2]Ref. 4. Attachment B [3]Ref.6. Attachment B

[4]Extrapolated (straight line) from 1980 and year 2000 data

Table V. AQMA Total Households by Census Tract (HH/CT)[1]

CENSUS T.	1976	1977	1978	1980	1983	1985	1987	2000
18	1473	1713	1731	2579	3443	4045	4647	8472
19	2935	3222	3377	3909	3995	4092	4189	4768
20	1831	1963	1984	2142	2450	2677	2903	4332
21	2658	2787	2881	2951	3240	3462	3684	5075
22	1218	1280	1338	1563	2211	2659	3106	5952
23	1870	1947	1852	2012	2352	2600	2846	4404
24	2573	2666	2671	2746	3077	3326	3574	5136
25	1230	1524	1640	2271	2785	3150	3515	5828
26	956	994	1117	1329	1608	1809	2009	3276
27	974	986	990	988	1060	1119	1176	1540
28	1524	1569	1579	1572	1634	1693	1750	2103
29	1957	2081	2183	2366	3112	3634	4155	7467
30	1040	1128	1179	1585	1706	1803	1900	2504
31	2189	2235	2340	2533	2574	2628	2680	2993
32	2022	2255	2305	2560	2543	2558	2572	2639
33	2694	2686	2702	2741	2713	2722	2731	2758
34	1912	1847	1900	2040	2054	2084	2114	2283
35	798	826	741	835	1171	1404	1635	3113
36	1167	1195	1141	1350	1442	1517	1592	2055
37	467	462	461	442	467	487	507	632
38	2739	2729	2419	2672	2692	2732	2771	3000
39	981	935	934	1201	1345	1453	1562	2243
40	1106	1104	1109	1315	1315	1329	1341	1414
41	1420	1425	1422	1440	1473	1510	1547	1768
42	1468	1483	1483	1551	1587	1626	1665	1901
43	1955	2071	1987	2337	2732	3019	3306	5115
44	3745	4207	4486	5664	6165	6557	6948	9396
45	2261	2502	2505	2768	2731	2733	2737	2729
46	1122	1134	1141	1198	1202	1216	1231	1313
47	1453	1475	1464	1522	1509	1516	1523	1551
48	1707	1813	1628	1880	1892	1918	1945	2095
49	1513	1514	1535	1575	1611	1651	1691	1928
50	1528	1619	1645	1796	1936	2048	2159	2853
51	1223	1253	1261	1281	1316	1353	1389	1608
52	742	774	802	849	970	1059	1148	1708
53	818	842	839	903	952	992	1033	1287
54	1360	1535	1727	1712	2077	2337	2597	4245
Totals	60,629	63,781	64,499	72,256	79,142	84,520	89,878	123,484

[1]Total Household = Total dwelling units from Table IV, minus an assumed average vacancy rate of 2.5 percent (1975-1980); 3 percent (1981-87); and, 4 percent by the year 2000; based on discussions with LCOG staff.

Table VI. Estimated AQMA Total Population and Total Households[5]

	Total Population				Total Households		
Year	Metro Study Area[1]	AQMA[4]	SJO[2]	Household Size[1] (Ave.)	Metro Study Area[1]	AQMA[3]	SJO[2]
1970	154,000		147,928	2.95	50,100		48,272
1975	174,000		168,685	2.79	60,550		
1976		165,517		(2.73)	(62,790)	60,629	56,274
1977		176,036		(2.76)	(65,030)	63,781	(57,857)
1978		174,147		(2.70)	(67,270)	64,499	(59,441)
1979		181,784		(2.66)	(69,510)	(68,340)	(61,025)
1980	194,900	190,033	188,655	2.63	71,750	72,256	
1982					(76,950)		(66,654)
1983					(79,550)	79,142	(68,530)
1985	221,100		212,692	2.53	84,750	84,520	
1987					(89,870)	89,878	(76,589)
1990	246,200			2.45	97,550		
1995	271,300			2.38	110,750		
2000	293,700	287,718	277,687	2.33	122,450	123,484	

1. "Population, Households and Employment," LCOG, February 1978 pp 2, 41 (Reference 3).

2. "Eugene/Springfield AQMA Data Base Development," Seton, Johnson and Odell, February 15, 1978 (Reference 2).

3. From Table V.

4. Households (column 7) x Household Size (column 5).

5. Values in parentheses are extrapolated.

Projection of Survey Results Based on Population Growth Alone

The telephone survey data corresponds to the 1978-79 heating season, here defined as July 1978 - June 1979. It must be translated to a calendar year basis for modeling and projection of other years' emissions.

TSP emissions per household (Table III) could simply be multiplied by AQMA-total households (Table VI) for any year, to estimate AQMA-total TSP emissions. However, the household emission factor should first be adjusted for heating season severity as shown in Table VII. This assumes the amount of wood burned per average household will vary directly with how cold the "average weather" is. Table VIII indicates the 1978-79 survey year was about 12.5 percent colder than "normal," as represented by a 30-year period, 1941-1970. For past years, actual degree day data allows calculation of an average household TSP emission factor specifically for that year. For future years, a household emission factor based on a 30-year average heating season severity factor was used.

Table IX summarizes estimates of AQMA-total TSP emissions for several past and future years, based on population and household growth alone, and using household emission factors adjusted for heating season severity where possible.

Table VII. Adjustment of Household TSP Emission Factors for Heating Season Severity

Year	Annual Heating Season Severity Factor[1]	Adjusted Household Emission Factor (tons TSP/yr/HH)
Calendar 1976	1.016	0.01524
Calendar 1977	1.035	0.01553
Calendar 1978	1.069	0.01604
Survey Yr. 1978-79	1.125	0.01688[2]
30-Year Average	1.000	0.0150

[1]From Table VIII. [2]From Table III. Example: .01688 (1.069/1.125) = .01604

Table VIII. Heating Season Severity Factors for Eugene-Springfield

Month	"Normal" 30 year average)	Calendar 1977	Calendar 1978	Survey 1978-79	Calendar 1976	Calendar 1977	Calendar 1978	Survey 1978-79	Calendar 1976
JAN	794	801	690	1029	707	1.01	.870	1.295	
FEB	602	562	576	614	664	.934	.957	1.02	
MAR	592	615	508	496	636	1.039	.858	.838	
APR	441	422	503	432	478	.957	1.141	.979	
MAY	289	417	375	288	316	1.443	1.297	.996	
JUN	133	126	102	159	210	.947	.767	1.195	
JUL	41	68	52	52	10	1.658	1.268	1.268	
AUG	51	20	48	48	38	.392	.941	.941	
SEPT	119	178	165	165	58	1.496	1.386	1.386	
OCT	366	385	366	366	340	1.052	1.265	1.00	
NOV	582	637	763	763	518	1.095	1.311	1.311	
DEC	729	675	919	919	840	.926	1.26	1.260	
Annual	4739	4906	5067	5331	4815	1.035	1.069	1.125	1.016

[1]Base Temp. = 65°F. [2]Severity Factor = DD measured/DD "normal". DD = degree days.
[3]From: "Local Climatological Data-Monthly Summarizes For Eugene, Oregon, from National Weather Service (Airport Site)

Table IX. Estimates of AQMA-total Emissions Based on Population and Household Growth Alone

Year	AQMA Total Households[1]	Household Emission Factor[2] (tons TSP/HH/Year)	AQMA Total TSP Emissions (tons/year)
Calendar 1977	63,781	0.01553	991
Calendar 1978	64,499	0.01604	1035
Survey 1978-79	66,420	0.01688	1121
Calendar 1980	72,256	0.0150	1083
Calendar 1982		"	
Calendar 1983	79,142	"	1187
Calendar 1985	84,520	"	1268
Calendar 1987	89,878	"	1348

1. From Table VI 2. From Table VII.

Projection Based on a Trend Factor Which Includes Population Growth

Talbott, Wong and Associates, Inc. researched potential trend factors specifically associated with growth in wood space heating, including rules of wood stoves and fire wood cutting permits (Reference 1). They proposed a trend factor for all three AQMAs, which uses a best fit curve representing the volume of cut timber actually removed for fire wood from the nearest National Forest during 1974-1979 (Figure II). The Eugene/Springfield AQMA curve in Figure II is based on data provided by the Willamette National Forest. It is used here to estimate a "maximum" growth rate for wood space heating, for the period 1977-1987.

The curve is assumed to reflect both the growth in population and households, as well as other factors which promote increased wood heating such as the rising cost of alternative fuels, and probable decline in average real income per capita (?).

Table X illustrates the use of this trend factor to project AQMA-total TSP emissions for several years. The Figure II curve is based on the federal fiscal year (FFY 1979 = October 1978 to October 1979). Accordingly, the trend factor value representing the survey year (July 78-June 79) is read "3 months earlier" on the curve. Likewise, calendar year trend factor values are read "3 months later" on the curve. Again, in projecting the AQMA-total TSP emissions found for the survey year 1978-79, an adjustment is made for relative heating season severity, where possible.

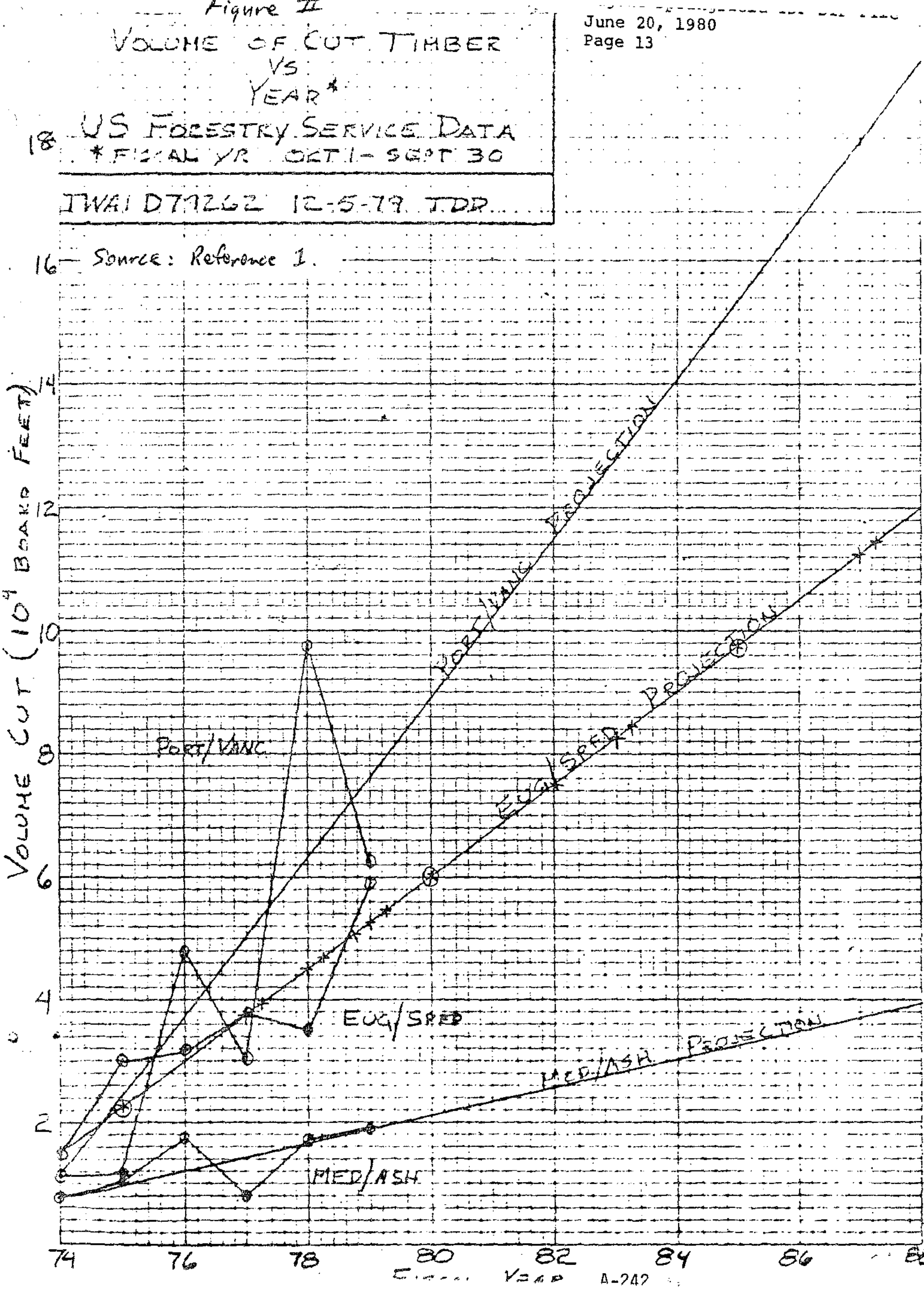


Figure II
VOLUME OF CUT TIMBER
VS
YEAR*
US FORESTRY SERVICE DATA
*FISCAL YR OCT 1 - SEPT 30
TWAI D79262 12-5-79 TDR
Source: Reference 1.
VOLUME CUT (10^4 BOARD FEET)
PORT/VANC PROJECTION
EUG/SPFD PROJECTION
MED/ASH PROJECTION
PORT/VANC
EUG/SPFD
MED/ASH
18
16
14
12
10
8
6
4
2
74
76
78
80
82
84
86
88

Table X. Estimates of AQMA Total Emissions Based on a Trend Factor Associated with Residential Wood Space Heating which Includes Population and Household Growth

Year	Trend Factor Value[1]	Heating Season Severity Factor[2]	AQMA Total TSP Emissions[3] (tons/year)
Calendar 1977	3.94	1.035	801
Calendar 1978	4.69	1.069	985
Survey 1978-79	5.07	1.125	1121 [4]
Calendar 1980	6.00	1.000	1179
Calendar 1982	7.50	"	1174
Calendar 1983	8.44	"	1659
Calendar 1985	9.75	"	1916
Calendar 1987	11.44	"	2248

1. From Figure II, Graph of "Volume of Cut Timber" (from Reference 1)

2. From Table VIII

3. Multiply: Survey Year (1978-79) AQMA-total Emissions from Table III x the ratio of Trend Factor Values (Projection Year/Survey Year ratio) x the ratio of Heating Season Severity Factors (Projection Year/Survey Year).

4. From Table III

Figure III illustrates that the trend factor projects much higher future TSP emissions from wood space heating than a projection based on population and household growth alone, (900 tons/year more by 1987). DEQ continues to research this and other trend values in order to put the present growth in wood space heating into better perspective.

Allocation of Wood Space Heating TSP Emissions To Model Grids

The following equation illustrates how wood space heating TSP emissions were allocated to 2 kilometer model grids:

$$TSP/HH \times HH/CT \times FCT/GRID = TSP/GRID \quad (1)$$

where,

TSP/HH = a household TSP emission factor (tons/year per average AQMA household); from Table VII.

HH/CT = Total households per census tract; from Table V.

FCT/GRID = The fraction of each census tract within each 2 km model grid; from SJO[2]; contained in Attachment A.

TSP/GRID = TSP from wood space heating allocated to each model grid (tons/year); see Attachment A.

This was the general approach used by Seton, Johnson and Odell (Reference 2) and utilitizes SJO's allocation of census tracts to 2 km model grids (FCT/GRID). Whereas SJO projected 1970 census data on HH/CT using total population growth as a growth factor, this analysis extracts HH/CT from dwelling unit projections. Thus, total households are assumed to have the same distribution within the AQMA as total dwelling units for all years analyzed.

Attachment A contains the calculation of total households per model grid. This figure was multiplied by the appropriate household emission factor (Table VII) to give total TSP per grid, which is also in Attachment A, for several past and future years. This represents allocation to model grids of the lower TSP projections, based on population and household growth alone (Table IX).

To similarly allocate the <u>higher</u> projections of future TSP based on the Talbott, Wong trend factor (Table X) would require scaling up the grid values in Attachment A, by a factor calculated as follows, for any year <u>after</u> 1978-79.

$$\text{Scaling Factor} = \frac{\text{Table X, Column 4 value}}{\text{Table IX, Column 4 value}} \qquad (2)$$

Table XI summarizes these scaling factors, which can be input to the GRID model to increase each TSP/GRID value by these uniform amounts.

Table XI. Scaling Factors to Increase TSP/GRID Based on Talbott, Wong Trend Factor

	Estimated AQMA Total TSP (T/yr)		
Year	Table IX	Table X	Scaling Factor
1977	991	801	
1978	1035	985	
1978-79	1121	1121	1121/1121 = 1.00
1979			
1980	1083	1179	1179/1083 = 1.089
1982		1474	1474/ =
1983	1187	1659	1659/ = 1.40
1985	1268	1916	1916/ = 1.51
1987	1348	2248	2248/ = 1.67

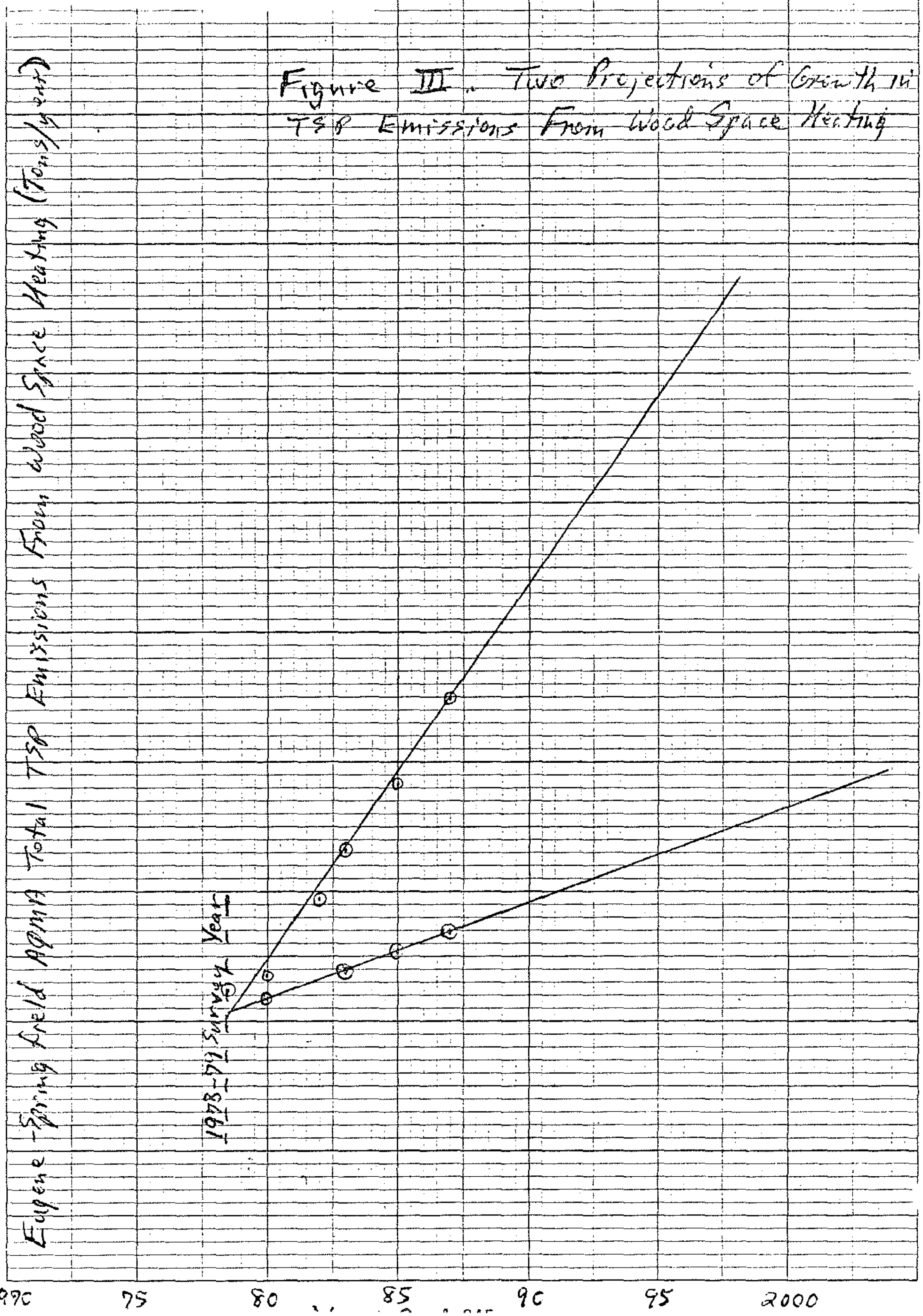


Figure III. Two Projections of Growth in TSP Emissions From Wood Space Heating
Eugene-Springfield AQMA Total TSP Emissions From Wood Space Heating (Tons/year)
1978-79 Survey Year
500
1000
1500
2000
2500
1970
75
80
85
90
95
2000

References

1. Letter report with attachments from Richard E. Hatchard, P.E., and Terry D. Day, E. I. T. of Talbott, Wong and Associates, Inc., Consulting Engineers to Peter B. Bosserman, Oregon Department of Environmental Quality, 522 Southwest Fifth Avenue, Portland, OR December 20, 1979.

2. "Emission Inventory Improvements and Projections for the Eugene/Springfield Air Quality Maintenance Area," prepared for the Oregon Department of Environmental Quality, by Seton, Johnson and Odell Inc., Consulting Engineers, 317 Southwest Alder Street, Portland, Oregon 97204, February 15, 1978.

3. "Population, Households and Employment," prepared by Lane Council of Governments (LCOG), 125 East 8th Avenue, Eugene, Oregon, February, 1978.

4. Letter from John Replinger of LCOG to Bob Gay of DEQ, December 16, 1979; including "1980 Regulation and Housing Estimates By Census Tract" (September 1979 estimate); and a memorandum entitled "Adjustments to the 2000 Transportation Plan Dwelling Unit Projections." (Attachment B)

5. "Dwelling Units By Structure Type By Census Tract," from LCOG's 1976, 1977 and 1978 Metro Parcel File. (Attachment B)

6. October 24, 1976, projection of dwelling units by census tract from the 2000 Transportation Plan. (Attachment B)

RLG:f
AF0753 (2)

ATTACHMENT A

Total Households, and Total Wood Space Heating TSP, By Model Grid

GRID X,Y	No.	CT	FCT GRID	1977 Households Parts	1977 Households Total	1977 TSP (T/yr)	1978 Households Parts	1978 Households Total	1978 TSP (T/yr)	1983 Households Parts	1983 Households Total	1983 TSP (T/yr)	1985 Households Parts	1985 Households Total	1985 TSP (T/yr)	1987 Households Parts	1987 Households Total	1987 TSP (T/yr)
1,1	1					T/yr			T/yr									
1,2	15																	
1,3	29	(10)	(0)															
1,4	43	(10)	(.01)															
1,5	57	(10)	(.01)															
1,6	71	25	.09	137	137	2.1	148	148	2.4	251	251	3.8	284	284	4.3	317	317	4.8
1,7	85	25	.09	137	137	2.1	148	148	2.4	251	251	3.8	284	284	4.3	317	317	4.8
1,8	99	25	.02	30	30	0.5	33	33	0.5	56	56	0,8	63	63	0.9	117	117	1.8
		(10)	(.02)															
1,9 2,1	2																	
2,2	16																	
2,3	30	(10)	(.01)															
2,4	44	25	.05	76	76	1.2	82	82	1.3	139	139	2.1	158	158	2.4	176	176	2.6
		(10)	.02															
2,5	58	25	.20	305	305	4.7	328	328	5.3	551	557	8.4	630	630	9.5	703	703	10.5
		(10)	(0)															
2,6	72	25	.23	351	351	5.5	377	377	6.0	641	641	9.6	725	725	10.9	809	809	12.1
2,7	86	25	.23	351	351	5.5	377	377	6.0	641	641	9.6	725	725	10.9	809	809	12.1
2,8	100	24	.14	373	403	6.3	374	407	6.5	431	487	7.3	466	529	7.9	500	570	8.6
		25	.02	30			33			56			63			70		
		(10)	(.01)	—														
2,9	114																	
3,1																		
3,2	17																	
3,3	31	44	.174	732	732	11.4	781	781	12.5	1073	1073	16.1	1141	1141	17.1	1209	1209	18.1
		(10)	(.01)															
3,4	45	43	.16	331	378	13.6	318	901	14.5	437	1238	18.6	483	1335	20.0	529	1432	21.5
		44	.13	547			583			801			852			903		
		(10)	(.01)															
3,5	59	25	.01	15	821	12.8	16	796	12.8	28	1103	16.5	32	1221	18.3	35	1338	20.0
		26	.04	40			45			64			72			20		
		43	.37	766			735			1011			117			1223		
3,6	73	25	.02	30	855	13.3	33	949	15.2	56	1341		63	1503		70	1663	24.95
		26	.74	736			827			1190			1339			1487		
		27	.09	89			89			95			101			106		

TSP (Tons/Yr) was projected based on projected growth in AQMA households only (Table IX in text). To convert to higher projections used in modeling, use scaling factors in Table XI.

Pete Bessermans (PBB) allocation of the rest of CT 44 to SJO previous allocation of ~~CT~~ part of CT 44 to Model Grids

GRID	FCT/GRID SJO	PBB*
3,3	.087	.174
3,4	.065	.130
~~3,5~~	~~0~~	
4,3	.150	.304
4,4	.109	.218
5,3	.065	.130
5,4	.022	.044
	.498	1.000

* Arbitrarily, doubled SJO, and added .004 to largest FCT/GRID

1977 TSP/GRID (T/yr) = 1977 HH/GRID x .01604 Tons/HH

1978 TSP/GRID = 1978 HH/GRID x .01688 Tons/HH

1983 TSP/GRID = 1983 HH/GRID x .0150
1985 " = 1985 " x .0150
1987 " = 1987 " x .0150

Attachment A

Total Households and Total TSP Per Model GRID

GRID X,Y	No.	CT	ECI GRID	1977 Households Part	1977 Households Total	1977 TSP (T/yr)	1978 Households Part	1978 Households Total	1978 TSP (T/yr)	1983 Households Part	1983 Households Total	1983 TSP (T/yr)	1985 Households Part	1985 Households Total	1985 TSP (T/yr)	1987 Households Part	1987 Households Total	1987 TSP (T/
						T/y			T/yr									
,7	87	24	.17	453	805	12.5	454	826	13.2	523	1007	15.1	565	1095	16.4	607	1185	17.
		25	.03	46			49			84			94			105		
		26	.13	129			145			209			235			261		
		27	.18	177			178			191			201			212		
,8	101	24	.29	773	773	12.0	775	775	12.4	892	892	13.3	965	965	14.4	1036	1036	13.3
,9	115	(4)	(.04)															
		24	.06	160	160	2.5	160	160	2.6	185	185	2.7	200	200	3.0	214	214	3.2
,1	4																	
,2	18																	
,3	32	44	.304	1279	1279	19.9	1364	1364	21.9	1874	1874	28.1	1993	1993	29.8	2112	2112	31.6
,4	46	42	.05	74	1384	21.5	74	1430	22.9	79	1942	29.1	81	2084	31.2	83	2226	33.3
		43	.19	393			378			519			574			628		
		44	.218	917			978			1344			1429			1515		
,5	60	41	.13	185	1157	18.0	185	1137	18.2	192	1356	20.3	196	1441	21.6	201	1527	22.9
		42	.32	475			475			508			520			533		
		43	.24	497			477			656			725			793		
,6	74	26	.09	89	1778	27.6	101	1796	28.8	145	1925	28.8	163	2011	30.1	181	2098	31.4
		27	.55	542			544			583			615			647		
		28	.40	628			632			654			677			700		
		41	.25	356			356			368			377			387		
		42	.11	163			163			175			179			183		
4,7	88	23	.09	175	1009	15.7	167	1004	16.1	212	1138	17.0	234	1220	18.3	256	1304	19.5
		24	.17	453			454			523			565			608		
		27	.18	177			178			191			201			212		
		28	.13	204			205			212			220			228		
4,8	102	23	.22	428	801	12.4	407	781	12.5	517	948	14.2	572	1038	15.5	626	1126	16.8
		24	.14	373			374			431			466			500		
4,9	116	(4)	(.04)															
		23	.04	78	158	2.5	74	154	2.5	94	186	2.7	104	204	3.0	114	221	3.3
		24	.03	80			80			92			100			107		
5,1	5	(11)	(.008)															
		54	.15	230	230	3.6	259	259	4.2	312	312	4.6	351	351	5.2	390	390	5.8
5,2	19	52	.23	178	926	14.4	184	998	16.0	223	1188	17.8	244	1310	19.6	264	1431	2
		53	.25	211			210			238			248			258		
		54	.35	537			604			727			818			909		

Attachment A
Total Households and Total TSP Per Model GRID

GRID X	Y	CT	PCT GRID	1977 Households Part.	1977 Households Total	1977 TSP (T/yr)	1978 Households Part.	1978 Households Total	1978 TSP (T/yr)	1983 Households Part.	1983 Households Total	1983 TSP (T/yr)	1985 Households Part.	1985 Households Total	1985 TSP (T/yr)	1987 Households Part.	1987 Households Total	1987 TSP (T/yr)
						T/y			T/yr									
,3	33	44	.13	547	2146	33.3	583	2188	35.1	801	2563	38.4	852	2667	40.0	903	2773	41.5
		46	.75	851			856			902			912			923		
		52	.15	116			120			146			159			172		
		53	.75	632			629			714			744			775		
5,4	47	42	.20	297	3351	52	297	3363	53.9	317	3729	55.9	325	3772	56.6	333	3816	57.2
		43	.04	83			79			109			121			132		
		44	.044	185			197			271			289			306		
		45	1.0	2502			2505			2731			2733			2737		
		46	.75	284			285			301			304			308		
5,5	61	29	.12	250	1819	28.2	262	1832	29.4	373	2099	31.9	436	2195	32.9	499	2291	34.7
		40	.50	552			555			658			665			671		
		41	.38	542			540			560			574			588		
		42	.37	475			475			508			520			533		
5,6	75	28	.27	424	1494	23.2	426	1531	24.6	441	1879	28.2	457	2069	31.0	473	2258	33.8
		29	.30	624			655			934			1090			1246		
		30	.08	90			94			137			144			152		
		41	.25	356			356			368			378			387		
5,7	89	22	.03	38	998	15.5	40	977	15.7	66	1192	17.8	80	1308	19.6	93	1422	21.3
		23	.30	584			556			706			780			854		
		28	.20	314			316			327			339			350		
		29	.03	62			65			93			109			125		
5,8	103	(3)	(.03)															
		23	.26	506	506	7.9	482	482	7.7	612	612	9.1	676	676	10.1	740	740	11.0
5,9	117	(3)	(.07)															
		(4)	(.01)															
		23	.09	175	175	2.7	167	167	2.7	212	212	3.1	234	234	3.5	256	256	3.8
6,1	6	(11)	(.035)															
		50	.091	147	531	8.2	150	582	9.3	176	695	10.4	186	770	11.5	196	845	12.6
		54	.25	384			432			519			584			649		
6,2	20	50	.091	147	1398	21.7	150	1462	23.5	176	1654	24.8	186	1775	26.6	196	1896	28.4
		51	.50	627			631			658			677			695		
		52	.31	240			249			301			328			356		
		54	.25	384			432			519			584			649		

ATTACHMENT A

Total Households and Total TSP Per Model GRID

KIF V	No	CT	ECT GRID	1977 Households Part.	1977 Households Total	1977 TSP (T/yr)	1978 Households Part.	1978 Households Total	1978 TSP (T/yr)	1983 Households Part.	1983 Households Total	1983 TSP (T/yr)	1985 Households Part.	1985 Households Total	1985 TSP (T/yr)	1987 Households Part.	1987 Households Total	1987 TSP (T/yr)
,3	34	47	.71	1047	3348	52.0	1039	3225	51.7	1071	3549	53.2	1076	3628	54.4	1081	3709	55.6
		48	.71	1287			1156			1343			1361			1381		
		50	.091	149			150			176			186			196		
		51	.50	627			631			658			677			695		
		52	.31	240			249			301			328			356		
,4	48	31	.05	112	4822	74.9	117	4459	71.5	129	5246	78.6	131	5409	81.1	134	5574	83.6
		37	.20	92			92			93			97			101		
		38	1.0	2729			2419			2692			2732			2771		
		39	1.0	935			934			1345			1453			1562		
		47	.29	428			425			438			440			442		
		48	.29	526			472			549			556			564		
,5	62	30	.50	564	1340	20.8	590	1379	22.1	853	1768	26.5	902	1830	27.4	950	1889	28.3
		31	.10	224			234			257			263			268		
		40	.50	552			555			658			665			671		
6,6	[illegible]	22	.03	38	1104	17.1	40	1157	18.6	66	1663	24.9	80	1913	28.6	93	2161	32.4
		29	.42	874			917			1307			1526			1745		
		30	.17	192			200			290			307			323		
6,2	90	22	.30	384	384	6.0	401	401	6.4	663	663	9.9	708	798	11.9	931	931	13.9
6,8	104	22	.06	77	77	1.2	80	80	1.3	132	132	1.9	60	160	2.4	176	186	2.8
6,9																		
7,1	7	(11)	(.035)															
		36	.09	108	403	6.3	103	402	6.4	130	482	7.2	137	510	7.6	143	536	8.0
		50	.182	295			299			352			373			393		
7,2	21	36	.11	131	860	13.4	126	866	13.9	159	1030	15.4	167	1089	16.3	175	1147	17.2
		50	.45	729			740			871			922			972		
7,3	35	36	.07	84	1442	22.4	80	1458	23.4	101	1566	23.4	106	1613	24.1	111	1660	24.9
		49	.80	1211			1228			1289			1321			1353		
		50	.091	147			150			176			186			196		
7,4	49	31	.21	469	1165	18.1	491	1189	19.1	541	1266	18.9	552	1302	19.5	563	1339	20.[illegible]
		36	.02	23.9			23			29			30			32		
		37	.80	370			369			374			390			406		
		49	.20	303			307			322			330			338		
7,5	63	30	.17	192	1086	16.9	200	1136	18.2	290	1219	19.7	307	1358	20.3	323	1395	2[illegible]
		31	.40	894			936			1029			1051			1072		

ATTACHMENT A

Total Households and Total TSP Per Model GRID

GRID		CT	FCT/GRID	1977 Households Part.	1977 Households Total	1977 TSP (T/yr)	1978 Households Part.	1978 Households Total	1978 TSP (T/yr)	1983 Households Part.	1983 Households Total	1983 TSP (T/yr)	1985 Households Part.	1985 Households Total	1985 TSP (T/yr)	1987 Households Part.	1987 Households Total	1987 TSP (T/yr)
,6	77	22	.09	115	924	14.3	120	967	15.5	199	1249	18.7	239	1371	20.5	280	1492	22.3
		29	.12	250			262			373			436			497		
		30	.08	90			94			136			144			152		
		31	.21	469			491			541			552			563		
,7	91	22	.30	384	384	6.0	401	401	6.4	663	663	9.9	798	798	11.9	932	932	13.9
,8	105	22	.06	77	77	1.2	80	80	1.3	133	133	1.9	160	160	2.4	186	186	2.7
,9																		
,1	8	36	.06	72	72	1.1	68	68	1.1	87	87	1.3	91	91	1.3	96	96	1.4
,2	33	36	.22	263	263	4.1	251	251	4.0	317	317	4.7	334	334	5.0	350	350	5.2
,3	36	36	.22	263	263	4.1	251	251	4.0	317	317	4.7	334	334	5.0	350	350	5.2
,4	50	32	.50	1128	1259	19.6	1153	1279	20.5	1272	1431	21.4	1279	1446	21.6	1286	1461	21.9
		36	.11	131			126			159			167			175		
,5	64	21	.27	752	1654	25.7	778	1700	27.3	875	1892	28.3	935	1958	29.3	995	2024	30.3
		32	.40	902			922			1017			1023			1029		
,6	78	21	.37	1031	1136	17.6	1066	1176	18.9	1199	1342	20.1	1281	1440	21.6	1363	1536	23.0
		22	.03	38			40			66			80			93		
		31	.03	67			70			77			79			80		
,7	92	(21)	(.02)															
		21	.18	502	502	7.8	519	519	8.3	583	583	8.7	623	623	9.3	663	663	9.9
,8	106	(21)	(.01)															
		22	.03	38	38	0.6	40	40	0.6	66	66	0.9	80	80	1.2	93	93	1.3
,9																		
,1	9	(11)	(.022)															
		(17)	(.017)															
		36	.06	72	72	1.1	68	68	1.1	87	87	1.3	91	91	1.3	96	96	1.4
,2	23	(17)	(.028)															
		36	.04	48	48	0.7	46	46	0.7	58	58	0.8	61	61	0.9	64	64	0.9
,3	37	(17)	(.01)															
		35	.24	198	198	3.1	178	178	2.9	281	281	4.2	337	337	5.0	392	392	5.8
,4	51	32	.10	226	2058	32.0	231	2074	33.2	254	2180	32.7	256	2215	33.2	257	2251	33.7
		33	.50	1343			1351			1357			1361			1366		
		34	.22	406			418			452			458			465		
		35	.10	83			74			117			140			163		
,5	65	20	.21	412	2006	31.2	417	2027	32.5	515	2164	32.3	562	2235	33.5	610	2368	34.6
		21	.09	251			259			292			312			332		
		33	.50	1343			1351			1357			1361			1366		

ATTACHMENT A
Total Households and Total TSP Per Model GRID

X/Y	No.	CT	FCT GRID	1977 Households Part.	1977 Households Total	1977 TSP (T/yr)	1978 Households Part.	1978 Households Total	1978 TSP (T/yr)	1983 Households Part.	1983 Households Total	1983 TSP (T/yr)	1985 Households Part.	1985 Households Total	1985 TSP (T/yr)	1987 Households Part.	1987 Households Total	1987 TSP (T/
,6	79	(2)	(.03)			T/yr			T/yr									
		20	.05	98	349	5.4	99	358	5.7	122	414	6.2	134	446	6.6	145	477	7.1
		21	.09	251			259			292			312			332		
,7	93	(2)	(.01)															
		22	.06	77	77	1.2	80	80	1.3	133	133	1.9	159	159	2.3	186	186	2.7
,8																		
,9																		
0,1	10	(17)	(.017)															
,2	24	(17)	(.017)															
,3	38	(17)	(.01)															
		35	.17	140	140	2.2	126	126	2.0	199	199	2.9	239	239	3.5	278	278	4.1
,4	52	19	.12	387	1479	23.0	405	1521	24.4	479	1711	25.6	491	1756	26.3	503	1800	27
		34	.56	1034			1064			1150			1167			1183		
		35	.07	58			52			82			98			114		
10,5	[illegible]	19	.08	258	1273	19.8	270	1303	20.9	320	1532	22.9	327	1615	24.2	335	1700	25.5
		20	.31	609			615			759			830			900		
		34	.32	406			418			452			458			465		
10,6	80	(2)	(.01)															
		20	.21	412	412	6.4	417	417	6.7	514	515	7.2	562	562	8.4	610	610	9.1
0,7																		
,8																		
,9																		
11,1																		
11,2																		
11,3	39	35	.21	173	173	2.7	156	156	2.5	246	246	3.6	295	295	4.4	343	343	5.1
11,4	53	19	.36	1160	1193	18.5	1216	1245	20.0	1438	1485	22.2	1473	1529	22.9	1508	1573	23.5
		35	.04	33.			29			47			56			65		
11,5	67	(2)	(.01)															
		18	.06	102	685	10.7	103	706	11.3	207	931	14.0	243	1002	15.0	279	1072	16.0
		19	.12	387			405			479			491			503		
		20	.10	196			198			245			268			290		
11,6	1	20	.13	255	255	4.1	258	258	4.1	319	319	4.8	348	348	5.2	377	377	5.7
11,7																		
11,8																		
11,9																		

ATTACHMENT A

Total Households and Total TSP Per Model GRID

GRID X,Y		CT	FCT GRID	1977 Households Part.	1977 Households Total	1977 TSP (T/yr)	1978 Households Part.	1978 Households Total	1978 TSP (T/yr)	1983 Households Part.	1983 Households Total	1983 TSP (T/yr)	1985 Households Part.	1985 Households Total	1985 TSP (T/yr)	1987 Households Part.	1987 Households Total	1987 TSP (T/yr)
						T/yr			T/yr									
12,1																		
12,2																		
12,3	40	18	.04	68	337	5.2	69	330	5.3	138	497	7.4	162	565	8.4	186	632	9.4
		19	.04	129			135			160			164			168		
		35	.17	140			126			199			239			278		
12,4	54	18	.06	102	1004	15.6	103	1049	16.9	207	1171	17.5	243	1376	20.6	279	1580	23.7
		19	.28	902			946			964			1133			1301		
12,5	68	18	.165	282	282	4.4	285	285	4.6	568	568	8.5	667	667	10.0	768	768	11.5
12,6																		
12,7																		
12,8																		
12,9																		
13,1																		
13,2	27																	
13,3	41	18	.11	188	188	2.9	190	190	3.0	379	379	5.6	445	445	6.6	511	511	7.6
13,4	55	18	.18	308	308	4.8	311	311	5.0	620	620	9.3	728	728	10.9	836	836	12.5
13,5	69	18	.18	308	308	4.8	311	311	5.0	620	620	9.3	728	728	10.9	836	836	12.5
13,6																		
13,7																		
13,8																		
13,9																		
14,1																		
14,2																		
14,3	42	18	.07	120	120	1.9	121	121	1.9	241	241	3.6	283	283	4.2	325	325	4.8
14,4	56	18	.11	188	188	2.9	190	190	3.0	379	379	5.6	445	445	6.6	511	511	7.6
14,5	70	(2)	(.01)															
		18	.04	68	68	1.1	69	69	1.1	138	138	2.0	162	162	2.4	186	186	2.7
14,6																		
14,7																		
14,8																		
14,9																		
TOTALS					63778	991		64498	1034		78997	[illegible]1.5		[illegible]4510	1[illegible]42.4		[illegible]0045	[illegible]

~~1977~~ TSP/GRID = HH/GRID x ~~.01604~~ .01553 (1977); ~~.01688~~ .01604 (1978); .0150 (1983,85,87)

1976 = .01524

TRACT	Duplex	Single Family	Multi-family	X mobile home	TOTAL
18	94	1,182	51	168	1,495
19	480	1,732	356	412	2,980
20	162	1,470	221	6	1,859
21	268	1,233	999	198	2,698
22	110	739	7	380	1,236
23	148	1,633	22	95	1,898
24	146	2,434	14	18	2,612
25	54	903	15	277	1,249
26	118	682	27	143	970
27	80	905	0	4	989
28	170	1,090	270	17	1,547
29	248	1,279	399	61	1,987
30	60	771	188	37	1,056
31	212	1,504	504	2	2,222
32	336	1,069	621	27	2,053
33	130	1,890	551	164	2,735
34	74	1,427	309	131	1,941
35	26	594	55	135	810
36	26	593	73	493	1,185
37	24	300	150	0	474
38	262	258	2,261	0	2,781
39	102	208	686	0	996
40	94	418	578	33	1,123
41	140	1,196	88	18	1,442
42	112	673	640	65	1,490
43	88	1,430	388	79	1,985
44	228	2,543	882	149	3,802
45	282	1,258	753	2	2,295
46	140	995	4	0	1,139
47	156	998	321	0	1,475
48	118	834	781	0	1,733
49	102	1,239	195	0	1,536
50	184	1,219	147	1	1,551
51	122	966	154	0	1,242
52	72	553	128	0	753
53	86	729	14	1	830
54	50	1,146	182	3	1,381
TOTAL	5,304	40,093	13,034	3,119	61,550
GRAND	5,304	40,093	13,034	3,119	61,550

Attachment B

CT 18-54 Dwelling Units

Year	SFD	Total / Total Households	% SFD of Total	% TOTAL DU Increase from Previous Year
1975		60550		
1976	40,093	61,550 (62770)	65.14 %	
1977	41,298	64,753 (65030)	63.78 %	5.20 %
Jan 1, 1977	41,320	65,135	63.44 %	
1978	41,892	65,502 (67270)	63.96 %	1.16 % {12/79 Bkgd Report Metro Plan
{Lane Co. {Eugene {Springfield	{11,170 -23 {22,528 -7 {8,225 -1			
1979 (Sept 1979)		73,281 } (69510)		11.88 %
1979 (Oct 1979)	47,008	75,106 }	62.58 %	14.67 %
1980 (Sept 1979)		73,281 71,750		

Note:

2000	101,832	(101,935 - 103)	T-2000 Plan (1975) 10-24-75 Version
2000	~95,000		T-2000 Plan April 1974 Version
2000	127,750	(p 8) Metro Plan	Bkgd Report (Dec. 1979)

DWELLING UNITS BY STRUCTURE TYPE BY CENSUS TRACT
LCOG RESEARCH SECTION
SOURCE 1977 METRO PARCEL FILE-JANUARY 1, 1977 ASSESSED VALUES

TRACT	Duplex	Single Family	Multi-Family	X-Mobile home	TOTAL
18	134	1,363	54	188	1,739
19	536	1,759	369	607	3,271
20	242	1,523	221	7	1,993
21	280	1,240	1,107	202	2,829
22	128	776	11	384	1,299
23	176	1,667	18	116	1,977
24	166	2,502	14	25	2,707
25	116	1,046	12	373	1,547
26	140	742	14	113	1,009
27	88	910	0	3	1,001
28	170	1,100	302	21	1,593
29	276	1,318	458	61	2,113
30	74	816	218	37	1,145
31	244	1,550	475	0	2,269
32	428	1,172	661	28	2,289
33	150	1,880	534	163	2,727
34	82	1,438	311	44	1,875
35	28	604	51	156	839
36	32	613	57	511	1,213
37	24	295	150	0	469
38	212	259	2,300	0	2,771
39	90	213	646	0	949
40	88	411	589	33	1,121
41	146	1,189	91	21	1,447
42	98	649	694	65	1,506
43	100	1,433	490	80	2,103
44	266	2,742	1,024	239	4,271
45	270	1,253	1,016	1	2,540
46	142	1,000	9	0	1,151
47	154	1,008	335	0	1,497
48	100	845	896	0	1,841
49	88	1,263	186	0	1,537
50	210	1,285	148	1	1,644
51	130	964	178	0	1,272
52	94	564	128	0	786
53	92	748	14	1	855
54	54	1,158	344	2	1,558
TAL	5,843	41,298	14,125	3,482	64,753
[illegible]	5,843	41,298	14,125	3,482	[illegible]

Attachment B

DWELLING UNITS BY STRUCTURE TYPE BY TRACT
LCOG RESEARCH SECTION
SOURCE 1978 METRO PARCEL FILE- ~~JANUARY 1, 1979~~ ASSESSED VALUES

DATE- ~~11/06/79~~
PAGE- 1

TOTAL OF NUMBER-OF-UNITS FOR LAND-USE

~~CITY~~ - LANE CO

TEMP-TRACT	1111 Single Family Housing	1120 Duplex (2 families)	1132 Apt. (1-4 units)	1133 Apt. (5-19 units)	1134 Apt. (≥20 units)	1150 Trailer House (not in Trailer Park)	1400 Mobile Home Park or Court	TOTAL
	0	4	0	0	0	0	0	4
11	23	0	0	0	0	1	0	24
18	104	0	0	0	0	9	33	146
19	10	0	0	0	0	0	0	10
20	1,042	78	4	0	0	6	0	1,130
21	858	50	7	0	0	14	0	929
22	301	18	13	0	0	69	149	550
23	1,567	184	12	6	0	27	84	1,880
24	2,506	164	14	0	0	28	0	2,712
25	6	2	0	0	0	0	0	8
26	21	0	0	0	0	0	0	21
27	914	88	0	0	0	3	0	1,005
28	1,092	166	6	15	20	22	0	1,321
29	4	0	0	0	0	0	58	62
30	53	6	35	107	0	0	0	201
31	406	44	0	16	0	1	0	467
32	362	62	0	0	0	2	0	426
35	388	14	0	0	0	144	0	546
36	201	18	5	6	0	33	469	732
40	8	0	0	0	0	0	0	8
41	1,179	134	78	13	0	13	6	1,423
42	8	0	0	0	0	0	0	8
44	58	6	0	0	0	2	0	66
45	2	0	0	0	0	0	0	2
46	4	0	0	0	0	0	0	4
47	3	0	0	0	0	0	0	3
49	12	0	0	0	0	0	0	12
50	9	2	0	0	0	1	0	12
53	19	4	0	0	0	0	0	23
54	10	0	0	0	0	0	0	10
TOTAL	11,170	1,044	174	163	20	375	799	13,745

** TOTAL RECORDS IN THE CATEGORY (CITY - LANE CO.) = 12,163

Attachment B

12/20 Claire , John Kuglinger

Most accurate DU count = Parcel File

NPDC projections done by N Yrs - mostly

Could send occupancy studies 78,79 vacancy rates by Zip Codes

78-79 Housing Survey had a question on primary & secondary source

T-2000 Pop/HH = 2.75] 2.33] New

Population Projections

~~1980~~ T-2000 277,000 pop prediction now considered low

1980 low fertility climbing faster

76, 77, 78, 79 DUs

Metro wide latest year 2000 DU projections - not by CT

Claire + John will send

(1) ~~a~~ Local DU ~~pr~~ inventories for ~~80~~ past yrs other than 1978 (this sheet for 1976, 1977, maybe 1979) - with land Use Code interpretations

(2) Revised areawide Year 2000 DU projections.

I can decide to allocate to CT as per ~~my~~ the original T-2000 allocations which they sent, or maybe to increase densities in the core area more than outlying. Areawide totals broken down by SF, MF etc

(3) Metro Area total population estimates ("latest and greatest") for 1980, 85, 90 and some recent past or present years (asked for 1976, 77, 78, 79,)

will use latest population to "grow" total ~~so~~ dwelling units, or maybe SF DUs

12/21 687-4283

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
1979
AIR QUALITY CONTROL

DWELLING UNITS BY STRUCTURE TYPE BY TRACT
LCOG RESEARCH SECTION
SOURCE 1978 METRO PARCEL FILE-JANUARY 1, 1978 ASSESSED VALUES

DATE- 11/06/79

TOTAL OF NUMBER-OF-UNITS FOR LAND-USE

TEMP-TRACT	1111 SFD	1120	1132	1133	1134	1150	1400	TOTAL
CITY - SPR								
	1	0	0	0	0	0	0	1
18	1,214	194	19	73	0	5	106	1,611
19	1,830	556	113	198	62	231	428	3,418
20	500	166	6	211	0	1	0	884
21	379	332	37	931	132	0	185	1,996
32	329	400	61	518	78	7	20	1,913
33	1,889	140	66	458	27	3	160	2,743
34	1,444	84	39	294	24	5	39	1,929
35	139	14	7	44	0	2	0	206
TOTAL	8,225	1,886	348	2,727	323	254	938	14,701

** TOTAL RECORDS IN THE CATEGORY (CITY - SPR) = 9,873

GRAND (CT16-54)=	41,923	6,353	3,181	8,347	2,270	653	2,805	65,532
								− 45
								65,487

A-260

Attachment B

TOTAL OF NUMBER-OF-UNITS Land Use Codes 1 = Resid FOR LAND-USE

TEMP-TRACT	1111 SFD R	1120	1132	1133	1134	1150	1400	TOTAL
CITY - EUG								
	0	0	8	0	0	0	0	8
10	7	0	0	0	0	0	0	7
11	0	0	24	92	0	0	0	116
22	516	126	0	0	0	0	166	808
25	1,122	168	7	0	0	5	355	1,657
26	824	164	0	14	0	4	107	1,113
28	15	6	19	242	0	0	0	282
29	1,367	332	263	118	70	4	0	2,154
30	791	102	26	40	0	0	37	996
31	1,204	246	69	218	172	0	0	1,909
32	1	0	0	0	0	0	0	1
36	372	12	40	0	0	2	0	426
37	292	26	23	40	87	0	0	468
38	264	212	262	1,316	402	0	0	2,456
39	210	90	177	380	91	0	0	948
40	405	86	56	142	396	0	33	1,118
41	15	6	0	0	0	0	0	21
42	644	100	171	437	81	2	63	1,498
43	1,487	114	148	122	66	4	76	2,017
44	2,929	297	628	402	0	1	231	4,488
45	1,250	270	190	588	242	1	0	2,541
46	1,001	144	4	5	0	0	0	1,154
47	1,011	148	42	181	101	0	0	1,483
48	847	98	201	433	74	0	0	1,653
49	1,261	84	23	114	64	0	0	1,546
50	1,324	216	36	45	37	0	0	1,658
51	968	128	2	182	0	0	0	1,280
52	582	100	8	100	24	0	0	814
53	726	88	14	0	0	1	0	829
54	1,093	60	218	246	20	0	0	1,637
TOTAL	22,528	3,423	2,659	5,457	1,927	24	1,069	37,086

** TOTAL RECORDS IN THE CATEGORY (CITY - EUG) = 25,966

Attachment B

ATTACHMENT B

LANE COUNTY

1980 POPULATION AND HOUSING ESTIMATES BY CENSUS TRACT[1]

Census Tract	Population	DU's Housing	Census Tract	Population	DU's Housing	
1	5521	2045	28	4730	1596	
2	3820	1433	29	6672	2402	
3	1755	662	30	4460	1609	
4	8630	3244	31	7485	2572	
5	859	317	32	5952	2599	
6	1963	734	33	6675	2783	
7	8498	3186	34	5066	2071	
8	1466	549	35	2371	848	
9	8995	3399	36	2942	1371	
10	5155	1983	37	4140[2]	449	
11	4267	1643	38	6012	2713	
12	5980	2218	39	2671	1219	
13	5472	2038	40	2961	1335	
14	2175	808	41	4306	1462	
15	5099	1934	42	3611	1575	
16	3706	1375	43	6503	2373	
17	4334	1612	44	16359	5750	
18	8048	2618	45	5652	2810	
19	11236	3969	46	3142	1216	
20	6157	2175	47	3795	1545	
21	7304	2996	48	4756	1909	
22	4141	1587	49	4564	1599	
23	5553	2043	50	4894	1823	
24	7757	2788	51	3581	1301	
25	6049	2306	52	2254	862	
26	3684	1349	53	2461	917	
27	2979	1003	54	4577	1738	
			TOTAL	273195	102461	CT 1-54
				77695	-29180	-CT 1-17
				195,500	73281	CT 18-54

[1] 1970 Census Tracts

[2] 2,989 persons in group quarters

SOURCE: L-COG Research Section, [redacted]

APPENDIX B

LCOG Lane Council of Governments
NORTH PLAZA LEVEL PSB / 125 EIGHTH AVENUE EAST / EUGENE, OREGON 97401 / TELEPHONE (503) 687-4283

December 26, 1979

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
1979
AIR QUALITY CONTROL

Mr. Bob Gay
Department of Environmental Quality
State of Oregon
P. O. Box 1760
Portland, Oregon 97207

Dear Bob:

As per your telephone request of December 20, I am forwarding several documents you may find of value. These items include:

1. Dwelling Units by Structure Type by Census Tract, 1976 and 1977.

2. 1980 Population and Housing Estimates by Census Tract (Note: These are September, 1979 estimates).

3. Land Use Codes (see page 2 for explanation of residential land use codes).

4. Population, Households and Employment (particularly, see pages 2, 19 and 41).

5. Draft Metro Area General Plan Background Report (see, particularly, pages 8 and 10).

As I indicated in our telephone conversations, the population and dwelling unit projections used in development of the 2000 Transportation Plan are low when compared with more recent projections. Furthermore, the geographic distribution of dwelling units assumed in the Transportation Plan is significantly different from the allocations made in the Metro Area General Plan.

Allocation of dwelling units in the Metro Plan was made according to 71 analysis zones rather than by census tract. This allocation was made according to residential structure type, and, in the near future, these Year 2000 allocations will be integrated into our computer files by individual parcel. This would allow us to produce future dwelling units by structure type for census tracts or two-kilometer grids. However, allocations of future land use are now readily available only according to analysis zones. A copy of the map depicting these zones is attached.

Because of your urgent need for somewhat more accurate projections of Year 2000 dwelling units by census tract, I developed some adjustments which could be applied to the dwelling unit projections in the Transportation Plan. These adjustments result in an increase of 27,400 dwelling units over the Transportation Plan projections. These adjustments were made on a gross basis and were done without review and assistance of the

Metro Plan staff which did the more recent dwelling unit allocations. Errors are almost certain because of the assumptions and estimates I made to comply with your time frame. It is my feeling that these adjustment figures will provide a somewhat more accurate geographical distribution of dwelling units than would the Transportation Plan by itself. The attached memo indicates these adjustment figures.

It is unfortunate we were not made fully aware of your data needs at an earlier date because we probably could have provided you with more accurate, useful information. In fact, some of the data could have been provided according to two-kilometer grids directly, thus avoiding the intermediate step of dealing with census tracts.

If you have any questions, please feel free to contact me.

Sincerely,

John Replinger

John Replinger
Associate Planner
Transportation

JR:rl/W1&2
Enclosures

APPENDIX B

LCOG Lane Council of Governments

NORTH PLAZA LEVEL PSB / 125 EIGHTH AVENUE EAST / EUGENE, OREGON 97401 / TELEPHONE (503) 687-4283

MEMORANDUM

December 26, 1979

TO: Bob Gay

FROM: John Replinger JR

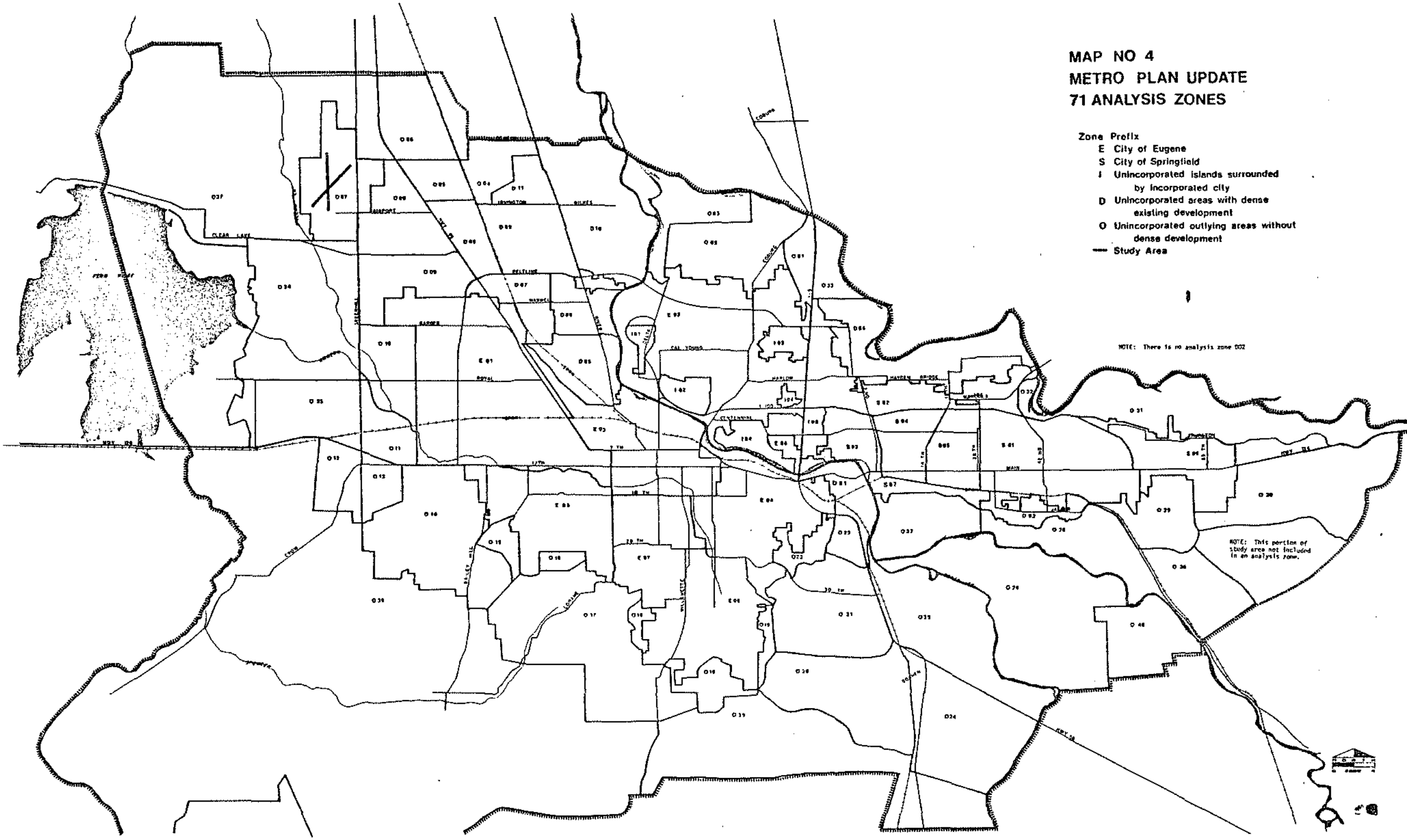
SUBJECT: Adjustments to 2000 Transportation Plan Dwelling Unit Projections

These adjustments to the Year 2000 dwelling unit projections for the 2000 Transportation Plan will make it more closely resemble the Metro Area General Plan dwelling unit projections for Year 2000.

Please note: Much more accurate projections of Year 2000 dwelling units by census tract will be available in spring, 1980.

Census Tract	DU Adjustment	Census Tract	DU Adjustment	Census Tract	DU Adjustment
10	+ 600	30	- 500	43	+1,700
18	+5,800	31	- 500	44	+2,400
19	+1,400	32	+ 200	45	- 300
20	+1,500	33	+ 100	46	+ 100
21	+1,000	34	+ 100	47	+ 100
22	+3,800	35	+1,900	48	+ 100
23	+1,500	36	0	49	+ 200
24	+1,500	37	0	50	+ 600
25	+2,500	38	- ~~200~~ 700	51	+ 300
26	+1,000	39	-1,200	52	+ 300
27	+ 400	40	- 400	53	+ 200
28	+ 400	41	+ 200	54	+1,600
29	- 500	42	0		

JR:rl/W3


MAP NO 4
METRO PLAN UPDATE
71 ANALYSIS ZONES
Zone Prefix
E City of Eugene
S City of Springfield
I Unincorporated islands surrounded by incorporated city
D Unincorporated areas with dense existing development
O Unincorporated outlying areas without dense development
Study Area
NOTE: There is no analysis zone D02
NOTE: This portion of study area not included in an analysis zone.

Year 2000 ALLOCATIONS AS PER T-2000 PLAN

Total Pop By Census Tract		ODOT	TZONE	TPOP		GQ	TOTAL DWELLING UNITS DUS	5+	16-65	Labor Force LF	AUTOS	Total DUs Per CT	10/24/76 (CLESAT99)	Adjusted Yr 2000 DUs
TRACT		225	1002	116		0	31	113	76	61	66	103	+600	703
10		227	1003	253	369	0	72	238	170	115	145			
	*	23	1801	2089		0	679	1927	1429	839	1211			
		25	1802	149		0	52	143	99	74	87			
		27	1803	1508		0	500	1393	1031	611	876			
TRACT 18		28	1804	2309		0	735	2129	1579	926	1335	3025	+5800	8825
	*	29	1805	917	8684	0	400	848	625	377	552			
		30	1806	403		0	117	376	273	174	231			
		31	1807	1156		0	500	1069	789	471	696			
		32	1808	153		0	42	147	102	76	87			
		33	1901	1330		0	526	1229	909	540	790			
		34	1902	0		0	0	0	0	0	0			
		35	1903	531		0	200	494	361	225	313			
TRACT 19		36	1904	2245	9214	90	848	2070	1563	917	1279	3567	+1400	4967
		37	1905	1205		0	424	1134	823	491	705			
		38	1906	1458		0	569	1347	996	590	864			
		39	1907	2445		0	1000	2254	1672	979	1460			
	*	40	2001	1109		0	350	1025	757	453	641			
5641	*	41	2002	1506		0	466	1391	1029	609	868			
	*	42	2003	2175	9024	98	703	2006	1488	873	1210	3012	+1500	4512
	*	43	2004	658		0	226	611	448	275	384			
	*	44	2005	3593		0	1267	3309	2459	1432	2103			
	*	45	2101	286		0	113	269	193	128	170			
	*	46	2102	1852		0	609	1709	1267	746	1074			
11,366		47	2103	4085		0	1607	3761	2797	1626	2425	4286	+1000	5286
		48	2104	0		0	0	0	0	0	0			
	*	49	2105	2964		0	1240	2731	2028	1184	1775			
	*	50	2106	2179		0	717	2009	1491	875	1265			
	*	51	2201	1101		0	400	1018	752	450	647			
	*	52	2202	2201	6604	0	800	2030	1506	884	1293	2400	+3800	6200
22.	*	53	2203	3302		0	1200	3041	2260	1318	1940			
	*	54	2301	3302		90	959	3041	2260	1318	1843			
	*	55	2302	2690	9756	8	852	2479	1840	1076	1550	3088	+1500	4588
23.	*	56	2303	3764		0	1277	3466	2577	1500	2192			
	*	57	2401	2955		0	931	2723	2022	1181	1707			
	*	58	2402	1123		0	388	1038	767	459	656			
	*	59	2403	350		0	104	328	237	154	201			
24.		60	2404	3044	12084	0	949	2804	2083	1216	1756	3850	+1500	5350
		61	2405	2248		0	712	2073	1538	902	1299			
		62	2406	2364		0	766	2179	1618	948	1370			
		63	2407	0		0	0	0	0	0	0			
		64	2501	150		0	44	144	99	74	86			
		65	2502	2630		0	900	2424	1799	1052	1534			
25.		66	2503	1618	9424	0	481	1494	1106	654	928	3571	+2500	6071
		67	2504	2406		0	1006	2218	1646	964	1441			
	*	68	2505	2598		0	1133	2394	1778	1040	1566			
		69	2506	22		0	7	26	12	24	13			
		70	2601	42		0	13	45	25	31	24			
		71	2602	190		0	60	181	127	90	110			
26.		72	2603	2414	6579	10	920	2225	1652	968	1422	2412	+1000	3412
		73	2604	2457		115	833	2265	1681	984	1373			
		74	2605	1476		0	581	1363	1009	598	876			
		75	2701	2172	4047	0	647	2003	1486	872	1247			
27.		76	2702	1875		0	558	1730	1282	755	1076	1205	+400	1605
		77	2801	1654		96	714	1527	1131	668	946			
28.		78	2802	1059	5025	0	383	979	723	433	623	1791	+400	2191
		79	2803	2312		0	689	2132	1582	927	1327			
		80	2901	2547		13	1126	2347	1743	1020	1531			

ATTACHMENT B

DU

		81	2902	2236		0	666	2062	1530	898	1233			
		82	2903	1849		0	550	1705	1264	745	1061			7778
29.		83	2904	2722	20498	0	856	2508	1863	1089	1571	8278	-500	
	*	84	2905	6744		0	3072	6204	4619	2675	4091			
	*	85	2906	4400		0	2008	4050	3012	1750	2670			
		86	3001	1685		90	474	1555	1152	680	915			
	*	87	3002	3824		0	1390	3521	2618	1523	2247			
30.	*	88	3003	2718	8892	0	983	2505	1860	1087	1597	3108	-500	2608
		89	3004	665		0	256	617	453	278	394			
		90	3005	0		0	0	0	0	0	0			
		91	3101	2533		263	967	2335	1733	1014	1363			
31		92	3102	3630		90	1062	3343	2485	1447	2033			
		93	3103	2774	10488	0	994	2556	1898	1109	1627	3618	-500	3118
	*	94	3104	394		0	172	368	267	171	237			
	*	95	3105	587		0	256	545	399	247	354			
	*	96	3106	570		0	167	530	387	240	327			
		97	3107	0		0	0	0	0	0	0			
		98	3201	1434		156	458	1325	980	581	750			
		99	3202	1452		0	456	1341	992	588	838			
32.	*	100	3203	1605	6651	0	700	1482	1097	648	967	2549	+200	2749
		101	3204	1782		90	756	1644	1219	719	1023			
	*	102	3205	378		0	179	353	256	165	231			
		103	3301	2631		0	832	2425	1800	1053	1520			
		104	3302	1079		90	337	997	736	441	577			
		105	3303	1012	8051	0	358	936	691	415	593			
33		106	3304	1000		0	324	925	682	410	579			
		107	3305	610		0	197	566	415	256	353	2773	+100	2873
		108	3306	760		0	316	704	518	315	455			
		109	3307	141		0	61	136	93	71	85			
		110	3308	175		5	67	167	117	85	101			
		111	3309	643		0	281	597	438	269	388			
	*	112	3401	1674		0	730	1545	1144	676	1009			
		113	3402	1032		0	398	954	704	422	611			
		114	3403	1796	6269	10	598	1657	1228	724	1039	2278	+100	2378
34.		115	3404	1487		50	450	1374	1016	602	809			
		116	3405	23		0	8	27	12	24	13			
		117	3406	257		0	94	242	173	117	151			
		118	3501	651		0	195	604	443	272	374			
35	*	119	3502	2459		0	766	2267	1683	986	1418			
		120	3503	9	4111	0	3	14	3	19	5	1343	+1900	3243
		121	3504	70		0	24	70	45	43	41			
	*	122	3505	922		0	355	853	629	379	546			
		123	3601	548		0	193	510	372	231	321			
		124	3602	220		0	90	208	147	102	131			
36		125	3603	0		0	0	0	0	0	0			
		126	3604	4132		0	1260	3604	2829	1644	2378			
		127	3605	825	6347	0	400	764	562	341	505	2141	+0	2141
		128	3606	203		0	57	192	136	96	116			
		129	3607	6		0	2	11	1	13	3			
		130	3608	110		0	29	107	72	58	62			
	*	131	3609	303		0	110	284	204	135	178			
	*	132	3701	556		0	303	517	378	235	348			
		133	3702	534	4171	0	187	497	363	226	312			658
37.		134	3703	1799		1307	163	1660	1230	725	287	658	+0	
		135	3704	1282		1282	0	1185	876	521	0			
		136	3801	98		72	12	96	64	54	16			
		137	3802	1294		626	493	1196	884	526	444			
38 6953	*	138	3803	1729		581	875	1592	1179	696	767	3825	-700	3125
	*	139	3804	1268		56	885	1172	866	516	804			
					6953									

*	140	3805	2568		527	1560	2367	1757	1028	1369			
	141	3901	14		14	0	19	6	21	0			
	142	3902	22		22	0	26	12	24	0			
	143	3903	119		119	0	115	78	62	0			
*	144	3904	369		118	200	345	250	161	170			
*	145	3905	251		0	200	237	169	115	170			
	146	3906	0		0	0	0	0	0	0			
	147	3907	0		0	0	0	0	0	0	3536	-1200	2336
	148	3908	0	4741	0	0	0	0	0	0			
	149	3909	128		0	86	124	85	66	83			
*	150	3910	1248		48	998	1154	852	507	822			
*	151	3911	1964		74	1578	1812	1343	790	1295			
*	152	3912	345		20	263	323	233	151	221			
*	153	3913	281		0	211	264	189	126	188			
*	154	4001	1099		90	801	1017	750	449	683			
*	155	4002	574	3770	0	407	533	390	242	378	1873	-400	1473
	156	4003	2097		47	665	1934	1435	843	1188			
	157	4101	1342		14	394	1240	917	545	762			
	158	4102	690		0	203	640	470	288	395			
	159	4103	1451	5558	0	431	1340	992	588	833	1642	+200	1842
	160	4104	967		0	286	895	660	397	555			
	161	4105	1108		0	328	1025	756	452	636			
*	162	4201	883		44	444	817	602	364	522			
	163	4202	262		23	120	247	176	119	147			
	164	4203	760		0	550	704	518	315	503			
	165	4204	195	3471	88	50	185	130	92	65	1980	+0	1980
	166	4205	0		0	0	0	0	0	0			
	167	4206	0		0	0	0	0	0	0			
	168	4207	0		0	0	0	0	0	0			
*	169	4208	1871		0	816	1726	1280	753	1127			
	170	4301	200		0	56	190	134	94	114			
	171	4302	1071		0	472	990	731	438	646			
	172	4303	1171		0	347	1083	780	466	672			
	173	4304	1347		0	585	1245	920	547	811			
	174	4305	881		0	260	815	601	363	505			
	175	4306	1048	4774	0	310	969	715	429	601	3628	+1700	5328
	176	4307	0		0	0	0	0	0	0			
	177	4308	1014		0	300	938	692	416	582			
	178	4309	522		0	248	486	355	222	319			
	179	4310	0		0	0	0	0	0	0			
*	180	4311	498		0	181	464	338	212	293			
*	181	4312	2022		16	869	1865	1383	813	1208			
*	182	4401	3636		143	1470	3348	2489	1449	2094			
*	183	4402	2696		0	980	2485	1844	1078	1584			
	184	4403	2458		9	811	2266	1682	985	1422			
*	185	4404	4234	20623	0	1539	3898	2899	1685	2487	7387	+2400	9787
	186	4405	4183		194	1598	3851	2864	1665	2374			
	187	4406	1451		0	431	1340	992	588	833			
	223	4407	1965		90	558	1813	1344	791	1076			
	188	4501	877		32	344	812	598	361	504			
	189	4502	1000		15	312	925	682	410	569			
*	190	4503	2141		104	871	1975	1465	860	1224			
	191	4504	844	7341	0	381	782	575	348	511	3143	-300	2843
	192	4505	420		0	156	392	285	181	247			
	193	4506	1052		0	375	973	718	430	617			
*	194	4507	1007		0	704	931	687	413	662			
	195	4601	1848		0	560	1705	1264	745	1063			
	196	4602	674	4237	0	193	623	459	281	386	1268	+100	1368
	197	4603	1715		0	510	1583	1173	692	984			

ATTACHMENT B

		TPOP		GQ	TDUS	5+	16-65	LF	AUTOS			
198	4701	1241		65	436	1147	848	505	693			
199	4702	894	4227	0	264	827	610	368	513			
200	4703	1114		80	306	1031	761	455	593	1516	+100	1616
201	4704	1275		0	512	1179	871	518	759			
202	4801	1564		233	803	1443	1069	632	848			
203	4802	664		0	228	616	452	277	337			
* 204	4803	1112	5174	0	505	1029	759	454	674			
205	4804	12		0	4	17	5	20	7	2082	+100	2182
206	4805	1822		0	542	1681	1246	734	1046			
207	4901	1048	5699	0	310	969	715	429	601			
208	4902	1696		237	600	1566	1160	685	872	1808	+200	2008
209	4903	2955		160	898	2723	2022	1181	1618			
210	5001	1781		0	567	1644	1218	718	1030			
211	5002	1603	7045	0	524	1480	1096	648	930			2973
* 212	5003	2440		0	887	2249	1670	978	1434	2372	+600	
213	5004	1224		8	394	1132	836	498	705			
214	5101	1318		0	451	1218	900	535	769			
215	5102	1440		189	371	1330	984	583	718	1375	+300	1675
216	5103	897	4369	0	265	830	612	369	514			
* 217	5104	714		0	288	662	486	297	425			
218	5201	1046		23	511	967	714	428	630			
* 219	5202	2828	3874	90	968	2605	1935	1131	1603	1479	+300	1779
220	5301	1283		97	360	1186	876	521	682			
221	5302	2619	3902	0	781	2414	1793	1049	1503	1141	+200	1341
222	5401	1649		0	498	1522	1127	666	948			
* 223	5402	2683		0	836	2473	1836	1074	1548	2822	+1600	4433
* 224	5403	2979	7858	0	1299	2745	2038	1190	1795			
225	5404	547		0	189	509	372	231	319	101933	+27,400	129,333 TOTAL
224 10/24/75		[illegible]		8,361	[illegible]	255,883	189,342	112,218	158,771		(CLESAT20)	

TZONE	ODOT	AGF	MNCN	MFEM	NMEM	WHSL	GAF	CMSV	PQSV	EDUC	ST1E	ST2E
1002	226	0	0	213	63	7	75	75	0	0	150	283
1003	227	11	0	0	0	2	0	0	20	85	105	13
1801	25	3	51	9	0	0	8	6	0	103	117	63
1802	26	0	5	0	0	0	0	0	0	15	15	5
1803	27	0	28	50	0	0	112	3	2	107	224	78
1804	28	0	51	0	0	0	4	0	0	56	60	51
1805	29	0	28	0	0	0	144	85	0	214	433	28
1806	30	0	9	0	0	0	0	0	0	0	0	9
1807	31	0	37	8	0	9	173	78	0	0	251	54
1808	32	0	0	0	0	0	0	0	0	0	0	0
1901	33	0	14	17	0	0	107	5	0	125	237	31
1902	34	0	0	3407	0	0	0	0	0	66	66	3407
1903	35	0	0	296	20	0	0	5	0	43	48	316
1904	36	15	28	354	33	0	104	32	6	0	142	430
1905	37	0	14	77	14	0	104	0	14	0	118	105
1906	38	0	23	246	63	42	139	0	6	22	167	374
1907	39	0	75	89	0	0	58	21	11	0	90	164
2001	40	0	9	359	65	0	28	0	0	107	135	433
2002	41	0	19	3	0	0	0	0	0	99	99	22
2003	42	0	54	0	0	5	250	0	0	0	250	59
2004	43	0	9	0	0	0	109	77	0	0	186	9
2005	44	0	98	100	5	24	21	6	0	279	306	227
2101	45	0	9	138	63	72	142	0	0	0	142	282
2102	46	0	19	56	11	0	89	18	4	0	111	86
2103	47	0	122	0	0	0	229	165	6	5	405	122
2104	48	0	0	0	63	72	210	123	0	0	333	135
2105	49	0	89	352	177	199	63	0	0	75	138	817
2106	50	10	42	8	0	0	58	82	26	35	201	60
2201	51	0	117	15	0	0	150	80	0	103	333	133

Appendix 4.6.3.1--3

Unpaved Road Dust Inventory

M E M O R A N D U M

May 8, 1979

TO: Joe Lassiter, Lane Regional Air Pollution Authority

FROM: Terry Smith

SUBJECT: EMISSIONS INVENTORY FOR GRAVEL ROADS AND ALLEYS IN THE CITY OF EUGENE

After a brief inspection, it became apparent that the Seton, Johnson, and Odell (SJO) Emissions Inventory For Unpaved Roads was unsatisfactory. SJO estimated emissions by applying a uniform speed and traffic volume to all unpaved sections in Eugene and Springfield. The values used--20 miles per hour and 125 vehicles per day--were determined from a limited field survey.

The inventory reported here was prepared from a more extensive field survey in which over 65 traffic counts and speed determinations were made. A specific traffic speed and volume were applied to each link to determine the emissions. The effect of this more refined approach is an increase in estimated emissions for Eugene, greater spatial accuracy in the emissions estimates, and the identification of a small number of roads and alleys that are responsible for the bulk of the emissions.

Identification of Unpaved Roads and Alleys and Their Length

Unpaved roads and alleys were identified from a 1977-1978 Road and Alley Survey maintained by the City. For unpaved roads, the computerized survey data includes the length of the link. A few errors exist in this data file, so field checks were made to determine actual conditions. Road segments paved since January 1, 1976, were determined from records of paving activity.

Unpaved alleys are divided into two categories--gravel and unimproved. Only gravel alleys are assessed here, since most unimproved alleys are covered with vegetation and are either impassable or little-used. Alley lengths were obtained from 1,000-scale maps. Maps were also used to locate each link in its inventory grid.

Determination of Traffic Volumes and Travel Speeds

Average weekday traffic (AWDT) counts were made with standard pneumatic traffic counters. Speed determinations were made by the floating car technique. Although a large number of traffic counts and speed determinations were made, there were many links that had to be estimated. A systematic scheme for making these estimates was made. A set of typical values was developed for different road types from actual measurements and applied to all unmeasured links.

AWDT assignments were made based on land use around the link. In residential areas, aerial photographs were used to determine the number of dwelling units using a road. The standard assumption of 10 counts per unit was assigned to those roads. In commercial areas, assignments were made by inspection of land use and actual counts made in similar areas. Since these areas receive high use, the majority of the traffic counts taken were from these areas. Estimated counts were found to differ significantly from measured values in only six out of 25 cases. Estimated travel speeds from unpaved roads were assigned according to length and type of road based on experience and field data. Long through-sections were assigned higher speeds, while short dead-end sections were assigned low speeds. Since emissions are thought to vary with the square of the speed for speeds under 30 mph, this is probably the greatest source of error in the analysis.

From measured AWDT and speed, alleys were found to fall into three categories: low-use alleys with AWDT equal to 17 and travel speed of 10 mph; medium-use alleys with AWDT equal to 65 and speed of 10 mph; and high-use alleys with AWDT equal to 312 and speed of 15 mph. Low-use alleys were found in single-unit dwelling residential areas. Medium-use alleys were found in areas with a mixture of single- and multiple-unit dwellings or commercial and residential zoning. With a few site-specific exceptions, the high-use alleys are in major traffic corridors, such as the 6th and 7th avenue couplets, and in the University district, high unit-density areas. From this information, the remaining alleys were classified into one of the three categories.

Determination of Annual Emissions

The procedure recommended in AP-42 and used by SJO was used in this analysis to determine daily emissions. Annual emissions calculated by multiplying this value by 365 are not strictly correct, since mid-week traffic counts do not reflect average annual traffic volume. To account for this difference, daily emissions should be multiplied by 330 to get the annual emissions. Therefore, the actual annual emissions are 9.6 percent lower than given here.

Emissions from private roads in Southern Pacific Railroad yards have been included here. The total emissions estimated for three roads is 20.2 tons per year.

Emissions from unpaved roads for future years were determined by subtracting those roads that the City proposes to pave. Traffic volumes were assumed to remain constant for roads remaining unpaved in future years. The future-year case for alleys is based on staff recommendations and does not reflect a formally-adopted program by the City.

Results of the Analysis

Tables 1 and 2 show the grid-by-grid emissions estimates for unpaved roads and gravel alleys. Out of the total of 16.25 miles of unpaved roads, 4.7 miles are responsible for 88 percent of the emissions. Of the 12.4 miles of gravel alleys, 1.58 miles were responsible for 79 percent of emissions.

From cost estimates of a dust abatement paving program, it was found that reductions cost about $3,700 per ton of annual emissions for both high-use roads and alleys. These estimates are based on full paving with asphalt or concrete and installation of storm sewers. Maintenance costs are not included.

TS:pm/Thall

Attachments

TMS

TABLE 1

EMISSIONS FROM GRAVEL ROADS IN EUGENE--4/16/79
Updated with additional traffic counts and emissions from SP yards

Emissions in Tons/Year

Grid #	1976	1978	1983	1985
72	12	8	7	0
73	40	35	11	2
74	29	29	16	0
75	0	-	-	-
76	13	13	3	3
77	0	-	-	-
58	2	2	2	2
59	2	2	2	2
60	83	69	36	23
61	24	20	8	8
62	68	7	7	7
63	21	0	0	0
44	0	0	-	-
45	123	123	0	0
46	37	31	1	1
47	4	4	1	1
48	0	-	-	-
49	0	-	-	-
32	10	10	5	5
33	9	9	9	9
34	5	5	5	5
35	11	8	8	8
19	6	6	6	6
20	2	2	2	2
21	237	237	26	8
TOTALS	753	635	170	92

Total unpaved roads = 16.25 miles (including SP as of 1976)

TS:pm/PW21b7

most of the paving was done in 1976

TABLE 2

EMISSIONS FROM GRAVEL ALLEYS IN EUGENE

Emissions in Tons/Year

Grid #	1976	1977	1985*
61	8	8	1
62	1	1	1
47	30	30	7
48	21	21	5
49	42	42	3
33	1	1	1
34	12	12	5
35	1	1	1
TOTAL	116 Ton/Year	116 Ton/Year	24 Ton/Year

Total of 12.4 miles gravel alleys.

1.58 miles of high-use gravel alleys emit 91.4 tons/year.

*Staff recommendation for use in control strategy development; has not been acted upon by Eugene City Council.

TS:pm/PW21b8

REVISED PRIORITY LIST FOR UNPAVED ROADS
(4/30/79)

Street	From/To	Grid #	Annual Emissions Ton/Year	Tons/mile Priority	Length
Bailey Hill	Stewart to 11th	46	30.0	206	0.5
43rd/N. Shasta Loop		21	211.5	188	1.13
13th	Bertelsen to Ocean	45	8.9	188	0.05
Stewart	Bertelsen to East	45	83.5	163	0.51
43rd	N. Shasta Loop to city limits	21	8.7	149	0.06
Lassen	Haig to Roosevelt	60	20.2	127	0.16
Kintyre	Bethel to end	74	16.4	104	0.16
Rikhoff	Bethel to S.P.R.R.	74	6.5	96	0.07
Martin	Center to Amazon	6	15.2	77	0.20
Pattison	Waite to Berntzen	73	10.1	77	0.13
Dove	Taney to end	73	10.4	65	0.16
Wallis/12th	11th to end	45	30.4	65	0.[illegible]7
Jefferson	Clark to end	61	12.8	60	0.21
Fir Acres	Willagillespie to end	76	10.6	58	0.18
Ogle	Bethel to Allane	60	7.6	58	0.13
Allane	Bethel to Ogle	60	5.6	56	0.10
Fuller	Jay to Echo Hollow	73	7.0	55	0.13
Berntzen	Pattison to Concord	74	6.7	53	0.13
Port	Barger Drive to end	72	6.7	53	0.13
S. Shasta Loop	Barber Drive to city limits	21	9.3	51	0.18
14th	Hayes to Garfield	47	3.4	47	0.07
Dove Lane	Ruskin to end	73	1.7	44	0.09
Highland Oaks	Trillium to Hawkins Lane	32	4.6	36	0.1[illegible]

TS:pm/PW21b5

HIGH-USE ALLEYS RECOMMENDED FOR PAVING

Alley	From/To	AWDT
Orchard Alley	15th to end	880
7th Alley	Madison to Monroe	733
7th Alley	Washington to Jefferson	330
Columbia Alley	17th to 19th	280
Harris Alley	21st to 22nd	270
Kincaid Alley	27th to 28th	190
6th Alley	Polk to Taylor	190
14th Alley	Patterson to Hilyard	150
Oak Alley	23rd to 24th	140
6th Alley	Polk to Taylor to Van Buren	Est.*
6th Alley	Blair to Monroe	Est.
6th Alley	Lawrence to Lincoln	Est.
7th Alley	Washington to Lawrence	Est.
3rd Place Alley	Polk to Blair	Est.
14th Alley	Alder to Kincaid	Est.
15th Alley	Patterson to Hilyard	Est.
Moss Alley	15th to 17th	Est.
Villard Alley	15th to 17th	Est.
Orchard Alley	15th to 17th	Est.
Villard Alley	15th to end	Est.

TS:pm/PW21b6

*Estimated AWDT for high-use alleys was 312, the average for those counted.

ASSUMPTIONS

FOR SPEEDS BETWEEN 0 - 30 MPH

$$e = 0.6(0.81)(\overset{s}{11.2})\left(\frac{S}{30}\right)^2\left(\frac{365-\overset{w}{111}}{365}\right)$$

S	e (lb/vmt)
5 mph	0.1127
10 mph	0.4509
15 mph	1.0146
20 mph	1.8037
25 mph	2.8184
30 mph	4.0584

$$\text{PARTICULATE EMISSIONS (TONS/YR)} = \frac{308\,(e)(VMT)}{2000} = 0.154(e)(VMT)$$

CITY OF SPRINGFIELD
SPRINGFIELD, OREGON 97477

PUBLIC WORKS

346 MAIN STREET
726-3753

July 2, 1980

Ralph Johnston
Technical Services Supervisor
Lane Regional Air Pollution Agency
16 OakWay Mall
Eugene, Oregon 97401

Dear Ralph,

In response to your recent request, the following is a summary of the method used in calculating "1978 Road Dust Emissions" for unpaved streets in the City of Springfield.

For each unpaved street section, an AQMA grid number, section length, average daily traffic volume and 85th percentile vehicle speed were assigned. Where traffic volumes made the process practical, speeds were assigned based on radar sampling. On sections having very low volumes, a standard sedan was driven over the section several times to establish a "comfortable operating speed".

An emissions value in "tons per year" was then computed for each street section using the formula

$$E = \frac{818.2\ V^2A \cdot 365L \cdot 1.10\times10^{-6}}{20^2}$$

where V = 85%tile Vehicle Speed

A = Average Daily Traffic

L = Section Length in Miles

assuming 818.2 grams/vehicle mile and 1.10×10^{-6} tons/gram.

Emission for each AQMA grid were then found by summing the appropriate street section emissions values.

If we may be of further assistance in this matter, please advise.

Sincerely,

Michael A. Kelly

Michael A. Kelly
Director of Public Works

GM/MAK/bj

SPRING FIELD

1978 ROAD DUST EMISSIONS

AQMA GRID #	EMISSIONS TONS/YEAR 1 JANUARY 1978
50	12.52
51	14.74
52	[redacted] 86.02
53	[redacted] 90.80
54	44.84
55	3.91
56	0.14
64	48.94
65	6.69
66	35.66
67	6.00
40	2.2

[redacted]
352.46

RECEIVED
[illegible]
LANE REGIONAL AIR POLLUTION AUTHORITY
17260

TONS/YR.	% OF TOTAL
1.21	<1
9.40	2
5.19	1
5.62	1
8.76	2
34.18	9
9.18	2
40.37	[illegible]
2.4/2.4	1
1.22/6.12	2
33.32	8
5.44	1
5.97	1
19.32	5
5.05	1
0.51/1.52	<1
0.31	[illegible]
1.60	[illegible]
0.51	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

SPRINGFIELD UNPAVED ROAD DUST
EMISSIONS CALCULATED FOR JANUARY 1, 1978

AQMA GRID #	STREET SECTION	TON/YR./MILE	ADT	85% SPEED	SECTION LENGTH	TON/YR.	% OF TOTAL
50	Summit Blvd./Wallace Ln. to Wallace Ct.	4.84	60	10	0.25	1.21	<1
66	Scott Rd./18th St. to 21st St.	52.22	220	17	0.18	9.40	2
65	Lawnridge Ave./Debra Dr. to Roseblossom Dr.	103.80	390	18	0.05	5.19	1
64	West "N" St./Prescott St. to Laura St.	35.13	190	15	0.16	5.62	1
50	Water St./"F" St. to "K" St.	23.38	170	14	0.32	8.76	2
64	Prescott St./Centennial Blvd. to Fairview Dr.	142.42	600	17	0.24	34.18	8
52	34th St./Main St. to S.P.R.R.	24.16	150	14	0.38	9.18	2
52	35th St./Main St. to N. "E" St.	126.16	600	16	0.32	40.37	10
53/67	37th St./Kathryn St. to Industrial St.	18.46	200	15	0.13	2.4/2.4	1
52/66	34th St./Industrial St. to Olympic St.	27.19	230	12	0.27	1.22/6.12	2
53	39th St./Main St. to N. "E" St.	92.56	390	17	0.36	33.32	8
53	41st St./Main St. to Commercial St.	27.20	230	12	0.20	5.41	1
53	47th St./Main St. to Bluebell St.	35.12	190	15	0.17	5.97	1
54	"D" St./49th St. to 51st St.	92.00	230	20	0.21	19.32	5
54	49th St./"C" St. to "E" St.	42.08	200	16	0.12	5.05	1
50/64	Laura St./West "I" St. to Fairview Dr.	4.61	25	15	0.44	0.51/1.52	<1
66	"S" St./17th St. to "Q" St.	59.38	250	17	0.14	8.31	[illegible]
51	Quarry Rd./E/O S. 4th St.	2.76	15	15	0.38	1.05	<1
51	Union St. - S/O Park	2.04	25	10	0.25	0.51	<1
51	So. "B" St.	4.6	25	15	0.10	0.46	<1
51	So. "E" St./3rd St. to 4th St.	4.63	25	15	0.08	0.37	<1
66	17th St./N/O "Q" St.	147.88	450	20	0.08	11.93	[illegible]
54	Nighthawk Ln./W/O Prescott St.	3.73	20	15	0.11	0.41	<1

A-281

AQMA GRID #	STREET SECTION	TON/YR./MILE	ADT	85% SPEED	SECTION LENGTH	TON/YR.	% OF TOTAL
56	"E" St./60th St. to 61st St.	55.50	300	15	0.04	2.22	1
54	57th N/O Main St.	21.00	100	16	0.13	2.73	1
53/67	38th St./S/O Kathryn	27.69	150	15	0.13	1.8/1.8	1
53/67	39th St./S/O Kathryn	27.69	150	15	0.13	1.8/1.8	1
64	Water St./Centennial Blvd. to "N" St.	46.22	250	15	0.09	4.16	<1
50	"I" St./Water St. to Laura St.	9.29	50	15	0.07	0.65	<1
50	"J" St./Water St. to Laura St.	9.29	50	15	0.07	0.65	<1
64	"K" St./Water St. to Kelly St.	9.22	50	15	0.09	0.83	<1
65	"R" St./W/O N. 2nd St.	5.93	50	12	0.15	0.89	<1
64	Hartman St./Harlow Rd. to Darlene St.	14.80	80	15	0.15	2.22	<1
51	"J" St./N. 9th St. to N. 10th St.	3.5	30	12	0.06	0.21	<1
65	10th St./Centennial Blvd. to "N" St.	2.35	20	12	0.17	0.40	<1
52	17th St./Main St. to S. "A" St.	110.89	600	15	0.09	9.98	2
51	S. "B" St./14th St. to 16th St.	36.95	200	15	0.20	7.39	2
52	"C" St./34th St. to 35th St.	29.60	250	12	0.05	1.48	<1
52	S."A" St./18th St. to 24th St.	28.47	120	17	0.38	10.82	3
53	Camellia St./44th St. to 46th St.	30.89	130	17	0.09	2.78	1
53	N."A" St./40th St. to 41st St.	18.44	100	15	0.09	1.66	1
54	N."A" St./54th St. to 55th St.	44.38	240	15	0.08	3.55	1
54	52nd Pl./Main St. to Bluebell	61.70	260	17	0.23	14.19	3
55	60th St./"F" St. to "G" St.	22.14	120	15	0.07	1.55	<1
[illegible]	Wallace Ln./Prescott St. to Summit Blvd.	8.22	100	10	0.09	0.74	<1
53	40th St./Camellia St. to Oregon St.	203.67	620	20	0.09	18.33	4
55/56	"E" St./70th St. to 71st St.	9.33	50	15	0.03	0.14/0.14	<1
52	"E" St./34th St. to 35th St.	11.75	50	17	0.04	0.47	<1
65	7th St./S/O "I" St.	3.50	30	12	0.06	0.21	<1

AQMA GRID #	STREET SECTION	TON/YR./MILE	ADT	85% SPEED	SECTION LENGTH	TON/YR.	% OF TOTAL
[illegible]/53	Oregon St./32nd St. to 40th St.	53.21	200	18	0.56	12.5/17.3	7
50/53	Virginia St./32nd St. to 38th St.	66.53	250	18	0.45	14.97/14.97	7
53	35th St./Main St. to "E" St.	95.81	360	18	0.36	34.49	8
[illegible]	Mt. Vernon St. E/O S. 42nd St.	12.93	70	15	0.17	2.20	1
51	10th St./"F" St. to "G" St.	118.60	500	17	0.04	4.75	1
53/54	Booth Kelly Log Rd. *						
					[illegible]		

*Private road, not in regular use.

UNSURFACED LANE COUNTY ROADS AND DEDICATED PUBLIC ROADS WITHIN THE EUGENE-SPRINGFIELD AQMA - APRIL 1979

1978 EMISSIONS

GRID	MILES	VMT	TONS/YR
6	1.26	44.6	23.8
7	0.52	16.9	9.3
9	0.13	4.4	2.8
10	0.28	11.4	3.4
19	0.55	82.5	51.6
21	2.16	62.8	35.0
22	0.67	13.5	7.6
23	0.14	1.8	0.6
24	1.00	45.0	24.6
35	0.07	1.4	0.1
36	0.42	18.2	3.2
37	0.69	16.9	9.6
39	0.03	1.0	0.4
40	0.11	4.4	1.2
50	0.23	15.5	1.2
51	0.19	3.8	0.7
53	0.04	1.1	0.5
60	0.06	2.0	0.2
61	0.24	17.9	1.4
63	0.21	5.7	2.1
64	0.07	1.1	0.1
[illegible]	[illegible]	1.0	1.1

	GRID	MILES	VMT	TONS/YR
	74	0.42	26.3	6.2
	75	0.02	0.4	—
	79	0.42	4.2	2.7
	87	0.47	10.6	4.8
	88	0.33	12.7	2.8
	89	0.52	31.6	11.8
	101	0.25	6.7	1.2
	102	0.14	3.4	1.7
	103	0.57	30.4	18.2
	TOTAL	12.49	500.0	229.9
(Fox Hollow)		+.45		70.3
		12.94		300.2

PARTICULATE EMISSIONS FROM UNSURFACED LANE COUNTY AND DEDICATED PUBLIC ROADS WITHIN THE EUGENE-SPRINGFIELD AQMA - APRIL 1979

1978 EMISSIONS

D NAME	ROAD #	LENGTH (MILES)	VMT (WEEKDAY)	SPEED (MPH)	PARTICULATE EMISSIONS (TONS/YEAR)	MAP GRID
IZON, W	1281	0.55	22.0	25	9.6	6
GELL LN	DPR	0.07	1.1	10	0.1	64
4	1008	0.29	2.9	20	0.8	37
A	DPR	0.16	4.8	15	0.7	83
LM	3430	0.02	0.2	5	-	101
NNER	DPR	0.09	0.9	15	0.1	102
ANTON*	1256	0.55	82.5	30	51.6	19
OSSOM	1880	0.10	1.0	20	0.3	23
ROOKLYN, N	DPR	0.05	3.5	10	0.2	50
ENTRAL	1009	0.16	3.2	15	0.5	51
RISTENSON	1284	0.38	15.2	30	9.5	6,7
NCORDIA	DPR	0.14	11.2	10	0.8	50
ELAY	DPR	0.40	28.0	30	17.5	103
RRIS/ANE	DPR	0.40	14.0	30	8.8	57
UMMOND	DPR	0.32	12.8	20	3.5	10,24
GEWOOD	DPR	0.03	0.3	10	-	88
LBERT	DPR	0.07	2.1	25	0.9	39,53
LBERT	DPR	0.05	2.5	10	0.2	50,74
[illegible]	DPR	0.21	4.2	25	1.8	22
NT	DPR	0.21	2.1	10	0.1	87
[illegible]	DPR	0.40	12.0	30	7.5	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	20	[illegible]	[illegible]

PARTICULATE EMISSIONS FROM UNSURFACED [illegible]
COUNTY AND DEDICATED PUBLIC ROADS WITHIN THE
EUGENE-SPRINGFIELD AQMA – APRIL 1979
1978 EMISSIONS

ROAD NAME	ROAD #	LENGTH (MILES)	VMT (WEEKDAY)	SPEED (MPH)	PARTICULATE EMISSIONS (TONS/YEAR)	MAP GRID
ICKORY	DPR	0.15	4.5	25	2.0	63
IDDEN LN	DPR	0.13	5.9	15	0.9	10
ONEYSUCKLE	DPR	0.06	1.2	10	0.1	63
OYA	DPR	0.42	25.2	30	15.8	24
AMES LN	DPR	0.10	1.0	20	0.3	103
[illegible]	1378	0.05	1.0	10	0.1	74
AKE PARK	DPR	0.07	1.1	20	0.3	60,74
EBO	DPR	0.05	2.5	30	1.6	102
EDA	3439	0.05	1.0	20	0.3	87,101
INDA LN	DPR	0.11	4.4	20	1.2	40
ONE OAK	DPR	0.28	19.6	25	8.5	89
OOP LN	DPR	0.14	4.9	30	3.1	9,10
c DOUGAL	DPR	0.16	7.2	30	4.5	87
AYNARD, E.	DPR	0.02	0.4	10	—	75
EMORY	DPR	0.12	7.2	20	2.0	88
ERRILL	DPR	0.05	1.5	10	0.1	61
[illegible]	DPR	0.10	3.0	15	0.5	101
YOAK, W.	DPR	0.02	0.4	15	0.1	83
OWL	DPR	0.60	18.0	30	11.3	6
[illegible]	[illegible]	0.24	14.4	10	1.0	61
[illegible]	[illegible]	0.07	1.4	20	0.4	103
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PARTICULATE EMISSIONS FROM UNSURFACED LANE COUNTY AND DEDICATED PUBLIC ROADS WITHIN THE EUGENE-SPRINGFIELD AQMA - APRIL 1979 3/3

1978 EMISSIONS

OAD NAME	ROAD #	LENGTH (MILES)	VMT (WEEKDAY)	SPEED (MPH)	PARTICULATE EMISSIONS (TONS/YEAR)	MAP GRID
IASTA BLVD	DPR	0.03	0.6	20	0.2	51
IAST LOOP S.	DPR	0.16	4.0	15	0.6	21
[illegible]	1871	0.10	5.0	15	0.8	21
PRING BLVD	DPR	0.54	13.5	30	3.4	21
TEVENS LN	DPR	0.05	2.0	15	0.3	61
UNNYSIDE	1375	0.13	3.9	10	0.3	74
EAGUE LP	1868	0.25	6.3	25	2.7	7
THOMAS AVE	DPR	0.08	0.8	10	0.1	87
THUNDERCLOUD	DPR	0.04	0.8	25	0.3	23
UMWALT	DPR	0.10	3.0	15	0.5	101
4TH/HARVEST	1533	0.60	6.0	30	3.8	65,79
8TH AVE. E.	DPR	0.04	0.8	20	0.2	50
1ST AVE. E.	DPR	0.13	3.9	15	0.6	36
[illegible] AVE. E.	DPR	0.13	11.1	15	1.7	36
5TH AVE. E.	DPR	0.16	3.2	20	0.9	36
9TH AVE. E.	DPR	0.07	1.4	10	0.1	35
[illegible]TH AVE. E.	DPR	0.56	11.2	30	7.0	21,22
[illegible]TH AVE. E	DPR	0.60	12.0	30	7.5	21,22
[illegible]	[illegible]	0.66	26.4	30	16.5	21
TOTALS						
[illegible]		3.23	150.2		80.5	
[illegible]		[illegible]	[illegible]		[illegible]	
[illegible]					[illegible]	

Appendix 4.6.4.1--1

Summary of PM Modeling Results

A DESCRIPTION OF THE
EUGENE-SPRINGFIELD AIR QUALITY
MAINTENANCE AREA AIRSHED MODEL

Air Quality Division
Department of Environmental Quality
April, 1979

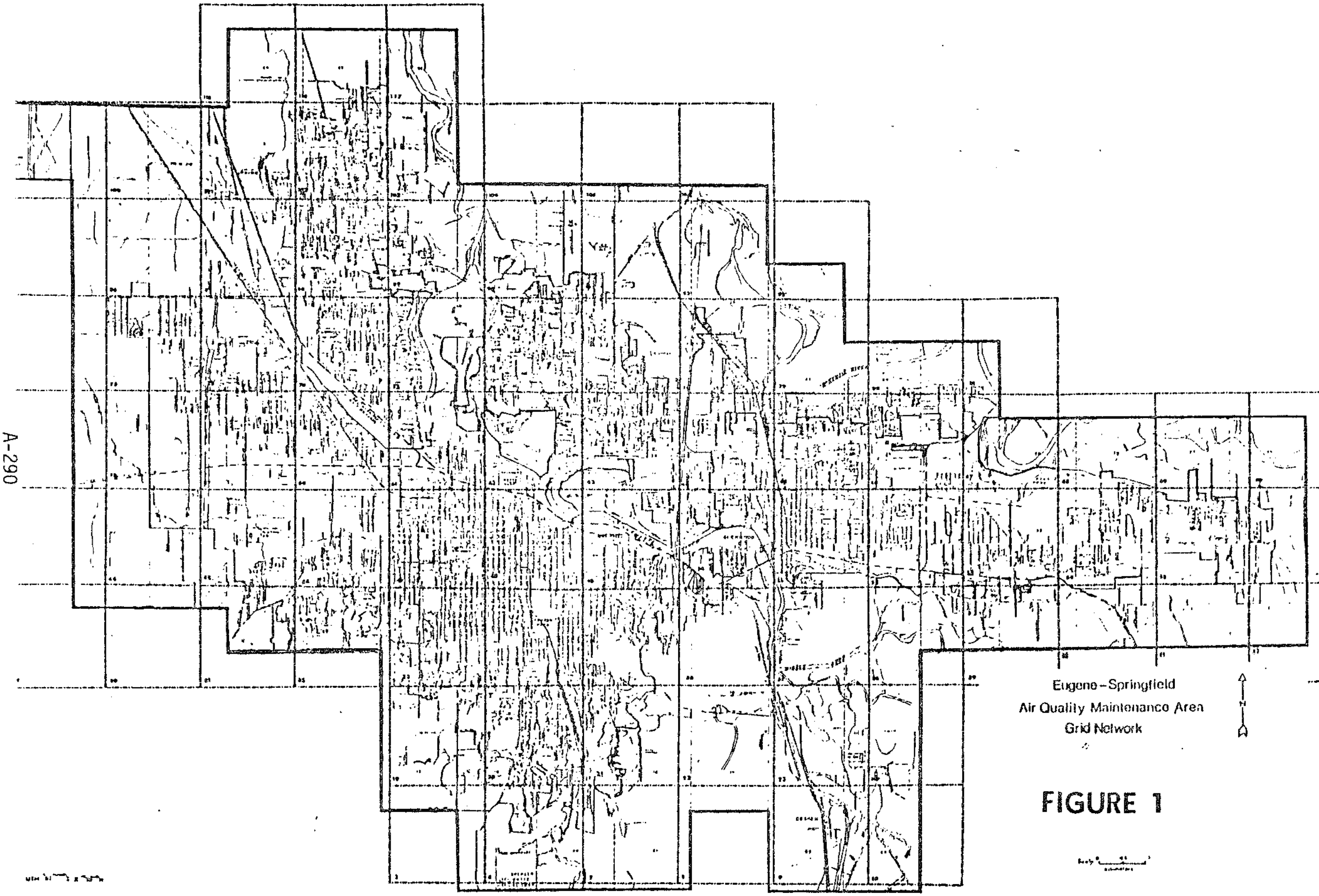
Eugene-Springfield Air Quality Maintenance Area

Airshed Model

Introduction

To assist in the development of control strategies for the Eugene-Springfield Air Quality Maintenance Area (AQMA; see Figure 1), computer simulations of the airshed were made using the Department's GRID model. The mesoscale wind flows induced by the complex terrain necessitated the use of a sophisticated model to accurately predict pollutant concentrations. Existing Gaussion models, CDM, VALLEY and PTMPT, would not be expected to perform as well as GRID in the complex terrain and thus were not utilized.

To provide the flow field input into GRID the model WEST (Winds Extrapolated from Stability and Terrain) was utilized. Observed meteorological conditions were grouped into typical days with each group constituting a typical regime day. The report "Eugene-Springfield Meteorological Regime Analysis 1977" prepared by the Department describes the regimes and the classification process. Wind and stability conditions for each regime day were input to WEST for key stations. With this input WEST developed a divergence free wind field which was used in the GRID model. Figure 2 shows a WEST simulation of a flow pattern.

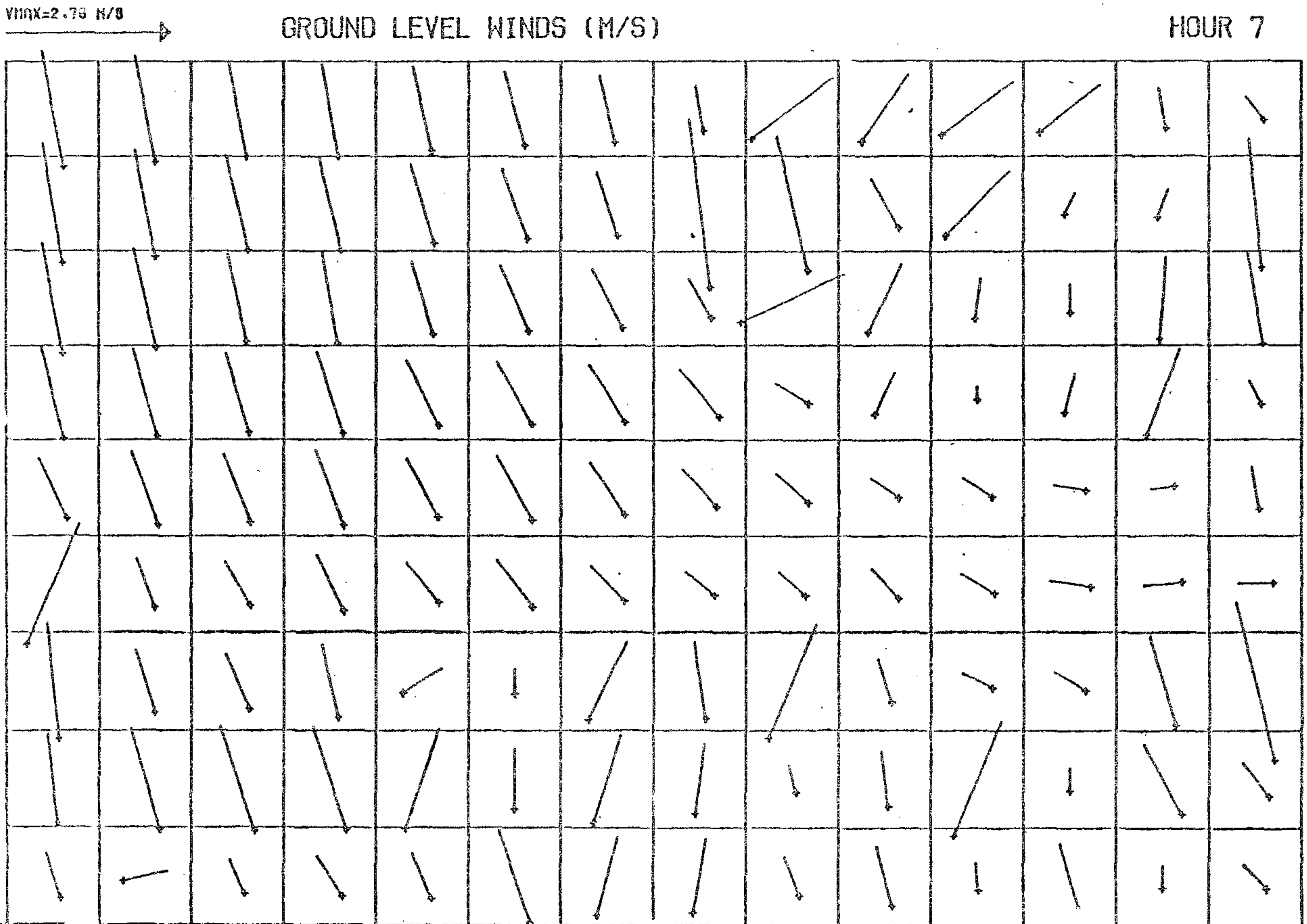


Eugene-Springfield
Air Quality Maintenance Area
Grid Network

FIGURE 1

FIGURE 2

WEST Model Simulated Flow Field



About the GRID Model

Ambient air quality is the result of three basic processes. The first is pollutant emissions; at zero emissions there is no air quality problem. However, this cannot be the only important process, since while pollutant emissions may not vary much from day to day, air quality can show considerable variation. The variability seen in daily air quality is mainly due to atmospheric processes which transport (winds) and disperse (turbulent diffusion) the emissions. A final process that may be a major factor is transformations that occur from chemical reactions among pollutants and atmospheric gases. Additional phenomena that can be included in this last process are: (1) gravitational settling of particulates, (2) absorption of the pollutant on surfaces and (3) rainout and washout of particulates and gases. The atmospheric processes affecting air quality are described through a set of mathematical equations (the model) and these equations are solved with specific emissions and meteorological input data to predict air quality.

The basic equation describing the time rate of change of a pollutant concentration at a given location is given by:

$$\frac{\partial C}{\partial t} = -\vec{\nabla} \cdot \vec{U}C + \vec{\nabla} \cdot \overleftrightarrow{K} \cdot \vec{\nabla} C + S(c) + R(c) \qquad (1)$$

where $\frac{\partial C}{\partial t}$ is the time rate of change of pollutant concentrations at a specific location; $\vec{\nabla} \cdot \vec{U}C$ is the transport of pollutant concentration by the mean wind field; $\vec{\nabla} \cdot \overleftrightarrow{K} \cdot \vec{\nabla} C$ is the dispersion of pollutant concentration by diffusion; S is the rate of pollution emissions; and R is the creation or removal of pollutants by chemical or other transformations.

In the GRID model, the AQMA was divided into a set of cells or grids. A 9 x 14 grid system was established with each grid being 2 kilometers on a side (see Figure 2). Each grid is divided into 5 horizontal layers, the result being 630 distinct cells encompassing the AQMA. Each layer is of a distinct thickness with the surface layer being 50 meters thick. The other layers are, in ascending order, 100, 150, 200 and 250 meters thick. (See Figure 3)

The effects of the complex terrain typical of the region have been incorporated in the GRID model by not allowing any concentration flux into grids that are below ground level and through the use of curvilinear wind fields. The wind is channeled around or over a cell the way it flows in the real atmosphere due to terrain obstructions.

Emissions and diffusion parameters are input into the model and then equation 1 is solved in the grid model using a finite difference approximation. That is, the concentration is updated due to, for example, transport and source emissions in each direction by:

$$C_i^{n+1} = C_i^n + \left[\frac{F^n_{i-1/2} - F^n_{i+1/2}}{\Delta x} + S_i \right] \Delta t$$

where the fluxes $F^n_{i+1/2} = \frac{\Delta x}{2 \Delta t} \left\{ \left[C^n_{i+1} + C^n_i \right] - 1/2 \left[C^n_{i+1} - C^n_i \right] \alpha \right\} \alpha$

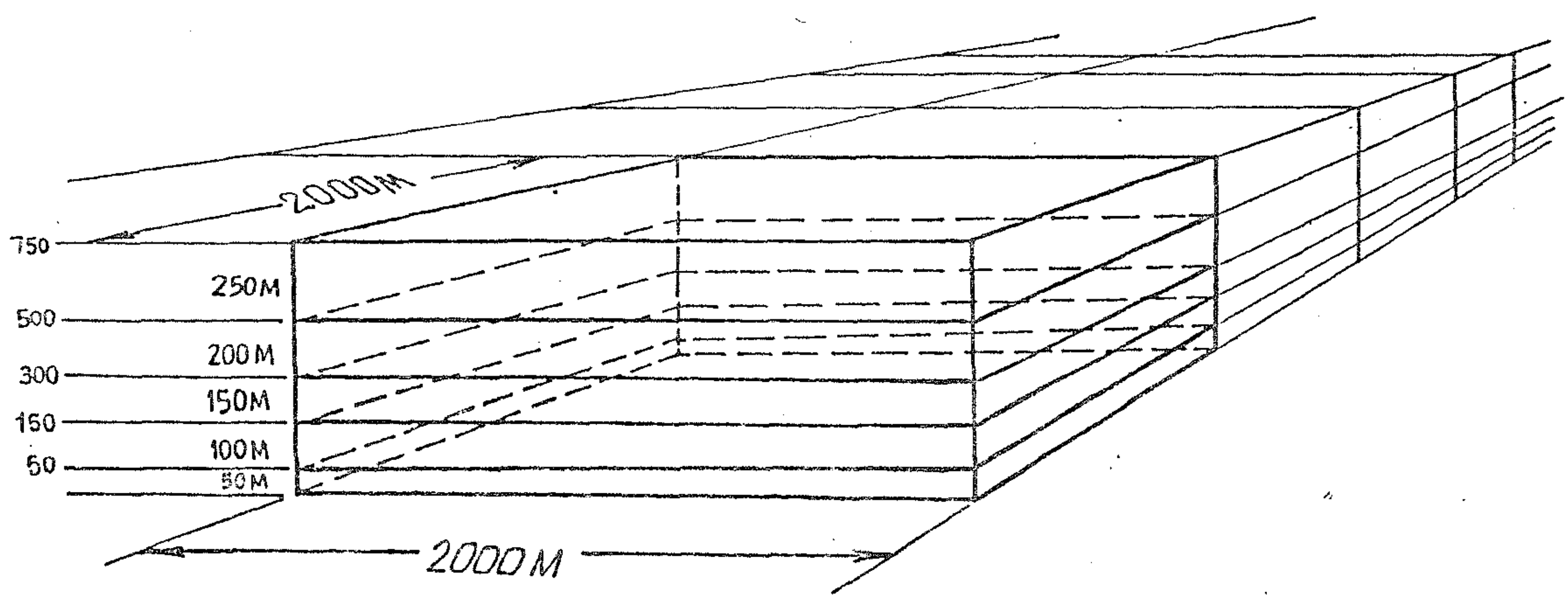
and $\alpha = \frac{U_{i-1/2}}{\Delta x} \Delta t$

for the ith cell and the nth time step, with flux correction limiting C_i^n by

$$.2 * \text{MIN} \left\{ C^n_{i-1}, C^n_i, C^n_{i+1} \right\} \leq C_i^{n+1} \leq 1.8 * \text{MAX} \left\{ C^n_{i-1}, C^n_i, C^n_{i+1} \right\}$$

Figure 3

GRID CELL STRUCTURE



A critical requirement of the grid model is that the wind field be non-divergent, i.e.

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} = 0,$$

in order to prevent an unrealistic buildup or depletion of pollutant concentrations. The method used to insure nondivergence was to adjust the vertical velocity profile. This was accomplished in the equations utilized in the WEST model.

Once the model produces a pollutant concentration field for each regime the annual predicted concentration for each grid cell is calculated by summing each regime concentration multiplied by its respective frequency of occurrence. That is:

$$C_a = \sum_{i=1}^{n} C_i f_i$$

where C_a = annual concentration

C_i = regime concentration

f_i = regime frequency

n = number of regimes

To predict the annual concentration at a specific receptor, R, within a grid cell, X, a weighted average of selected cell concentrations surrounding R is calculated. The cells whose concentrations are included are those that have R within the area bounded by the lines connecting the centroids of the cells. The equation used to give the predicted concentration at R is such that the cell(s) closest to R contribute more to the prediction than those further away. That is, a concentration at a receptor is weighted towards those cells closest to it.

This annual prediction is then compared to the observed annual concentration at the receptor and a calibration factor is developed. The model is then run on another year's data base to determine the predictive capability using the calibration factor.

Future air quality concentrations are then made based on projected emissions inventories, on assumed annual frequency of occurrence of regime days and the calibrated model.

Several options are available for output from the GRID model. One is producing a computer plot of isopleths (lines of equal concentration) of the model predicted particulate concentrations. Other options include a listing of predictions at receptors and a digital printout of the concentrations in each grid cell on an annual basis or by meteorological regime day. (See Figure 4)

Combining this output with other information, such as cost effectiveness, the decision maker than develops a strategy to control emissions so as to attain and maintain air quality standards.

Emissions Sources

Sources of particulates within the study area have been categorized into point sources and area sources in the emissions inventory (EI). Source data has been included in the EI and allocated through the grid network as described below.

FIGURE 4

GRID Model Output

14 9

0	0	0	1	0	0	0	0	0	0	0	0	0	0
12	28	2	2	0	7	2	0	0	0	0	0	0	0
5	10	7	12	26	44	7	8	0	0	0	0	0	0
7	13	24	6	39	59	7	14	85	0	4	0	0	0
5	21	90	81	85	92	84	95	84	59	17	5	1	0
5	33	65	66	77	91	89	141	196	260	137	156	21	11
13	19	25	22	27	66	27	24	22	100	31	30	7	1
7	9	12	13	30	32	19	30	57	57	37	18	12	3
4	7	11	13	24	35	24	26	37	34	14	18	11	6

FREG 1.000 .000 -.000 -.000 -.000 -.000 -.000 -.000 -.000 -.000 11 AUG 77

RECEPTOR	XR	YR	OBSD	PRED	GEOM	COAV2	STATION
1	1.43	8.23	-.00	9.73	7.31	31.69	EUGENE AIRPORT
2	7.75	9.75	-.00	.00	.00	.00	COBURG
3	6.43	4.50	-.00	89.87	75.36	238.27	COMMERCE
4	4.96	4.13	-.00	53.46	41.90	162.33	WESTMORELAND
5	10.56	4.54	-.00	245.20	217.62	561.49	28TH AND C
6	6.60	2.15	-.00	31.77	23.36	106.91	SOUTH EUGENE
7	6.91	5.41	-.00	88.69	79.65	195.84	OAKWAY
8	10.09	4.31	-.00	202.58	172.67	517.02	CITY SHOPS
9	9.13	4.43	-.00	165.00	141.09	411.29	LIBRARY
10	13.07	4.51	-.00	78.37	61.00	240.91	THURSTON
11	10.11	5.03	-.00	147.09	131.71	327.79	DMV

*Point Sources

Point source information taken from the EI for use in the GRID model includes data pertaining to individual source operating conditions. Only sources within the AQMA having total plant site emissions of greater than 10 tons per year of particulate were included in the point source tabulation. Smaller sources were included in the area source categories.

Source information also utilized included: 1) Universal Transverse Mercator coordinates; 2) tons per year of TSP; 3) stack parameters; 4) EI number; 5) SIC number; and 6) an equipment identification number.

*Area Sources

Thirteen area source categories are included in the model application. They are:

1) paved road dust

2) motor vehicles

3) residential space heating - distillate oil

4) residential space heating - natural gas

5) commercial/institutional space heating - residual oil

6) commercial/institutional space heating - natural gas

7) open burning and field burning

8) wood space heating

9) orchard pruning

10) railroads and aircraft

11) unpaved road dust

12) small point sources (less than 10 tons per year emissions)

13) agricultural tilling and off-highway vehicles.

Emissions from each of the 13 categories were allocated to the grids in the AQMA by various methods. The methodology for allocation is described in the report "Eugene-Springfield Air Quality Maintenance Area Data Base Development," prepared by Seton, Johnson and Odell, February, 1978.

*Operating Schedules

Operating schedules for each source category are necessary as input to the modeling data bases. These schedules represent the daily and monthly variations in emissions that result from changes in heating requirements, production schedules, rainfall and other factors. A complete description is given in the Data Base Development report previously mentioned.

Inclusion of operating schedules allows for a more accurate modeling of the pollutant concentrations in the AQMA.

*Other EI Adjustments

To calculate the effective plume height from the emission sources standard plume rise equations as developed by Briggs are utilized. This information combined with other data input (such as meteorology) is used so as to better simulate what is actually happening in the atmosphere.

The EI is also adjusted so as to estimate the emissions for particles less than 30 microns in size. This is done so as to minimize the errors resulting from particle deposition. The larger particles settle out much closer to the source and thus would not affect as large an area of the airshed as those particles less than 30 microns. As is the case with the other considerations taken into account in the EI, this adjustment for particle size helps to bring about a more accurate simulation of air pollution concentrations.

Summary

Combining meteorological and emission inventory data with mathematical equations (the model) produces a simulation of particulate concentrations in the Air Quality Maintenance Area. The Area can then be analyzed to identify areas that may be subject to high pollution.

Utilizing the model output with other information, such as cost effectiveness, the decision maker can then develop a strategy to control emissions so as to attain and maintain air quality standards.

1. Conservation of mass

GRID is a conservation of mass or grid cell type model which uses a finite difference approximation of the basic diffusion equation:

$$\frac{\partial c}{\partial t} = - \nabla \cdot \vec{u}c + \nabla \cdot \overleftrightarrow{K} \cdot \nabla c + S$$

where:

$\frac{\partial c}{\partial t}$ = time rate change of particulate concentration

$\nabla \cdot \vec{u}c$ = advection of particulate concentration by the mean wind field u

$\nabla \cdot \overleftrightarrow{K} \cdot \nabla c$ = dispersion of particulate concentration by diffusion, approximated by the eddy diffusivity constant K

S = rate of particulate emissions

∇ = the "del" operator $(\partial/\partial x + \partial/\partial y + \partial/\partial z)$

The finite difference solution assumes that at may be approximated by a finite time Δt. Further a distance parameter ∂x may be approximated by a finite change in distance Δx.

In GRID the horizontal cell size (Δx or Δy) is 2,000 meters. Δz or the vertical cell size is variable. The ceiling heights of each grid cell layer are 50, 150, 300, 500, and 750 meters, respectively, above ground elevation.

The current solve routine is a flux corrected version of a Crowley's second order advection technique. Flux refers to transportation forces between cells. These forces arise mainly from advection (mean wind transport (i.e., wind speed and direction) by cell) and diffusion (concentration gradients between cells).

The time step Δt must be sufficiently small to assure stability in the calculations. Yet if too small, it would unreasonably increase simulation costs. It is computed from the maximum wind speed specified within the entire wind field that is being used during each hour of the simulation. Thus it changes whenever a new wind field is being used.

Initial concentrations within the model are set up during the first hour of the day by computing concentrations six times as long as during other hours of the day. This is done in lieu of specifying boundry conditions.

Several steps were taken to maximize accuracy when interpreting model results, The number of subtractions of model results to obtain strategy effectiveness were kept to a minimum. Further, smaller differences in predicted concentrations were scaled from model runs simulating larger emission differences.

2. Divergence Free Wind Fields

A basic requirement of conservation-of-mass type models is that the wind fields be divergence free. Mathematically this is stated as:

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} = 0$$

where u, v, and w are the x, y, and z vector componants of the wind velocity in each grid cell.

A simpler way of stating this is the winds cannot be allowed to build up pressure within any cell. This would arise if the sum of the cell face wind velocities multiplied by their respective cell face areas did not equal zero at each cell.

Divergence free wind fields are derived for the model from a pre-processor model called WEST.

3. Regime Classification of Meteorology.

As simulation costs are directly proportional to the number of days simulated, annual runs require the use of generalized meteorology. As a result in the Eugene/Springfield version of GRID each year's meteorology was approximated by a different weighting of 13 meteorological regimes. The basic assumption is that each of 365 days meteorology can be approximated by one of the 13 generalized meteorological types. The derivation of these 13 regimes is described elsewhere.

This regime approximation works best when simulating a long time period--e.g., when used to simulate annual average concentrations for past and future years.

For model simulations of a single day two different approaches were used. An "average" high particulate day was simulated by regime 7. To better simulate a "worst case" day, wind fields were generated from an actual worst case day (February 18, 1977). This latter approach probably better estimates worst case air quality in Eugene/Springfield because any regime day includes a wide range of pollution levels.

4. Plume Rise

Briggs plume rise equations for plume rise due to buoyancy flux are used in GRID. Depending on atmospheric stability (determined according to Pasquill, 1961), two different plume rises can be calculated. One plume rise estimate is used for unstable and neutral conditions. Another is used for stable conditions. Momentum effects due to exit velocity are not considered in GRID (nor in most EPA models).

It has been observed that plumes often due not rise above inversion layers. Within GRID, this situation was simulated by means of a selective plume trapping algorithm. Only plumes with a buoyancy flux sufficient to reach to twice the mixing height are allowed to penetrate past that mixing height. Remaining plumes are trapped within the mixing layer. Sensitivity tests have shown that this does not predict concentrations dramatically higher than those predicted without plume trapping.

Plume penetration of the inversion layer is of concern because plumes above the inversion layer have minimal effect on predicted ground level concentrations. However within GRID, these emissions above the inversion layer are not completely ignored as they are in most other models. A diffusion rate through the inversion layer is still finite and is still calculated. Further, fumigation is at least partially accounted for because emissions within a stable layer are simulated to diffuse downward as the inversion layer rises.

5. Hourly Operating Schedules

As area sources are dominated by motor vehicle emission sources, hourly area source emissions are input proportional to average hourly motor vehicle activity within the AQMA. This activity schedule is an important consideration as motor vehicle activity is low during night hours when ventilation restrictions are usually larger.

Point source emissions are allocated by hour of the day according to their individual operating schedules.

6. Decay Factors

Although decay factors were considered for simulation of particulate fallout, they were not used. There is conflicting literature information as to decay rates, especially for the important soil dust emissions. Also, with the relatively small distances between sources and receptor (as compared to Willamette Valley scale simulations), the time for decay is relatively short. With typical decay rates used past DEQ simulations, this would have had minimal effect on particulate concentrations.

7. Evaluation of Model Predictions

Model predictions were compared with Hi-vol observations (e.g., see Figure 1). A slope = 1 line with an intercept equal to the observed background concentration was felt to best describe this comparison. This was used rather than a traditional least squares line because:

a. It is impossible to inventory all emission sources (e.g., pollen, secondary TSP, and fugitive sources). This would mean that a perfect model with a perfect meteorological data base would have points all on the left of the 1:1 slope line. For larger underpredicted sites (e.g., city shops), this would cause an unreasonable adjustment in a least squares analysis.

b. There are an insufficient number of points (Hi-vols) to establish a regression line with accuracy in Eugene/Springfield.

c. CMB analysis have shown individual source contributions to reasonably be predicted by the GRID model.

d. Key sites are well predicted by a 1:1 slope line.

For these reasons, overpredictions were scaled down to the 1:1 line. This overpediction would have unreasonably shown overeffectiveness of some strategies. In contrast, underpredictions were not scaled up. Instead these were handled by evaluating differences between present and future model predictions and adding them to present Hi-vol values. Any consistant underprediction is thus minimized.

Patrick Hanrahan
June 20, 1980

AN144(b) (1)

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMO

TO: Don Arkell DATE: May 28, 1980

FROM: Bob Gay

SUBJECT: Summary of TSP Modeling Results- Preliminary Draft

Summary of Major Results and Conclusions

1. The number of locations exceeding the 60 ug/m^3 annual TSP standard is projected to increase from 4 to 7 between 1978 and 1987.

   The largest 1987 exceedance occurs at PNW Bell (12.4 ug/m^3); the second largest (11.4 ug/m^3) in Grid (11,4), which has no HIVOL; the third largest (6.4 ug/m^3) in Grid (12,4), which has no HIVOL.

2. The number of locations exceeding the 150 ug/m^3 24-hour average TSP standard is projected to increase from 6 to 13 between 1978 and 1987.

   The largest 1987 exceedances at existing HIVOL sites occur at PNW Bell (25.4 ug/m^3); Westmoreland (18.8 ug/m^3), and; Commerce (9.9 ug/m^3)

   The largest 1987 exceedances in grids without HIVOLs occur in Grid (4.4), 43 ug/m^3; Grid (5,4), 25 ug/m^3; Grid 8,4), 17 ug/m^3; and Grid (3,4), 16 ug/m^3.

3. Combinations of point and area source control strategies examined appear capable of reducing 1987 TSP levels sufficiently to eliminate all projected exceedances.

4. From 1978 to 1987, area sources increasingly dominate projected TSP levels--especially paved and unpaved road dust, and wood space heating.

5. Point source control strategies for hog fuel boilers, particle board dryers, and cyclones can help reduce 1987 TSP standard exceedances--especially in Grids (11,4) and (12,4).

6. Model-predicted TSP levels appear reasonable in relative magnitude and location of impacts.

   Model estimates are especially useful in evaluating the relative effectiveness of control strategies in key grids with TSP problems.

7. Based on its final calibration correlation coefficient (r = 0.67), the AQMA model explains about ____% of the HIVOL observed TSP levels, with a ____% confidence interval.

TABLE I

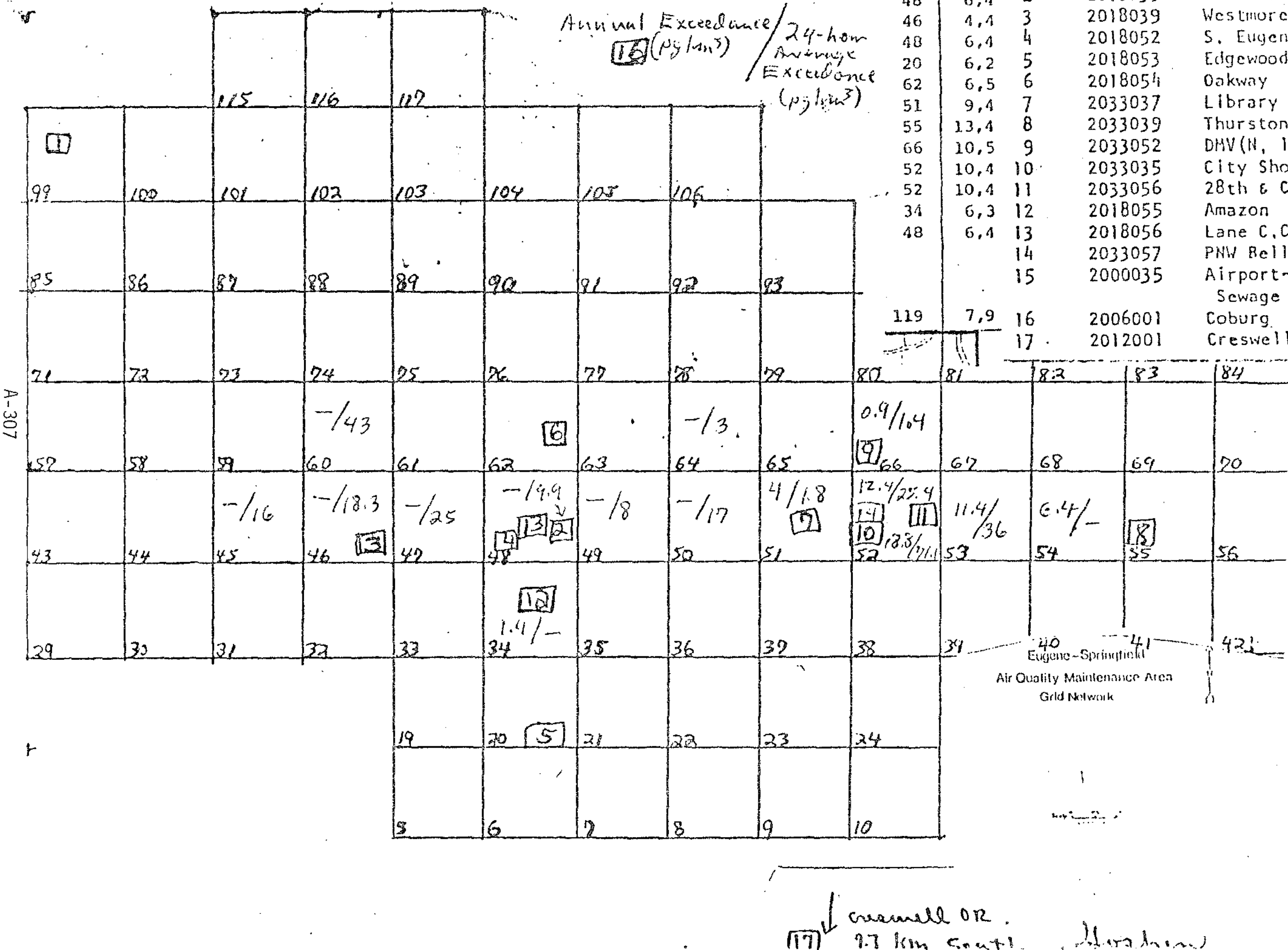
Summary of Projected 1978 and 1987 TSP Standard Exceedances

	1978*		1987**	
	Exceedances of 60 ug/m3 Standard (ug/m3)	Exceedances of 150 ug/m3 Standard (ug/m3)	Exceedances of 60 ug/m3 Standard (ug/m3)	Exceedances of 150 ug/m3 Standard (ug/m3)
Location				
Commerce				9.9
Westmoreland		8		18.3
Library			4.0	1.8
Thurston				
DMV			0.9	1.4
PNW Bell	7.6	14	12.4	25.4
City Shops	9.3	84	18.8	71.1
Grid (11.4)	9.7	23.0	11.4	36.0
Grid (12.4)	0.6		6.4	
Grid (3.4)		29.0		16.0
Grid (4.5)				43.0
Grid (5.4)				25.0
Grid (6.3)			1.4	
Grid (7.4)				8.0
Grid (8.4)		10.0		17.0
Grid (8.5)				3.0

*1978 "all sources" model predicted TSP,plus estimated background-standard
**From Tables IA-IC, Attachment I

AQ0088

Figure I. Estimated 1987 Exceedances of [annu]al and 24-hour Ave TSP Standards (μg/m³)



No	No	No.	No.	Location
99	1,8	1	2000033	Airport
48	6,4	2	2018035	Commerce
46	4,4	3	2018039	Westmore
48	6,4	4	2018052	S. Eugen
20	6,2	5	2018053	Edgewood
62	6,5	6	2018054	Oakway
51	9,4	7	2033037	Library
55	13,4	8	2033039	Thurston
66	10,5	9	2033052	DMV(N, 1
52	10,4	10	2033035	City Sho
52	10,4	11	2033056	28th & C
34	6,3	12	2018055	Amazon
48	6,4	13	2018056	Lane C.C
		14	2033057	PNW Bell
		15	2000035	Airport- Sewage
119	7,9	16	2006001	Coburg
		17	2012001	Creswell

TABLE II

Source Contributors to Eugene/Springfield AQMA TSP Emission Totals and Estimated Growth in TSP Emissions

Emissions Source Categories	1978 Emissions (Tons/Year)	Percent Contribution	1987 Emissions (Tons/Year)	Percent Contribution	1978-1987 Growth (Tons/Year)
Point Sources	8,517.5*	61.6	5529.0	42.4	-2988
Area Sources					
Paved Road Dust**	2,481.0	17.9	3090.0	23.7	609
Motor Vehicle Exhaust	219.0	1.6	105.7	0.8	-113
Space Heating					
Residential (Oil)	11.2	0.1	11.2	0.1	0
Residential (Gas)	5.8	0	5.8	0	0
Commercial (Oil)	3.4	0	3.4	0	0
Commercial (Gas)	0.5	0	0.5	0	0
Open Burning/Field Burning	72.5	0.5	72.5	0.6	0
Wood Space Heating***	967.5	7.0	2208.7	17.0	1241
Orchard Pruning	10.0	0.1	10.0	0.1	0
Railroads & Aircraft	44.7	0.3	44.7	0.3	0
Unpaved Road Dust	1,240.0	9.0	1648.0	12.7	408
Small Point Sources	134.6	1.0	174.1	1.3	40
Agricultural Tilling & Off-Road Vehicles	121.5	0.9	121.3	0.9	0
Subtotals (Area Sources)	5,312.0	38.4	7,496.0	57.6	+2298
Total (Area & Point)	13,829	100.0	13,025	100.0	-804

*1978 Point Source Emission=RACT, except for Kingsford and veneer dryers. These sources are now on compliance schedules to achieve RACT before 1987.

** Includes trackout surcharge (32%)

***Based on Talbot, Wong and Associates telephone survey

Consistent overprediction at certain sites (Thurston, So. Eugene) and underprediction at others (Westmoreland) prevents better correlation statistics. Improved emissions and meterological input data are needed to improve model accuracy.

Summary of Contents

This draft report gives preliminary results and conclusions related to DEQ's modeling of TSP levels in the Eugene-Springfield AQMA. Annual geometric mean and 24-hour average TSP levels have been modeled, for a base year (1978) and a future year 1987. The location and magnitude of exceedances of national ambient air quality standards have been estimated. The relative contribution to TSP levels of point sources and several categories of area sources is shown. Nine (9) point source control strategies, and eleven (11) area source control strategies were modeled, showing their potential effectiveness in reducing projected standard exceedances. Major assumptions related to the emissions and meterological data used are discussed.

Highest Exceedances of Standards Predicted for PNW Bell and Several GRIDS without HIVOLS

Table I summarizes projected 1987 exceedances; with 1978 exceedances included for comparison. The highest 1978 and 1987 annual average and 24-hr. TSP levels are estimated for PNW Bell and for several grids, where no HIVOL presently exists. The number of locations projected to exceed either the annual or 24-hour average standard doubles from 1978 to 1987.

Seven grids without HIVOLS are projected to exceed either the annual or 24 hour TSP standards in 1987. Projections for grids without HIVOLS are more tentative, because of inability to detect, and correct for, model overprediction.

In general, the largest exceedances of TSP standards by 1987 will occur throughout Springfield, and in West Eugene, in the vicinity of the Westmoreland Site. Eugene has only a single, relatively small violation of the annual standard in 1987.

Eight of Nine Existing HIVOL Sites Suitable for Model Calibration and Compliance Determinations.

Of the nine AQMA HIVOL sites, eight are suitable for model calibration, and standards compliance determination, etc. (sites 1-8, Table I). Springfield City shops does not meet EPA site criteria, so compliance is not required there. City shops has been officially recognized by EPA as dominated by nearby sources, and unrepresentative of area wide air quality. City shops data is included here only for comparison purposes.

Summaries of Model Results for Key Sites in Attachment I

Attachment I contains four sets of tables (I-IV) which provide detailed summaries of key modeling results, including estimated 1987 exceedances of standards (Table II), and the potential effectiveness of selected control srategies for area sources (Table III) and point sources (Table IV). Each of these four tables has three parts (A,B, C) corresponding to : A-- annual geometric mean TSP levels; B--"average worst case", 24-hr average TSP levels, and; C--"worst, worst case" 24--hr. average TSP levels.

Two 24-hour Average TSP Estimates Are Presented

Two different estimates of 1987 worst case, 24-hour average TSP levels were developed, using different meteorology in the model. "Average worst case" levels were estimated using Regime 7 meteorology, from the AQMA Grid Model, because Regime 7 predicted higher TSP levels than any other of the model's thirteen regimes. "Worst worst case" levels utilized meteorology patterned after an actual TSP violation day (Feb. 18, 1977). The latter approach better predicted HIVOL-observed worst case TSP air quality (compare Columns E &F, on reverse side of Tables IB and IC, Attachment I). Using Regime 7 meteorology, the model consistently predicted only about 70-75% of 24-hour average. TSP impacts from local sources. Using Feb. 18, 1977, meteorology, the model predicted much closer to 100% (compare Column H of Tables IB and IC, Attachment I). The Grid model predicted annual average TSP levels, on the average, much closer to 100%, indicating that the model's meteorological regimes do a better job of predicting long term average TSP levels than short term.

Use of February 18, 1977, meteorology results in significantly higher estimates not only of exceedances,but also of potential strategy effectiveness in offsetting such exceedances--especially for point source strategies. Chemical analysis of HIVOL filters from February 18, 1977, and two similar high--TSP winter days in 1977 indicated that the higher point source impacts predicted with February 18, 1977, meteorology are more reasonable than the lower impacts predicted with Regime 7 meteorology.

Accordingly, the magnitude of 24-hour TSP levels predicted using February 18, 1977, meteorology are considered the more appropriate estimates to guide TSP SIP plannung. However, the location of these "worst worst case" impacts should be regarded more tentatively--because of the numerous other worst case meteorological conditions that could occur.

Source Contributions to Ambient TSP Levels

Tables IIA-IIC in Attachment I summarize the relative contribution to 1987 TSP levels from point sources, area sources, and, several selected area source categories, including paved and unpaved road dust and wood space heating.

In 1978, area sources exerted substantially more influence on TSP levels than did point sources, except near industrial complexes in Springfield, and even there area sources contributed more. By 1987, area source predominance will be even more pronounced, due to assumed declines in point source emissions, while area source emissions continue to grow (Table II).

Tables IIA-IIC also indicate that the largest single area source contributor to TSP levels is paved road dust --for most high TSP grids. However, some of the highest-TSP grids without HIVOLS (11,4;12,4;3,4) show greater contributions from unpaved road dust, plus almost equally heavy contributions form point sources.

Wood space heating is the second biggest contributor to TSP levels in many of the higher-TSP grids, and is the largest contributor in a few grids by 1987 (So. Eugene site, and adjacent grid 6,3).

The combination of three transportation (roadway traffic related) area sources--paved and unpaved road dust, and motor vehicle exhaust--accounts for well over 50%,and as high as 80% of total area source contributions in 1987 in high--TSP grids.

The model estimates of source contributions to ambient TSP levels appear to be quite consistent with the emissions estimates in Table II for area sources, and reasonably consistent for point sources. Because point source emissions are site specific, and occur with widely varying plume rises, their ground level impact is not a linear function of emission strength. While point source emissions are easier to quantify, they are harder to simulate with the GRID model than area sources, which have virtually no plume rise, and are distributed throughout the AQMA more uniformly. Thus, it is not unreasonable that model estimates of 1978 point source impacts are substantially lower than area source impacts, even though total point source emissions exceed total area source emissions (1978). The relative impact of point sources within the AQMA--i.e.,heaviest near the Springfield industrialized zones, and lightest in west and south Eugene--appears reasonable.

To help the AQMA grid model predict point source impacts, independent estimates of point source impacts were obtained from laboratory analysis of HIVOL filters, and a "selective plume trapping" routine was included in the model. It is descibed briefly below under "Model Calibration".

Source Contributions To AQMA Emissions Totals

Table II summarizes AQMA total TSP emissions for 1978 and 1987. The 1978 and 1987 inventories were prepared by LRAPA and DEQ as part of this TSP SIP analysis. A brief description of the major assumptions involved in estimating 1978 and 1987 emissions is given below, and in Attachment II.

The major changes in AQMA emissions totals between 1978 and 1987 are assumed in this analysis to come from the following causes:

1. Major decreases in point source emissions for two reasons :

   a. Large sources installing new controls under compliance schedules (e.g. Kingsford; Veneer Dryers)

   b. A general decline in business activity (and hence TSP emissions) associated with wood products industry prospects. LRAPA estimated that almost all point sources would have a 6% decline in TSP emissions by 1987 related to declining business activity in the AQMA.

2. Major increases in the three largest area source emissions categories:

   a. Increased paved and unpaved road dust emissions, due primarily to VMT growth, as predicted by the reginal transportation model (SA Pollut).

   b. Increased wood space heating emissions, due both to increasing population and increasing demand for cheaper fuel.

3. The estimated decrease in motor vehicle exhaust emissions, due to phasing lead out of gasoline, is small compared to other area source changes.

4. The other nine area sources were assumed to remain essentially unchanged between 1978 and 1987, and so were not examined very closely.

Meteorological Assumptions

One of the AQMA Grid Model's thirteen meteorological regimes was discarded in the final analyses and modeling runs. Regime #9 was the only one of the thirteen regimes to have designated mixing heights of 50 meters. No other regime had designated mixing heights of lower than 150 meters. Tests of several plume trapping model routines, to better simulate point source impacts, produced clearly erroneous results with Regime 9. Yet some of the AQMA's worst air quality days have been classified as Regime 9, including Feb. 18, 1977.

When it was decided to include a selective plume trapping routine in the GRID Model, Regime 9 was dropped and its frequency of occurrence was added to Regime 7. Regime 7 is similar to Regime 9, and consistently predicted comparable TSP levels.

Regime 7 became the basis for estimating "average worst case" 24-hour TSP levels, because it predicted higher TSP levels than any other model regime. However, its worst case predictions were far short of observed violation TSP levels. This is probably because GRID model regimes inherently average out the severest meteorological conditions with much less severe conditions. The resulting composite meteorology is unlikely to simulate actual worst air quality days. It is an observerd characteristic of Eugene-Springfield regime-day classifications to date that both bad and good air quality days are found in the same regime-categories--even those regimes which predict the highest TSP levels. Thus the collection of days whose meteorology was used to build the composite meteorology for each regime contain a wide range of severity.

Accordingly, February 18, 1977, meteorology was used to simulate "worst worst case" TSP air quality because: (1) February 18, 1977, was a standard violation day; (2) the Grid model correlation (of model predicted vs HIVOL -observed air quality) for February 18, 1977, was good enough. Most importaantly, February 18, 1977, meteorology enabled the GRID model to predict worst case 24-hour average TSP levels comparable in magnitude to actual violation days. The limitation in this approach is that only one of many possible worst case conditions is represented by February 18, 1977, meteorology. In the future, other violation days should be similarly characterized and modeled to better evaluate the magnitude, and especially the lcoation, of present use.

"Typical" or "long term average" meteorology was needed in estimating 1978 to 1987 growth in TSP levels. The regime frequencies for all 365 days of 1977 and 1978 were averaged to afford such long term average (LTA) meteorology. Regime-Day classifications for other years were not available.

Air Quality Data Assumptions

The worst measured (annual and 24-hour)air quality levels during the past few years must be identified in TSP-SIP planning, and strategies devised to prevent their recurrence. It was decided to average the 1978 and 1979 (annual average and second highest 24-hour average) TSP levels, for use as worst case measured air quality. 1977 TSP levels were considered no longer representative of existing emissions impacting the AQMA for several reasons.

First, adoption and implementation of much more stringent and effestive smoke management rules and procedures have greatly reduced the number and severity of smoke intrusions (and complaints) related to field burning. Second, similar increased attention to slash burning smoke management may have also occurred, and may have decreased intrusions from this source. Third, point source emissions reductions implemented through compliance schedules, and other emissions reductions--e.g., paving of unpaved roads and lots--have also changed the emissions base. Finally, severe meteorology occurred during early 1977, associated with a region-wide drought. All these factors make 1977 TSP (HIVOL) data less representative of the present TSP situation to be addressed by the SIP, than 1978-79 average data.

Accordingly, in estimating 1987 Design Values for annual average and 24-hr.average TSP levels (Tables IA-IC, Attachment I), 1978-79 averages of previous "worst" measured HIVOL data are used.

Model Changes and Other Assumptions Made in Calibration

Attachment III briefly descibes how the AQMA Grid Model was calibrated, using chemical mass balance (CMB) techniques. Essentially, the dust emissions base was adjusted until an optimum fit was obtained between model and CMB estimates of dust impacts. Other area sources emissions levels were estimated using best available information. Greatest attention was paid to the largest sources.

A "Selective Plume Trapping" routine was added to the Grid Model code to improve point source impact predictions. This subroutine traps a point source plume at the mixing height designated for that model regime, if the plume's bouyant energy would carry it to a normal plume rise of less than twice the mixing height. Higher plume rises would not be trapped, but allowed to achieve their calculated plume rise. Point source emissions, thus deposited well above the designated mixing height, would be effectively blocked by that mixing layer from diffusing back to ground level.

The Grid model tends to "lose" the highest energy plumes, in terms of their ground level impacts. "Total plume trapping" efforts, designed to prohibit any such losses, were attempted, but results were clearly erroneous for at least one regime (#9). Chemical analysis of HIVOL filters suggested that Selective Plume Trapping was the best compromise assumption, and it also seemed to improve overall modeling correlation coefficients.

In general, the correlation coefficient for modeling of annual average TSP levels is around 0.7. Chronic model overprediction of TSP level at some sites (e.g. So.Eugene, Thurston) and chronic underprediction at other sites (e.g.,Westmorland) keep the correlation coefficient low.

Effectiveness of Point Source Control Strategies in Offsetting Standard Exceedances

Attachments V briefly describes the seven point source control strategies recommended for modeling evaluation by the AQMA Citizens Advisory Committee (CAC). Attachment I (Tables IVA-IVC) summarizes the potential effectiveness of these strategies, and a combination of all of them, in overcoming the projected 1987 exceedances of the annual average and 24-hr. average TSP Standards.

With the possible exception of Grid (12,4), even the combination of all five of the toughest point source control strategies could not eliminate any exceedance of the annual average standard. Likewise, under the "average worst case" (Regime 7) analysis (Table IV B, Attachment I), point source controls do not appear adequate by themselves to overcome projected exceedances of the 24-hour average standards. While the "worst worst case" analysis seems to indicate that point source controls alone might overcome exceedances in several grids--most notably Library and Grid (11,4)--such findings must be tentative, because the (February 18, 1977) meteorological basis for this analysis is narrow, since it was patterned after a single day.

One of the more promising point source control options appears to be the significant contribution of hog fuel boiler controls in reducing exceedances of the annual average standard at Grids (11,4) and (12,4).

Potential Area Source Control Strategy Effectiveness

The following area source control strategies were modeled to illustrate their potential effectiveness in overcoming projected standard exceedances:

1. Paving unpaved roads:

   a. Paving 10 miles with worst inventoried TSP emissions

   b. Paving 100% of inventoried unpaved roads

2. Remove Trackout surcharge to paved road dust emissions associated with industrial land use:

   a. 50% Trackout removal

   b. 100% Trackout removal

3. VMT Reductions of 10% and 20%, per Grid.

4. Requiring seasoned wood for wood space heating.

   a. Assumes seasoning reduces average moisture content from 28% to 20%, resulting in a 26% reduction in TSP emissions from wood space heating.

5. Weatherization of homes to Portland Energy Policy Standards, which is estimated to reduce space heating requirements (and hence, TSP emissions) from wood space heating by 60%:

    a. Insulation of all wood burning homes--might thus achieve the full 60% reduction in projected 1987 emissions from wood space heating.

    b. Insulation of all wood stove homes by 1987 would reduce 1987 TSP by 30%; assuming 80% of the 1978 to 1987 growth in wood space heating is from increased use of wood stoves.

Unlike point sources, combinations of area source control strategies examined could apparently overcome all projected standard exceedances. (Tables IIIA-IIIC, Attachment I).

In fact, paving of unpaved roads (worst 10 miles) alone would overcome exceedances of the annual ave. TSP standard at DMV and GRID (12,4)--Table IIIA, Attachment I; and; overcome 24-hr. standard exceedances in GRIDS (11,4), (3,4), (8,5), and (7,4), plus major contributions toward compliance attainment at key sites like DMV (24-hour), Library, Commerce and Westmorland.

One of the biggest advantages of modeling is to discern how to target specific control strategies to specific areas.

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Attachment I

Summary of Modeling Results, By Key Grid

Table I Estimated 1987 Compliance Design Value

A. Annual Geometric Mean TSP Levels
B. 24-hr. Average TSP Levels - "Average Worst Case"
C. 24-hr. Average TSP Levels - "Worst Worst Case"

Table II Major Source Contributions to 1978 and 1987 TSP Levels

A. Annual Geometric Mean TSP Levels
B. 24-hr. Average TSP Levels - "Average Worst Case"
C. 24-hr. Average TSP Levels - "Worst Worst Case"

Table III Potential Effectiveness of Area Source Strategies

A. Annual Geometric Mean TSP
B. 24-hr. Average TSP Levels - "Average Worst Case"
C. 24-hr. Average TSP Levels - "Worst Worst Case"

Table IV Potential Point Source Strategy Effectiveness

A. Annual Geometric Mean TSP
B. 24-hr. Average TSP Levels - "Average Worst Case"
C. 24-hr. Average TSP Levels - "Worst Worst Case"

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TABLE IIA. Annual Ave. TSP - Estimated 1987 Compliance Status

MONITORING SITE	1978-79 Average (1) Annual Ave. TSP (µg/m³) Arithmetic (HIVOL)	Geometric (HIVOL)	1978→87 GROWTH (2) (Arithmetic) (MODEL) ×	MODEL Correction Factor (3) =	Corrected GROWTH ×	Arithmetic to Geometric Correction Factor (4) =	GROWTH Corrected to Geometric Mean TSP	1987 DEQ VALUE (5) Estimated Annual Geometric Mean TSP	1987 EXCEEDAN[CE] of 60 µg/m[³] Standar[d]
	A	B	C	D	E	F	G	H	I
1. Commerce	62.1	51.85	7.8	.963	7.5	.835	6.27	58.1	0
2. Westmorland	61.05	49.35	5.5	1.0	5.5	.807	4.44	53.7	0
3. So. Eugene	39.75	30.70	3.3	.807	2.7	.772	2.06	32.8	0
4. Oakway	54.4	47.1	5.0	.933	4.7	.865	4.04	51.1	0
5. Library	68.45	59.2	5.6	1.0	5.6	.859	4.81	64.0	4.0
6. Thurston	58.8	48.05	7.2	.813	5.85	.817	4.78	52.8	0
7. DMV	63.95	56.35	5.5	.960	5.28	.880	4.65	60.9	0.9
8. PNW Bell	79.80	67.4	5.9	1.0	5.9	.845	4.99	72.4	12.4
9. City Shops	88.35	74.35	5.3	1.0	5.3	.842	4.46	78.8	18.8
				('78 MODEL +	BACKGRND +	GROWTH) × .83		= 1987 Geom. Mean	1987 EXCEEDAN[CE]
10. Grid 11,4				42	40	4		71.4	11.4
11. Grid 3,4				17	40	7		58.1	0
12. Grid 4,5				27	40	5		59.8	0
13. Grid 5,4				21	40	9		57.3	0
14. Grid 6,3				25	40	7		61.4	1.4
15. Grid 8,5				24	40	6		58.9	0
16. Grid 8,4				24	40	5		58.1	0
17. Grid 7,4				24	40	5		57.3	0
18. Grid 12,4				33	40	8		66.4	6.4
19. Grid 5,5				22	40	13		55.6	0

1. Average of 1978 and 1979 HIVOL data.
2. See over, Column C
3. See over, Column G
4. Column B/Column A for HIVOL sites. For grids without HIVOLS, used average for sites 1-8 (0.83).
5. Estimated 1987 annual geometric mean, using long term average (LTA) emissions base and LTA meteorology. For grids without HIVOLS, the 1987 geometric mean was estimated as follows: Base year (1978) model predicted ug/m³ (using 1977-78 365-day average regime frequencies), plus background of 40 ug/m³, plus 1978 to 1987 growth (see over, Column C). This total was multiplied by the average Column F Correction Factor for sites 1-8 (0.83) to give geometric mean TSP.

(I.H)

	LTA MODEL Prediction (1)				Site Specific Correction Factor			Fraction of Local Impact Predicted By MODEL
	1987 -	1978 =	GROWTH		1978 (2) HIVOL ÷	1978 (3) MODEL =	Correction Factor (4)	
	A	B	C	D	E	F	G	H
1. Commerce	34.92	27.08	7.8		64.4	66.84	0.963	1.04
2. Westmorland	19.37	13.85	5.5		64.0	54.34	1.177	0.85
3. So. Eugene	11.50	8.35	3.3		39.2	48.56	0.807	1.24
4. Oakway	23.45	18.48	5.0		53.7	57.53	0.933	1.07
5. Library	30.52	24.90	5.6		69.5	64.58	1.076	0.93
6. Thurston	36.20	29.03	7.2		55.7	68.51	0.813	1.23
7. DMV	30.96	25.47	5.5		62.2	64.82	0.960	1.04
8. PNW Bell	33.37	27.44	5.9		80.0	66.89	1.196	0.836
9. City Shops	30.16	24.88	5.3		85.5	64.44	1.327	0.75
10. GRID 11,4	46	42	4		For Grids without HIVOLS, no model correction factor was estimated			
11. GRID 3,4	30	17	13					
12. GRID 4,5	32	27	5					
13. GRID 5,4	29	21	8					
14. GRID 6,3	34	25	9					
15. GRID 8,5	31	24	7					
16. GRID 8,4	30	24	6					
17. GRID 7,4	29	24	5					
18. GRID 12,4	40	33	7					
19. GRID 5,5	27	22	5					

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1. 1987 (DEQEE5U) and 1978 (DEQGEIV) "all sources" model runs used long term average (LTA) emissions rates and meteorology (1977-78 365 day average regime frequencies).
2. Base Year (1978) HIVOL data.
3. Background (40 ug/m^3) + 1978 "all sources" model run (DEQGEIV) u[illegible]ng 1978 TSP Sample Days regime frequencies.
4. Column E/Column F. Factor can correct model estimates for over [illegible]der prediction--vs. a line of slope =1.0 with i[illegible]ercept at estimated background (40 [illegible]/m^3). In pr[illegible]ic[illegible] [illegible]ly corrects for mo[illegible] [illegible]rprediction.
5. 1.0/Column G

Table IB. "Average worst case, 24-hr. ave. TSP – Estimated 1987 Compliance Status

	(A) Second Highest 1978-79 Ave (HIVOL) (1)	(B) 1978 → 1987 GROWTH (MODEL) (2) ×	(C) Site Specific Correction Factor for Model Prediction (3) =	(D) 1978 → 1987 GROWTH Corrected	(E) 1987 DESIGN VALUE (4) Estimated 1987 24-hr. ave. TSP	(F) 1987 Exceedance of 150 μg/m Standard
1. Commerce	142	14.9	1.0	14.9	156.9	6.9
2. Westmorland	154	10.2	1.0	10.2	164.2	14.2
3. So. Eugene	96	3.5	1.0	3.5	99.5	0
4. Oakway	136	9.2	1.0	9.2	145.2	0
5. Library	145	8.3	1.0	8.3	153.3	3.3
6. Thurston	130	13.3	1.0	13.3	143.3	0
7. DMV	147	8.2	1.0	8.2	155.2	5.2
8. PNW Bell	(168)	7.6	1.0	7.6	175.6	25.6
9. City Shops	214	6.2	1.0	6.2	220.2	70.2
		1978 MODEL +	BACKGROUND +	GROWTH	= 1987 24-hr TSP	1987 EXCEED
10 GRID 11,4		56	56	9	121	0
11 GRID 3,4		36	56	26	118	0
12 GRID 4,5		51	56	10	117	0
13 GRID 5,4		44	56	16	116	0
14 GRID 6,3		45	56	15	116	0
15 GRID 8,5		44	56	14	114	0
16 GRID 8,4		46	56	10	112	0
17 GRID 7,4		42	56	10	108	0
18 GRID 12,4		38	56	14	108	0
19. GRID 5,5		40	56	10	106	0

1. Averag of second highest HIVOL values for 1978 and 1979.
2. See over, Column C
3. See over, Column G
4. Estimated 1987 second highest 24-hr. TSP concentration, using long term average (LTA) emissions base, and "average wor case" (Regime 7) meteorology. For grids without HIVOLS, estimated 1987, 2nd highset TSP as follows: Base year (1978) mod predicted ug/m^3 (Regime 7), plus background (56 ug/m^3) plus 1978 to 1987 growth (see over, Colum C).

	LTA MODEL Predictions[1]				Site Specific Correction Factor			Fraction of Impacts Predicted By MODEL[5]
	1987	− 1978	= 1978 ⇒ 87 GROWTH		HIVOL[2]	÷ MODEL[3]	= CORRECTION FACTOR[4]	
	A	B	C	D	E	F	G	H
1. Commerce	65.4	50.5	14.9		141	106.5	1.32	0.76
2. Westmorland	37.0	26.8	10.2		158	82.8	1.91	0.52
3. So. Eugene	14.0	10.5	3.5		89	66.5	1.34	0.75
4. Oakway	40.2	31.0	9.2		119	87.0	1.37	0.73
5. Library	53.6	45.3	8.32		142	101.3	1.40	0.71
6. Thurston	45.8	32.5	13.3		121	88.5	1.37	0.73
7. DMV	59.4	51.2	8.17		136	107.2	1.26	0.79
8. [illegible]	[illegible]	55.2	7.6		(164)[6]	111.2	1.47	0.68
9. City Shops	58.5	52.3	6.2		231	108.3	2.16	0.46
10. GRID 11,4	65	56	9		For grids without HIVOLS, No model correction factor was estimated			
11. GRID 3,4	62	36	26					
12. GRID 4,5	61	51	10					
13. GRID 5,4	60	44	16					
14. GRID 6,3	60	45	15					
15. GRID 8,5	58	44	14					
16. GRID 8,4	56	46	10					
17. GRID 7,4	52	42	10					
18. GRID 12,4	52	38	14					
19. GRID 5,5	50	40	10					

1. 1987 (DEQEE5U) and 1978 (DEQGEIV) "all sources" model runs used long term average (LTA) emissions rates and "average worst case" (Regime 7) meteorology.
2. Second highest 24-hr. TSP HIVOL measurement in 1978.
3. Background (56 ug/m^3)+1978 "all sources" model (DEQGEIV) predicted 24-hr. average TSP using Regime 7.
4. Column E/Column F. Factor can correct model estimates for over/under-prediction - vs. a line of slope =1.0 with intercept at estimated background (56 ug.m^3). In practice, DEQ corrects only for model overprediction.
5. 1 /Column G.

Table IC: "Worst" Worst Case, 24-hr ave TSP: Estimated 1987 Compliance Status

	(A) Second Highest 1978-79 Ave. (HIVOL) (1)	(B) 1978→1987 GROWTH (MODEL) (2) ×	(C) Site Specific (3) Model Prediction Correction Factor =	(D) GROWTH Corrected	(E) 1987 DESIGN VALUE (4) Estimated 1987 24-hr ave. TSP	(F) 1987 Exceedance of 150 µg/m³ Standard
1. Commerce	142	18.4	.975	17.9	159.9	9.9
2. Westmorland	154	14.3	1.0	14.3	168.3	18.3
3. So. Eugene	96	3.6	1.0	3.6	99.6	0
4. Oakway	136	11.0	.954	10.5	146.5	0
5. Library	145	8.2	.833	6.8	151.8	1.8
6. Thurston	130	14.8	1.0	14.8	144.8	0
7. DMV	147	5.5	.807	4.4	151.4	1.4
[illegible] 11	(168)	8.7	.851	7.4	175.4	25.4
[illegible] Shops	214	7.1	1.0	7.1	221.1	71.1
		78 MODEL +	BACKGROUND +	GROWTH	= 1987 24-hr TSP	1987 Exceedance
10 GRID 3,4		61	63	42	166	16.0
11. GRID 4,5		116	63	14	193	43.0
12 GRID 5,4		87	63	25	175	25.0
13 GRID 11,4		110	63	13	186	36.0
14 GRID 8,4		97	63	7	167	17.0
15 GRID 6,3		55	63	26	144	0
16 GRID 8,5		79	63	11	153	3.0
17 GRID 7,4		85	63	10	158	8.0
18 GRID 9,5		75	63	6	144	0
19 GRID 5,5		63	63	14	140	0
20 GRID 3,6		56	63	18	137	0

1. Average of second highest HIVOL values for 1978 and 1979
2. See over, Column C
3. See over, Column G
4. Estimated 1987 second highest 24-hr. average TSP level, using l[illegible] term average (LTA) emission[illegible]ase, and "worst worst case" meteorology (February 18, 1977). For grids without [illegible]S, estimated 1987 second [illegible]est TSP as follows: Base Year (1978) model predicted (using February 18, 1977 meteorology), plus background (63 ug/m³),

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(IC)

	LTA MODEL Predictions (1)				Site Specific Correction Factor			Fraction of Local Impact
	1987 −	1978 =	1978→1987 GROWTH		HIVOL (2) ÷	MODEL (3) =	CORRECTION FACTOR (4)	Predicted B/Mo[illegible]
	A	B	C	D	E	F	G	H
1. Commerce	100	81.6	18.4		141	144.6	0.975	1.03
2. Westmorland	65.5	51.2	14.3		158	114.2	1.384	0.72
3. So. Eugene	23.7	20.1	3.6		89	83.1	1.071	0.93
4. Oakway	72.7	61.7	11.0		119	124.7	0.954	1.05
5. Library	115.6	107.4	8.2		142	170.4	0.833	1.20
6. Thurston	52.2	37.4	14.8		121	100.4	1.206	0.83
7. DMV	111.0	105.5	5.5		136	168.5	0.807	1.24
8. [illegible] Bell	138.4	129.7	8.7		(164) (6)	192.7	0.851	1.18
9 City Shops	125.6	118.5	7.1		234	181.5	1.289	0.78
10. GRID 3,4	103	61	42					
11 GRID 4,5	130	116	14					
12. GRID 5,4	112	87	25					
13. GRID 11,4	123	110	13					
14 GRID 8,4	104	97	17					
15 GRID 6,3	81	55	26					
16. GRID 8,5	90	79	11					
17 GRID 7,4	95	85	10					
18 GRID 9,5	81	75	16					
19, GRID 5,5	77	63	14					
20 GRID 3,6	74	56	18					

For Grids without HIVOLS, no model correction factor was estimated

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1. 1987 (DEQEVIX) and 1978 (DEQEVIT) "all sources" model runs used long term average (LTA) emissions rates and "worst worst case" meteorology (February 18, 1977).
2. Second highest 24-hr. TSP HIVOL measurements in 1978.
3. [illegible]ackground (63 ug/m^3)+ 1978 "all sources" model (DEQEVIT) predicted 24-hr. average TSP using February 18, 1977, [illegible]eorology.
4. [illegible] E/ Column F. Factor can correct model estimates [illegible]or over/under-prediction--vs. a [illegible]ine of slope=1.0 with [illegible]cept at estimated TSP backg[illegible]und (63 ug/[illegible]. In p[illegible]ctice, DEQ only corrects for m[illegible] overprediction

TABLE II A. Annual Geometric Mean TSP - Major Contributing Sources to 1978 and 1987 TSP Levels (μg/m³)

	1987 Exceedance Over 60 μg/m³ Standard ①	Point Source Impacts ② 1978	Point Source Impacts ② 1987	Area Source Impacts ③ 1978	Area Source Impacts ③ 1987	Transportation Impacts ④ 1978	Transportation Impacts ④ 1987	Paved Road Impacts ⑤ 1978	Paved Road Impacts ⑤ 1987	Unpaved Road Impacts ⑥ 1978	Unpaved Road Impacts ⑥ 1987	Wood Burning Impacts ⑦ 1978	Wood Burning Impacts ⑦ 1987
1. Commerce	0	1.5	1.4	21.3	28.1	17.3	16.7	10.6	13.3	2.2	2.8	6.1	10.3
2. Westmorland	0	1.0	0.8	10.4	15.1	7.5	9.2	4.8	6.1	2.3	3.1	2.3	5.3
3. So. Eugene	0	0.9	0.7	5.6	8.2	3.9	4.8	2.1	2.7	1.6	2.2	1.6	3.2
4. Oakway	0	1.9	1.7	14.2	18.7	11.0	12.3	8.8	10.3	1.5	1.8	2.7	5.8
5. Library	4.0	3.2	2.8	17.6	22.9	13.7	16.0	10.6	12.7	2.2	2.8	3.4	6.3
6. Thurston	0	10.0	8.7	13.3	20.4	10.8	14.5	6.4	8.7	4.1	5.6	1.9	5.0
7. DMV	[illegible]	3.6	2.0	19.3	25.9	14.8	17.7	9.9	12.1	4.2	5.2	3.4	6.9
8. [illegible]	[illegible]	3.6	2.7										
9. City Shops	18.8	3.4	2.3	18.2	23.9	14.1	16.8	9.4	11.3	4.2	4.9	3.0	5.8
10. GRID 11,4	11.4	14.1	12.5	19.9	24.1	15.8	17.4	6.6	7.5	8.3	9.1	2.5	5.8
11. GRID 3,4	0	.8	.8	14.1	24.9	11.6	19.9	4.2	6.6	7.5	12.5	0.8	3.3
12. GRID 4,5	0	3.3	2.5	18.3	24.1	14.9	18.3	10.8	13.3	4.2	5.0	1.7	3.3
13. GRID 5,4	0	.8	.8	17.4	24.1	11.6	14.1	7.5	9.1	3.3	4.2	4.2	9.1
14. GRID 6,3	1.4	.8	.8	19.9	27.4	12.5	14.1	9.1	10.8	2.5	3.3	5.8	13.5
15. GRID 8,5	0	1.7	.8	19.1	24.9	15.8	18.3	10.0	12.5	4.2	5.0	3.3	5.8
16. GRID 8,4	0	2.5	1.7	18.3	23.2	14.9	18.3	11.6	14.1	2.5	3.3	2.5	5.0
17. GRID 7,4	0	5	5	19.1	19.1	10.8	12.5	5.8	6.6	4.2	5.0	3.3	5.8
18. GRID 12,4	6.4	13.3	10.8	14.1	21.6	10.8	15.8	5.0	6.6	5.8	8.3	2.5	5.8
19. GRID 5,5	0	1.7	1.7	15.8	20.8	11.6	12.5	8.3	9.1	2.5	3.3	2.5	5.8

1. From Table IA
2. From "all point sources" model run with long term average meteorology (1977-78 365 day average regime frequencies), and selective plume trapping. 1978 emissions = RACT, except for Kingsford and Veneer driers. 1987 emissions = RACT.
3. From "all area sources" model runs with long term average (LTA) emissions rates and meteorology (1977-78 365 day average regime frequencies), and selective plume trapping.
4. Combination of three VMT-based area sources--paved and unpaved road dust, and motor vehicle exhaust
5. Paved road dust only
6. Unpaved road dust only
7. Wood Space Heating only

Annual Arithmetic Mean TSP Major Contributing Sources

	All Point Sources (Only) Model Runs DEQGE37 DEQEV83		All Area Sources (Only) Model Run DEQEB10		Transportation Area Sources, Only Model Run DEQEG5X		Paved Road Dust Only Model Runs DEQEE2C DEQEG1Z		Unpaved Road Dust Only Model Runs DEQEG2D DEQEU2E		Wood Space Heating Only Model Run DEQGE1X DEQGE49	
	1978	1987	1978	1987	1978	1987	1978	1987	1978	1987	1978	1987
1. Commerce	1.80	1.66	25.54	33.60	17.16	20.63	12.72	15.79	2.68	3.38	7.32	12.33
2. Westmorland	1.19	.93	12.90	18.68	9.33	11.46	5.95	7.61	2.80	3.88	2.86	6.94
3. So. Eugene	1.16	.93	7.22	10.58	5.00	6.18	2.73	3.48	2.10	2.79	2.81	7.18
4. Oakway	2.14	1.99	16.44	21.58	12.70	14.20	10.14	11.94	1.69	3.05	3.13	6.68
5. Library	3.77	3.23	20.46	26.64	15.98	18.69	12.34	14.77	2.57	3.25	3.90	7.38
6. Thurston	12.25	10.64	16.33	24.91	13.24	17.78	7.80	10.68	4.99	6.80	3.31	6.10
7. DMV	4.11	2.29	21.97	29.44	16.79	20.07	11.23	13.71	4.74	5.94	3.89	7.79
8. NW Bell	4.3	3.18	23.31	30.60	17.99	21.16	12.[illegible]	14.82	4.69	5.84	4.21	8.05
9. City Shops	4.01	2.72	21.64	28.41	16.50	19.96	11.12	13.38	4.96	6.18	3.57	6.95
10. GRID 11,4	17	15	24	29	19	21	8	9	10	11	3	7
11. GRID 3,4	1	1	17	30	14	24	5	8	9	15	1	4
12. GRID 4,5	4	3	22	29	18	22	13	16	5	6	2	4
13. GRID 5,4	1	1	21	29	14	17	9	11	4	5	5	11
14. GRID 6,3	1	1	24	33	15	17	11	13	3	4	7	15
15. GRID 8,5	2	1	23	30	19	22	12	15	5	6	4	7
16. GRID 8,4	3	2	22	28	18	22	14	17	3	4	3	6
17. GRID 7,4	6	6	17	23	13	15	7	8	5	6	4	7
18. GRID 12,4	16	13	17	26	13	19	6	8	7	10	3	7
19. GRID 5,5	2	2	19	25	14	15	10	11	3	4	3	7

TABLE II A. Annual Geometric Mean TSP – Major Contributing Sources to 1978 and 1987 TSP Levels (μg/m³)

	1987 Exceedance Over 60 μg/m³ Standard (1)	Point Source Impacts (2) 1978	Point Source Impacts (2) 1987	Area Source Impacts (3) 1978	Area Source Impacts (3) 1987	Transportation Impacts (4) 1978	Transportation Impacts (4) 1987	Paved Road Impacts (5) 1978	Paved Road Impacts (5) 1987	Unpaved Road Impacts (6) 1978	Unpaved Road Impacts (6) 1987	Wood Burning Impacts (7) 1978	Wood Burning Impacts (7) 1987
1. Commerce	0	1.5	1.4	21.3	28.1	14.3	16.7	10.6	13.3	2.2	2.8	6.1	10.3
2. Westmorland	0	1.0	0.8	10.4	15.1	7.5	9.2	4.8	6.1	2.3	3.1	2.3	5.3
3. So. Eugene	0	0.9	0.7	5.6	8.2	3.9	4.8	2.1	2.7	1.6	2.2	1.6	3.2
4. Oakway	0	1.9	1.7	14.2	18.7	11.0	12.3	8.8	10.3	1.5	1.8	2.7	5.8
5. Library	4.0	3.2	2.8	17.6	22.9	13.7	16.0	10.6	12.7	2.2	2.8	3.4	6.3
6. Thurston	0	10.0	8.7	13.3	20.4	10.8	14.5	6.4	8.7	4.1	5.6	1.9	5.0
7. DMV	[illegible]	3.6	2.0	19.3	25.9	14.8	17.7	9.9	12.1	4.2	5.2	3.4	6.9
8. [illegible]	[illegible]	3.6	2.7										
9. City Shops	18.8	3.4	2.3	18.2	23.9	14.1	16.8	9.4	11.3	4.2	4.9	3.0	6.3
10. GRID 11,4	11.4	14.1	12.5	19.9	24.1	15.8	17.4	6.6	7.5	8.3	9.1	2.5	5.2
11. GRID 3,4	0	.8	.8	14.1	24.9	11.6	19.9	4.2	6.6	7.5	12.5	0.8	3.3
12. GRID 4,5	0	3.3	2.5	18.3	24.1	14.9	18.3	10.8	13.3	4.2	5.0	1.7	3.3
13. GRID 5,4	0	.8	.8	17.4	24.1	11.6	14.1	7.5	9.1	3.3	4.2	4.2	9.1
14. GRID 6,3	1.4	.8	.8	19.9	27.4	12.5	14.1	9.1	10.8	2.5	3.3	5.8	13.5
15. GRID 8,5	0	1.7	.8	19.1	24.9	15.8	18.3	10.0	12.5	4.2	5.0	3.3	5.8
16. GRID 8,4	0	2.5	1.7	18.3	23.2	14.9	18.3	11.6	14.1	3.5	3.3	2.5	5.0
17. GRID 7,4	0	5	5	14.1	19.1	10.8	12.5	5.8	6.6	4.2	5.0	3.3	5.8
18. GRID 12,4	6.4	13.3	10.8	14.1	21.6	10.8	15.8	5.0	6.6	5.8	8.3	2.5	5.8
19. GRID 5,5	0	1.7	1.7	15.8	20.8	11.6	12.5	8.3	9.1	2.5	3.3	2.5	5.8

1. From Table IA
2. From "all point sources" model run with long term average meteorology (1977-78 365 day average regime frequencies), and selective plume trapping. 1978 emissions = RACT, except for Kingsford and Veneer driers. 1987 emissions = RACT.
3. From "all area sources" model runs with long term average (LTA) emissions rates and meteorology (1977-78 365 day average regime frequencies), and selective plume trapping.
4. Combination of three VMT-based area sources--paved and unpaved road dust, and motor vehicle exhaust
5. Paved road dust only
6. Unpaved road dust only
7. Wood Space Heating only

Table IIE, "Average" Worst Case, 24-hr. ave. TSP - Major Contributing Sources (μg/m³)

	1987 Exceedance Over 150 μg/m³ Standard (1)	Point Source Impacts (2)		Area Source Impacts (3)		Transportation Impacts (4)		Paved Road Impacts (5)		Unpaved Road Impacts (6)		Wood Burning Impacts (7)	
		1978	1987	1978	1987	1978	1987	1978	1987	1978	1987	1978	1987
1. Commerce	6.9	2.4	2.3	48.4	63.5	37.5	37.7	34.1	29.8	5.1	6.3	13.9	23.4
2. Westmorland	14.3	2.2	2.0	21.5	35.6	18.0	21.4	11.9	14.9	4.8	6.4	5.4	13.8
3. So. Eugene	0	2.6	2.3	8.2	11.9	5.8	7.2	3.0	3.8	2.8	3.7	2.3	4.7
4. Oakway	0	2.4	2.3	29.2	38.6	22.9	25.7	18.3	21.5	3.2	3.9	5.4	11.8
5. Library	3.3	7.4	4.8	37.6	48.5	29.2	33.7	22.7	27.0	4.5	5.7	7.3	13.6
6. Thurston	0	7.1	6.4	25.6	39.5	21.1	28.8	13.9	17.9	7.5	10.5	3.3	9.4
7. DMV	5.2	9.6	4.0	41.8	55.8	32.0	38.1	20.8	25.4	4.8	12.1	7.3	14.6
8. [illegible]	25.6	11.7	6.3	43.1	55.9	33.1	38.7	21.9	26.1	9.7	11.9	7.6	14.5
9. City Shops	70.3	12.2	6.3	39.8	51.8	31.0	36.6	19.5	23.4	10.3	12.6	6.3	12.3
10. GRID 11,4	0	13	12	42	51	35	37	13	15	20	21	6	12
11. GRID 3,4	0	3	2	34	61	29	50	10	16	17	30	3	8
12. GRID 4,5	0	7	6	43	55	35	42	25	30	9	12	4	9
13. GRID 5,4	0	2	2	43	59	29	33	18	23	7	9	11	22
14. GRID 6,3	0	4	4	39	55	26	28	19	22	5	6	13	25
15. GRID 8,5	0	2	1	43	57	35	42	23	29	9	11	7	14
16. GRID 8,4	0	4	3	41	53	35	41	28	34	5	6	6	11
17. GRID 7,4	0	9	9	31	41	24	28	13	16	8	10	6	12
18. GRID 12,4	0	11	10	26	42	21	30	9	13	11	16	4	10
19. GRID 5,5	0	3	2	37	48	26	28	18	20	6	17	7	14

1. From Table IB
2. From "all point sources" model runs with "average worst case" meteorology (Regime 7), and selective plume trapping. 1978 emissions=RACT except for Kingsford and Veneer Dryers (DEQGE37). 1987 emissions=RACT (DEQEV83)
3. From "all area sources" model runs (DEQEBIU) with long term average (LTA) emissions rates, "average worst case" meteorology (Regime 7), and selective plume trapping.
4. Combination of three VMT-based area sources--paved and unpaved road dust, and motor vehicle exhaust (DEQEG5X)
6. Unpaved road dust only. (DEQEG2D; DEQEU2E)
7. Wood Space Heating only. (DEQGEIX; DEQGE44)

Table II C. "Worst" Worst Case, 24-hr ave. TSP - Major Contributing Sources (μg/m³)

	1987 Exceedance[1] over 150 μg/m³ Standard	Point Source Impacts[2] 1978	Point Source Impacts[2] 1987	Area Source Impacts[3] 1978	Area Source Impacts[3] 1987	Transportation Impacts[4] 1978	Transportation Impacts[4] 1987	Paved Road Impacts[5] 1978	Paved Road Impacts[5] 1987	Unpaved Road Impacts[6] 1978	Unpaved Road Impacts[6] 1987	Wood Burning Impacts[7] 1978	Wood Burning Impacts[7] 1987
1. Commerce	7.9	13.1	11.3	66.6	83.9	46.4	52.9	34.9	42.5	7.3	9.0	17.8	30.3
2. Westmorland	13.3	10.9	9.4	39.8	55.0	28.4	33.2	19.2	23.2	7.5	9.7	9.3	19.2
3. So. Eugene	0	6.8	4.6	12.9	18.8	9.1	11.3	5.2	6.4	3.4	4.5	3.4	7.0
4. Oakway	0	13.5	9.8	47.4	62.5	39.0	44.4	29.9	35.4	6.6	8.1	7.1	16.7
5. Library	1.8	50.1	41.1	54.9	71.0	43.1	49.5	31.6	37.7	8.7	10.5	10.1	19.5
6. Thurston	0	9.9	8.5	28.4	44.9	23.0	32.0	15.4	21.6	7.1	10.5	3.7	10.5
7. DMV	1.4	51.1	37.5	55.0	74.1	42.3	50.5	26.8	32.9	13.6	16.6	9.2	19.3
8 [illegible] Bell	25.4	66.4	54.8	62.1	81.2	48.2	56.3	31.3	37.3	14.6	17.7	10.9	21.5
9 City Shops	71.1	60.4	48.7	57.4	75.3	45.1	53.1	28.7	34.4	14.5	17.7	9.4	19.3
10 GRID 3,4	16.0	4	3	57	98	47	78	17	28	27	46	7	17
11. GRID 4,5	93.0	34	27	80	100	65	75	46	55	17	20	9	18
12. GRID 5,4	25.0	15	13	70	95	47	56	30	37	12	15	17	33
13 GRID 11,4	36.0	53	49	55	71	45	50	19	23	23	26	8	17
14 GRID 8,4	17.0	34	26	60	76	50	58	40	48	7	9	8	16
15. GRID 6,3	0	3	2	53	75	33	38	24	28	7	13	18	35
16. GRID 8,5	3.0	21	14	56	74	45	53	29	37	12	15	9	19
17 GRID 7,4	5.0	30	25	64	70	44	52	27	33	14	17	8	16
18 GRID 9,5	0	37	25	40	57	27	33	17	23	8	9	10	21
19, GRID 5,5	0	7	7	57	73	42	45	30	33	9	10	10	21
20 GRID 3,6	0	8	7	48	67	39	48	26	32	11	13	6	15

1. From Table IC
2. From "all point sources" model run with "worst worst case" meteorology (February 18, 1977), and selective plume trapping. 1978 emissions=RACT, except for Kingsford and Veneer Dryers (DEQEVIT). 1987 emissions=RACT (DEQEE9U).
3. From "all area sources" model runs (DEQEVIY) with long term average (LTA) emissions rates, "worst worst case" meteorology (February 18, 1977), and selective plume trapping.
4. Combination of 3 VMT-based area sources--paved and unpaved road dust, and motor vehicle exhaust (DEQEVIY)
5. Paved road dust only. (DEQEE9U)
6. Unpaved road dust only. (DEQEE9U)
7. [illegible]

TABLE III A. Annual Geometric (10) Mean TSP – Effectiveness of Area Source Strategies Toward 1987 Attainment.* (µg/m³)

	1987 Exceedance of 60 µg/m³ Standard (1)	Pave Unpaved Roads and Lots (2) Worst 10 miles	Pave Unpaved Roads and Lots 100% (3)	Reduce Trackout onto Paved Roads (4) 50%	Reduce Trackout onto Paved Roads (4) 100%	VMT Reductions (5) 10%	VMT Reductions (5) 20%	Wood Space Heating: Burn Drier Wood (6)	Wood Space Heating: Weatherize (7) All Wood Burning Homes	Wood Space Heating: Weatherize (7) All Wood Stove Homes	Combined Area Source Strategies (8) Comb #1	Combined Area Source Strategies Comb #2 (9)
Tons/Yr Eliminated		1046	1648	5.0	1000	484	968	577	1335	663	2934	4642
% Less 1987 Tons/yr		63%	100%	16%	32%	10%	20%	26%	60%	30%	43%	66%
1. Commerce	0	1.8	3.8	1.9	3.8	1.7	3.3	2.7	6.2	3.1	9.4	15.9
2. Westmorland	0	2.0	3.1	1.2	2.4	0.9	1.8	1.3	3.1	1.5	6.8	9.7
3. So. Eugene	0	1.2	2.0	0.2	0.5	0.5	0.9	0.8	1.9	1.0	2.9	5.2
4. Oakway	0	1.0	1.5	0.8	1.5	1.2	2.5	1.5	3.5	1.7	5.1	9.3
5. Library	4.0	1.8	2.9	2.2	4.4	1.6	3.2	1.6	3.8	1.9	8.1	13.3
6. Thurston	0	3.6	5.8	2.5	5.1	1.5	2.9	1.3	3.1	1.5	10.1	14.5
7. Dmv	0.9	3.3	5.3	2.5	4.9	1.8	3.5	1.8	4.1	2.1	10.9	16.7
8. Ma Bell	12.4	3.1	4.9	3.1	6.2	1.8	3.6	1.8	4.1	2.0	11.2	17.4
9. City Shops	13.9	3.3	5.2	2.9	5.9	1.7	3.4	1.5	3.5	1.8	10.0	16.6
10. GRID 11,4	11.4	6.3	10.0	1.7	3.3	1.7	3.3	1.8	4.2	2.1	12.5	18.1
11 GRID 3,4	0	8.9	14.1	2.5	5.0	2.1	4.2	1.1	2.5	1.2	18.3	20.8
12. GRID 4,5	0	3.2	5.0	4.6	9.1	2.1	4.2	1.1	2.5	1.2	10.0	17.4
13 GRID 5,4	0	2.7	4.2	1.7	3.3	1.2	2.5	2.2	5.0	2.5	10.0	14.9
14 GRID 6,3	1.4	2.1	3.3	0.8	1.7	1.2	2.5	3.2	7.5	3.7	8.3	14.9
15. GRID 8,5	0	3.7	5.8	2.5	5.0	2.1	4.2	1.8	4.2	2.1	10.0	13.3
16 GRID 8,4	0	2.1	3.3	0	0	1.7	3.3	1.1	2.5	1.2	7.5	12.5
17. GRID 7,4	0	3.7	5.8	0.4	0.8	1.2	2.5	1.8	4.2	2.1	5.0	11.6
18. GRID 12,4	6.9	5.7	9.1	1.2	2.5	1.7	3.3	1.4	3.3	1.7	11.6	19.9
19. GRID 5,5	0	2.1	3.3	2.5	5.0	1.2	2.5	1.4	3.3	1.7	7.5	13.3

*Each strategy's effectiveness (in 1987 ug/m³) was estimated by subtracting a 1987 "all area sources" run with strategies applied, from a 1987 baseline "all area sources" run. Strategies with smaller percent reductions were scaled from model runs of similar strategies with larger percentage reductions in the same sources. 1987 long term average (LTA) emissions rates were used, along with LTA meteorology (1977-78 365-day ave.)

1. From Table IA.
2. Paving 10 miles of unpaved roads (5 miles each in Eugene and Springfield) with highest inventoried TSP emissions.
3. Paving all inventoried unpaved roads.
4. Reducing "Trackout" surcharge to paved road dust emissions inventory by 50% and 100%
5. Reducing areawide VMT by 10% and 20%
6. Burning only seasoned firewood (average moisture content reduced from 28% to 20%)
7. Weatherizing homes to Portland Energy Policy Standards (60% average redustion in heating requirements)—for all wood burning homes, or all wood stove homes, by 1987.
8. Combination of 5 less stringent strategies--i.e., paving 10 worst miles, 50% Trackout reduction, 10% VMT reduction, burn drier wood, and weatherize all woood stove homes by 1987.
9. Combination of 5 more stringent strategies--i.e., paving 100% of unpaved roads, 100% trackout removal, 20% VMT reduction, burn drier wood, and weatherize all wood burning homes.

	PEQEBIV – PEQGESV (EUGSTLTTSTAR) Annual Arithmetic Mean TSP * — Pave (EUGSTLTNUCPARZ) 100% Unpaved Roads: All Area 1987 – 1989 = Δ µg/m³	x.63 PAVE WEST 36 MILES Δ µg/m³	PEQEBIV – PEQEE3X 100% Trackout Removal = Δ µg/m³	x0.5 50% Trackout Removal Δ µg/m³	PEQEBIV – PEQGE3P (EUGSTLTNTRANSAR2) 20% VMT Reduction = Δ µg/m³	x.5 10% VMT Reduction Δ µg/m³	PEQEBIV – PEQEGHX (EUGSTLTNWOOTARS) Weatherize All Wood Burning Homes 60% Wood Heat Reduction = Δ µg/m³	.5 30% Reduction Δ µg/m³	Burn Dry Wood .666 20% Reduction Δ µg/m³	PEQEBIV – PEQEGEV (EUGSTLTNALSTRAR2) Combo (12) = Δ µg/m³ (66% less TSP)	PEQEBIV – PEQEGEV (EUGSTLTNALSTRAR1) Combo (11) = Δ µg/m³ (47% less TSP)
1. Commerce (.835)	33.60 - 30.26 = 3.34	2.10	-29.0 = 4.60	2.3	-29.59 = 4.01	2.0	-26.21 = 7.39	3.7	3.2	-14.63 = 19.0	-22.44 = 11.2
2. Westmorland (.807)	18.18 - 14.32 = 3.86	2.43	-15.23 = 2.95	1.48	-16.39 = 2.29	1.145	-14.85 = 3.83	1.92	1.66	-6.73 = 12.6	-10.24 = 8.4
3. So. Eugene (.872)	10.58 - 8.03 = 2.55	1.61	-9.97 = .61	.31	-9.35 = 1.23	.615	-8.09 = 2.49	1.245	1.08	-3.91 = 6.7	-6.90 = 3.7
4. Oakway (.865)	21.53 - 19.79 = 1.74	1.13	-19.35 = 1.79	.90	-18.74 = 2.84	1.42	-17.57 = 4.01	2.0	1.74	-10.90 = 10.7	-15.71 = 5.9
5. Library (.859)	26.64 - 23.32 = 3.32	2.09	-21.52 = 5.12	2.56	-22.91 = 3.73	1.87	-22.21 = 4.43	2.22	1.92	-11.15 = 15.5	-17.24 = 9.4
6. Thurston (.817)	24.91 - 17.87 = 7.04	4.44	-18.72 = 6.19	3.10	-21.33 = 3.58	1.79	-21.17 = 3.74	1.87	1.62	-7.24 = 17.7	-12.49 = 12.4
7. DMV (.880)	29.44 - 23.47 = 5.97	3.76	-23.83 = 5.61	2.81	-25.42 = 4.02	2.01	-24.76 = 4.68	2.34	2.03	-10.42 = 19.0	-17.09 = 12.35
8. City Shop (.842)	28.41 - 22.19 = 6.22	3.92	-21.42 = 6.99	3.50	-24.41 = 4.0	2.0	-24.23 = 4.18	2.09	1.81	-8.68 = 19.7	-15.63 = 12.8
9. 28th & C —	36.37 - 26.10 = 10.27	6.47	-27.03 = 9.34	4.67	-31.04 = 5.33	2.67	-31.88 = 4.49	2.25	1.95	-9.65 = 26.7	-18.54 = 17.8
10. PNW Bell (.845)	30.60 - 24.71 = 5.81	3.71	-23.25 = 7.35	3.68	-26.37 = 4.23	2.12	-25.96 = 4.84	2.42	2.1	-9.98 = 20.6	-17.38 = 13.2
11. GRID 11,41 (.83)	29 - 17 = 12	7.6	-25 = 4	2	-25 = 4	2	-24 = 5	2.5	2.2	-12 = 17	-14 = 15
12. GRID 3,4	30 - 13 = 17	10.7	-24 = 6	3	-25 = 5	2.5	-27 = 3	1.5	1.3	-5 = 25	-8 = 22
13. GRID 4,5	29 - 23 = 6	3.8	-18 = 11	5.5	-24 = 5	2.5	-26 = 3	1.5	1.3	-8 = 21	-17 = 12
14. GRID 5,4	29 - 24 = 5	3.2	-25 = 4	2	-26 = 3	1.5	-23 = 6	3	2.6	-11 = 18	-17 = 12
15. GRID 6,3	33 - 29 = 4	2.5	-31 = 2	1	-30 = 3	1.5	-24 = 9	4.5	3.9	-15 = 18	-23 = 10
16. GRID 8,5	30 - 23 = 7	4.4	-24 = 6	3	-25 = 5	2.5	-25 = 5	2.5	2.2	-14 = 16	-18 = 12
17. GRID 8,4	28 - 24 = 4	2.5	-28 = 0	0	-24 = 4	2	-25 = 3	1.5	1.3	-13 = 15	-19 = 9
18. GRID 7,4	23 - 16 = 7	4.4	-22 = 1	0.5	-20 = 3	1.5	-18 = 5	2.5	2.2	-9 = 14	-17 = 6
19. GRID 12,4	26 - 15 = 11	6.9	-23 = 3	1.5	-22 = 4	2	-22 = 4	2	1.7	-8 = 18	-12 = 14
20. GRID 5,5	25 - 21 = 4	2.5	-19 = 6	3	-22 = 3	1.5	-21 = 4	2	1.7	-9 = 16	-16 = 9

* Used 1977-78 LTA ave. typical maquis frequencies

	DEQEBIU (EUG87LTAUNIDAR3) DEQ6L5V (EUG87LTAUNIDAR3) All Area (100%) Paved Roads = 1989 1987 Δ µg/m³	.63 → Pave worst 5.0 miles Δ µg/m³	DEQEBIU (EUG87LTATSPAR) 100% Trackout Removal =	Δ µg/m³	DEQEG3X (EUG87LTAPRDAR3) .5 → 50% Trackout Remov Δ µg/m³	DEQGE3Q (EUG87LTATRANSAR3) 20% VMT Reduction =	Δ µg/m³	.5 → 10% VMT Reduction Δ µg/m³	DEQEGHK (EUG87LTAWCDAR3) 60% Wood Heat Reduction =	Δ µg/m³	.5 → (30%) Δ µg/m³	.366 → Burn Drier Wood (26%) Δ µg/m³	DEQGEUU (EUG87ALSTRAR1) Stationary Control #1 =	(42% less TSP) µg/m³	DEQGEUU (EUG87ALSTRAR2) Stationary Control #2 =	(66% less TSP) µg/m³
1. Commerce	63.47-57.13 = 6.34	3.99	-55.11 =	8.36	4.18	-55.42 =	7.55	3.78	-49.41 =	14.06	7.03	6.09	-42.93 =	20.54	-27.86 =	35.61
2. Westmorland	35.60-29.35 = 6.25	3.94	-30.01 =	5.59	2.795	-31.33 =	4.27	2.14	-28.07 =	7.53	3.77	3.36	-20.39 =	15.21	-13.44 =	22.16
3. So. Eugene	11.90 - 8.74 = 3.06	7.93	-11.57 =	.33	.17	-10.48 =	1.42	.71	-9.13 =	2.77	1.39	1.20	-8.05 =	3.85	-4.41 =	7.49
4. Oakway	38.55-35.26 = 3.29	2.07	-34.94 =	3.61	1.81	-33.42 =	5.13	2.57	-31.47 =	7.08	3.54	3.07	-28.18 =	10.37	-19.70 =	18.85
5. Library	48.46-42.81 = 5.65	3.56	-38.20 =	10.26	5.13	-41.73 =	6.72	3.37	-40.31 =	8.15	4.08	3.53	-30.66 =	17.80	-19.74 =	28.72
6. Thurston	39.54-28.93 = 10.61	6.68	-28.33 =	11.21	5.61	-33.76 =	5.78	2.89	-33.85 =	5.69	2.85	2.47	-19.69 =	19.85	-10.97 =	28.57
7. Dinv	55.82-43.86 = 11.96	7.53	-44.76 -	11.06	5.53	-48.21 =	7.61	3.81	-47.11 =	8.71	4.36	3.77	-31.76 =	24.06	-19.46 =	36.36
8. City Shops	51.76 - 39.15 = 12.61	7.94	-38.29 =	13.47	6.74	-44.44 =	7.32	3.66	-44.42 =	7.34	3.67	3.18	-27.16 =	24.60	-14.65 =	37.11
9. 20th & C	65.57-46.49 = 19.08	12.0	-49.75 =	15.82	7.91	-57.55 =	8.02	4.01	-59.75 =	5.82	2.91	2.52	-33.06 =	32.51	-16.95 =	48.62
10. FNW Bell	55.44 - 44.05 = 11.89	7.5	-41.69 =	14.25	7.13	-48.21 =	7.73	3.87	-47.26 =	8.68	4.34	3.76	-30.43 =	25.51	-16.97 =	38.97
11. GRID 11,4	51 - 29 =	22	-44 =	7.	3.5	-44 =	7	3.5	-44 =	7	3.5	3.03	-25 =	26	-22 =	29
12. GRID 3,4	61 - 27 =	34	-50 =	11	5.5	-51 =	10	5	-56 =	5	2.5	2.2	-17 =	44	-10 =	51
13. GRID 4,5	55 - 44 =	11	-36 =	19	9.5	-46 =	9	4.5	-49 =	6	3.0	2.6	-33 =	22	-16 =	39
14. GRID 5,4	59 - 50 =	9	-51 =	8	4	-52 =	7	3.5	-46 =	13	6.5	5.6	-35 =	24	-23 =	36
15. GRID 6,3	55 - 49 =	6	-53 =	2	1	-49 =	6	3	-40 =	15	7.5	6.5	-39 =	16	-26 =	29
16. GRID 8,5	57 - 45 =	12	-54 =	3	1.5	-49 =	8	4	-49 =	8	4	3.47	-35 =	22	-26 =	31
17. GRID 8,4	53 - 47 =	6	-44 =	9	4.5	-45 =	8	4	-46 =	7	3.5	3.03	-36 =	17	-25 =	28
18. GRID 7,4	41 - 30 =	9	-39 =	2	1	-35 =	6	3	-34 =	7	3.5	3.03	-31 =	10	-17 =	24
19. GRID 12,4	42 - 25 =	17	-36 =	6	3	-35 =	7	3.5	-35 =	7	3.5	3.03	-19 =	23	-12 =	30
20. GRID 5,5	48 - 40 =	8	-37 =	11	5.5	-42 =	6	3	-39 =	4	4.5	3.90	-30 =	18	-18 =	30

TABLE III A. "Average" Worst Case, 24-hr. avg. TSP – Area Source Strategy Effectiveness Toward 1987 Attainment* (µg/m³)

	1987 Exceedance of 150 µg/m³ Standard (1)	Pave Unpaved Roads and Lots: (2) Worst 10 miles	Pave Unpaved Roads and Lots: 100% (3)	Reduce Trackout onto Paved Roads (4): 50%	Reduce Trackout onto Paved Roads (4): 100%	VMT Reduction (5): 10%	VMT Reduction (5): 20%	Wood Space Heating: Burn Drier Wood (6)	Wood Space Heating: Weatherize (7): All Wood Burning Homes	Wood Space Heating: Weatherize (7): All Wood Stove Homes	Combined Area Source Strategies: (8) Combo #1	Combined Area Source Strategies: Combo #2 (9)
Model Run ID.		—*—	DEYGESV	—*—	DEYEG3X				DEYEG4X			
Ton/Yr Eliminated		1046	7648	500	1000	484	968	577	1325	663	2934	4642
% Less 1987 Ton/Yr		63%	100%	16%	32%	10%	20%	26%	60%	30%	42%	66%
1. Commerce	6.9	4.0	6.3	4.2	8.4	3.8	7.55	6.1	14.1	7.0	26.5	35.6
2. Westmorland	14.3	3.9	6.3	2.8	5.6	2.1	4.3	3.3	7.5	3.8	15.2	22.2
3. So. Eugene	0	2.0	3.2	0.17	0.33	0.7	1.4	1.2	2.8	1.4	3.9	7.5
4. Oakway	0	2.1	3.3	1.80	3.61	2.6	5.1	3.1	7.1	3.5	10.4	18.9
5. Library	3.3	3.6	5.7	5.1	10.3	3.4	6.7	3.5	8.2	4.1	17.8	28.7
6. Thurston	0	6.7	10.6	5.6	11.2	2.9	5.8	2.5	5.7	2.9	19.9	28.6
7. DMV	5.2	7.5	12.0	5.5	11.1	3.8	7.6	3.8	8.7	4.4	24.1	36.4
8. NW Bell	25.6	7.5	11.9	7.1	14.3	3.7	7.7	3.8	8.7	4.3	25.5	37.0
9. City Shops	70.2	7.9	12.6	6.7	13.5	3.7	7.3	3.2	7.3	3.7	24.6	32.1
10. GRID 11,4	0	13.9	22.0	3.5	7.0	3.5	7.0	3.0	7	3.5	26	29
11. GRID 3,4	0	21.4	34.0	5.5	11.0	5.0	10.0	2.2	5	2.5	44	51
12. GRID 4,5	0	6.9	11.0	9.5	19.0	4.5	9.0	2.6	6	3.0	22	39
13. GRID 5,4	0	5.7	9.0	4.0	8.0	3.5	7.0	5.6	13	6.5	24	36
14. GRID 6,3	0	3.8	6.0	1.0	2.0	3.0	6.0	6.5	15	7.5	16	29
15. GRID 8,5	0	7.6	12.0	1.5	3.0	4.0	8.0	3.5	8	4.0	22	31
16. GRID 8,4	0	3.8	6.0	4.5	9.0	4.0	8.0	3.0	7	3.5	17	28
17. GRID 7,4	0	6.9	11.0	1.0	2.0	3.0	6.0	3.0	7	3.5	10	24
18. GRID 12,4	0	10.7	12.0	3.0	6.0	3.5	7.0	3.0	7	3.5	23	30
19. GRID 5,5	0	5.0	8.0	5.5	11.0	3.0	6.0	3.4	9	4.5	18	30

*Each strategy's effectiveness (in 1987 ug/m³) was estimated by subtracting a 1987 "all area sources" run with strategies applied, from a 1987 baseline "all area sources" run. Strategies with smaller percent reductions were scaled from model runs of similar strategies with larger percentage reductions in the same sources. 1987 long term average (LTA) emissions rates were used, along with "average worst case" meteorology (Regime 7).

1. From Table IB.
2. Paving 10 miles of unpaved roads (5 miles each in Eugene and Springfield) with highest inventoried TSP emissions.
3. Paving all inventoried unpaved roads.
4. Reducing "Trackout" surcharge to paved road dust emissions inventory by 50% and 100%
5. Reducing areawide VMT by 10% and 20%
6. Burning only seasoned firewood (average moisture content reduced from 28% to 20%)
7. Weatherizing homes to Portland Energy Policy Standards (60% average reduction in heating requirements)--for all wood burning homes, or all wood stove homes, by 1987.
8. Combination of 5 less stringent strategies--i.e., paving 10 worst miles, 50% Trackout reduction, 10% VMT reduction, burn drier wood, and weatherize all woood stove homes by 1987.
9. Combination of 5 more stringent strategies--i.e., paving 100% of unpaved roads, 100% trackout removal, 20% VMT reduction, burn drier wood, and weatherize all wood burning homes.

TABLE III C. "Worst" Worst Case, 24-hr. ave. TSP - Area Source Strategy Effectiveness Toward 1987 Attainment* (ug/m³)

	1987 Exceedance of 150 ug/m³ Standard[1]	Pave Unpaved Roads, Lots: Worst 10 miles[2]	Pave Unpaved Roads, Lots: 100%[3]	Reduce Trackout Onto Paved Roads: 50%[4]	Reduce Trackout Onto Paved Roads: 100%[4]	VMT Reduction: 10%[5]	VMT Reduction: 20%[5]	Wood Space Heating: Burn Drier Wood[6]	Wood Space Heating: Weatherize All Wood Burning Homes[7]	Wood Space Heating: Weatherize All Wood Stove Homes[7]	Combined Area Source Strategies: Combo #1[8]	Combined Area Source Strategies: Combo #2[9]
% Fine (<15µ) Tons/yr Eliminated		1046	1148	500	1000	484	968	577	1325	663	2934	3342
% Less 1987 Tons/yr		63%	100%	16%	32%	10%	20%	26%	60%	30%	42%	55%
1. Commerce	9.9	5.1	8.1	5.6	11.2	5.3	10.6	7.9	18.2	9.1	26.3	49.2
2. Westmorland	18.3	5.7	9.0	4.6	9.1	3.3	6.7	5.0	11.6	5.8	21.8	34.3
3. So. Eugene	0	2.9	4.6	0.6	1.2	1.1	2.3	1.8	4.2	2.1	7.2	11.8
4. Oakway	0	4.9	7.7	3.1	6.2	4.5	8.9	4.3	10.0	5.0	19.0	31.4
5. Library	1.8	6.6	10.5	7.4	14.8	4.9	9.9	5.1	11.8	5.9	29.7	43.4
6. Thurston	0	4.2	6.6	6.6	13.2	3.3	6.6	2.8	6.5	3.2	22.0	34.1
7. DIMV	14	10.4	16.6	7.5	15.1	5.0	10.1	5.0	11.6	5.8	32.8	47.8
8. PNW Bell	25.9	11.2	17.7	9.5	19.0	5.6	11.2	5.6	13.0	6.5	36.7	55.7
9. City Shops	71.1	11.0	17.5	9.1	18.1	5.3	10.6	4.9	11.3	5.7	35.0	49.0
10. GRID 3,4	160	31.5	50.0	8	16	7.5	15	4.3	10	5	67	81
11. GRID 4,5	430	12	19	15	30	7.5	15	4.8	11	5.5	37	67
12. GRID 5,4	250	10.7	17	7	14	6	12	8.7	20	10	37	59
13. GRID 11,4	360	18.3	29	5	10	5.5	11	4.8	11	5.5	36	41
14. GRID 8,4	170	5.7	9	8	16	6	12	4.3	10	5	27	48
15. GRID 6,3	0	5.7	9	1.5	3	4	8	9.1	21	10.5	25	41
16. GRID 8,5	3.0	9.5	15	3	6	5	10	4.8	11	5.5	30	40
17. GRID 7,4	30	11.3	18	4	8	5	10	4.3	10	5	20	42
18. GRID 9,50	0	6.3	10	2.5	5	3.5	7	5.6	13	6.5	22	32
19. GRID 5,5	0	6.9	11	6	12	4.5	9	5.6	13	6.5	25	42
20. GRID 3,6	0	10.1	16	7	14	5	10	4.3	10	5	29	44

*Each strategy's effectiveness (in 1987 ug/m³) was estimated by subtracting a 1987 "all area sources" run with strategies applied, from a 1987 baseline "all area sources" run. Strategies with smaller percent reductions were scaled from model runs of similar strategies with larger percentage reductions in the same sources. 1987 long term average (LTA) emissions rates were used, along with "worst worst case" meteorology (February 18, 1977).

1. From Table IC.
2. Paving 10 miles of unpaved roads (5 miles each in Eugene and Springfield) with highest inventoried TSP emissions.
3. Paving all inventoried unpaved roads.
4. Reducing "Trackout" surcharge to paved road dust emissions inventory by 50% and 100%
5. Reducing areawide VMT by 10% and 20%
6. Burning only seasoned firewood (average moisture content reduced from 28% to 20%)
7. Weatherizing homes to Portland Energy Policy Standards (60% average reduction in heating requirements)--for all wood burning homes, or all wood stove homes, by 1987.
8. Combination of 5 less stringent strategies--i.e., paving 10 worst miles, 50% Trackout reduction, 10% VMT reduction, burn drier wood, and weatherize all woood stove homes by 1987.
9. Combination of 5 more stringent strategies--i.e., paving 100% of unpaved roads, 100% trackout removal, 20% VMT reduction, burn drier wood, and weatherize all wood burning homes.

	Combo #1 LTATSPAN (Cycle 3) DEGEVIY 1990 (All) − Combo #1 = Δ µg/m³	Combo #2 DEGEVIV − DEGEEGC LTAALSTRAN(3) 1987 All − Combo #2 = Δ µg/m³	(LTAEPRDAR3) DEGEVIV − DEGEE 90 Paving UPRD 100% of UPRD Δ µg/m³	Worst 5.0 miles 0.63 Δ µg/m³	Trackout Reductions DEGEVIV − DEGEE13 (LTATRDAR3) Cycle 2 12% Δ µg/m³	50% 0.5 Δ µg/m³	Transport 50% Reduction VMT Reductions DEGEVIV − DEGEVIY (LTATRANSAR3) Cycle (30%) Δ µg/m³	(15%) 0.5 Δ µg/m³	DEGEVIV − DEGEVIY (LTAWSEDAR3) Woodstove Heating Weatherization (60%) Δ µg/m³	(30%) 0.5 Δ µg/m³	Rain Drop (26%) Δ µg/m³
1. Commerce	55.94 − 59.65 = 26.29	55.94 − 38.74 = 47.20	−47.81 = 5.13	5.12	−74.74 = 11.20	5.60	−75.36 = 10.58	5.29	−57.79 = 18.15	9.08	7.86
2. Westmorland	54.95 − 33.10 = 21.76	54.95 − 20.69 = 34.26	−45.95 = 9.00	5.67	−45.84 = 9.11	4.56	−48.30 = 6.65	3.33	−43.4 = 11.55	5.78	5.0
3. So. Eugene	18.77 − 11.55 = 7.22	−7.01 = 11.76	−14.17 = 4.60	2.90	−17.54 = 1.23	0.63	−16.51 = 2.26	1.13	−14.6 = 4.17	2.09	1.81
4. Oakway	62.54 − 43.51 = 19.03	−31.1 = 31.44	−54.82 = 7.72	4.86	−56.34 = 6.20	3.10	−53.65 = 8.89	4.45	−52.54 = 10.0	5.0	4.33
5. Library	70.96 − 43.23 = 27.73	−27.53 = 43.43	−60.48 = 10.48	6.6	−56.21 = 14.75	7.38	−61.08 = 9.88	4.94	−59.18 = 11.78	5.89	5.10
6. Thurston	44.88 − 22.90 = 21.98	−12.8 = 32.08	−34.20 = 6.6	4.16	−31.69 = 13.19	6.6	−38.33 = 6.55	3.28	−38.4 = 6.48	3.24	2.81
7. DIMV	74.10 − 41.28 = 32.82	−26.28 = 47.82	−57.55 = 16.55	10.43	−59.04 = 15.06	7.53	−64.02 = 10.08	5.04	−62.48 = 11.62	5.81	5.03
8. City Shops	75.30 − 40.31 = 34.99	−22.86 = 49.03	−57.80 = 17.5	11.03	−57.21 = 18.09	9.05	−64.74 = 10.56	5.28	−64.0 = 11.3	5.65	4.9
9. 28th & C	94.12 − 47.78 = 46.34	−27.01 = 67.11	−68.18 = 25.94	16.34	−70.75 = 23.37	11.69	−80.42 = 13.70	6.85	−81.94 = 12.18	6.09	5.28
10. PNW Bell	81.20 − 44.50 = 36.70	−25.55 = 55.65	−63.46 = 17.74	11.18	−62.25 = 18.95	9.48	−69.98 = 11.22	5.61	−68.24 = 12.96	6.48	5.62
11. GRID 3,4	98 − 31 = 67	−17 = 81	−48 = 50	31.5	−82 = 16	8	−83 = 15	7.5	−88 = 10	5	4.33
12. GRID 4,5	100 − 63 = 37	−33 = 67	−81 = 19	11.97	−70 = 30	15	−85 = 15	7.5	−89 = 11	5.5	4.77
13. GRID 5,4	95 − 58 = 37	−36 = 59	−78 = 17	10.71	−81 = 14	7	−83 = 12	6.0	−75 = 20	10	8.7
14. GRID 11,4	71 − 35 = 36	−30 = 41	−42 = 29	18.27	−61 = 10	5	−60 = 11	5.5	−60 = 11	5.5	4.77
15. GRID 8,4	76 − 49 = 27	−34 = 42	−67 = 9	5.67	−60 = 16	8	−64 = 12	6.0	−66 = 10	5	4.33
16. GRID 6,3	75 − 50 = 25	−34 = 41	−66 = 9	5.67	−72 = 3	1.5	−67 = 8	4.0	−54 = 21	10.5	9.10
17. GRID 8,5	74 − 44 = 30	−34 = 40	−59 = 15	9.45	−68 = 6	3	−64 = 10	5.0	−63 = 11	5.5	4.77
18. GRID 7,4	70 − 50 = 20	−28 = 42	−52 = 18	11.34	−62 = 8	4	−60 = 10	5.0	−60 = 10	5	4.33
19. GRID 9,5	57 − 35 = 22	−25 = 32	−47 = 10	6.3	−52 = 5	2.5	−50 = 7	3.5	−44 = 13	6.5	5.63
20. GRID 5,5	73 − 48 = 25	−31 = 42	−62 = 11	6.93	−61 = 12	6	−64 = 9	4.5	−60 = 13	6.5	5.63
21. GRID 3,6	67 − 38 = 29	−23 = 44	−51 = 16	10.08	−53 = 14	7	−57 = 10	5.0	−57 = 10	5	4.33

Table IV A Annual Geometric Mean TSP - Effectiveness of Point Source Control Strategies Toward 1987 Attainment

	1987 Exceedance[1] of 60 μg/m³ Standard	Hog Fuel Boilers: Strategy B 0.1 gr/SCF	Hog Fuel Boilers: Strategy E 0.05 gr/SCF	Particle Board Dryers: Strategy B 1.0 lb/1000 ft²	Particle Board Dryers: Strategy C .35 lb/1000 ft²	Cyclones >10 T/yr Baghouse	Rock Crushers 10% Opacity	Pulp Mill BACT on Furnace #4	Combined Strategies
Tons/yr eliminated		1524	2230	153	249	115	88	200	2452
% Less 1987 Tons/yr		46%	68%	53%	84%	97%	50%	33%	64%
1. Commerce	0	.63	.85	.03	.03	0	.02	0	.84
2. Westmorland	0	.05	.15	.04	.03	.02	.03	0	.21
3. So. Eugene	0	.19	.34	.02	.02	.01	.02	0	.37
4. Oakway	0	.34	.79	.02	.01	.01	.03	0	.82
5. Library	4.0	.63	1.15	.01	.01	.03	.05	.01	1.26
6. Thurston	0	1.93	2.75	1.18	1.60	.38	.02	.38	5.1
7. DMV	0.9	.67	.95	.06	.09	.05	.04	.01	.96
8. PNW Bell	12.4	.64	.91	.06	.08	.05	.04	.02	1.1
9. City Shops	18.8	.50	.71	.08	.10	.04	.03	.02	.92
10. GRID 11,4	11.4	3.3	5.0	0	0	.83	0	.85	5.8
11. GRID 3,4	0	.0	0	0	0	0	0	0	0
12. GRID 4,5	0	0	.8	0	0	0	0	0	.8
13. GRID 5,4	0	0	0	0	0	0	0	0	0
14. GRID 6,3	1.4	0	0	0	0	0	0	0	0
15. GRID 8,5	0	0	0	0	0	0	0	0	0
16. GRID 3,4	0	0	.3	0	0	0	0	0	.8
17. GRID 7,4	0	.8	2.5	0	0	0	0	0	3.5
18. GRID 12,4	6.4	1.7	3.3	1.7	1.7	0	0	0	6.6
19. GRID 5,5	0	0	0	0	0	0	0	0	0

* Each strategy's effectiveness (in 1987 ug/m³) was estimated by subtracting a 1987 "all point sources" model run with strategy(s) applied, from a 1987 baseline "all point sources" run. Future point source emissions rates were estimated to decline from base year (1978) levels, because of (a) anticipated further emissions controls, and/or; (b) a 6% decline in business activity by 1987, associated primarily with wood products industry prospects. Model used long term ave. meteorology (1977-78 365-day ave. regime frequencies).

1. From Table IA.
2. Point Source Control Stategies are described in Attachment, including cost estimates and energy requirements.

Annual Arithmetic Mean TSP *

	DEQ ELQR (ELEVN KNOCK) − DEQ ELQR (ELEVN HFDNST87) All Point 1987 − HFdn Strategy A =	Δ µg/m³	− DEQ EG95 (ELEV HFDSTKES87) HFdn Strategy E =	Δ µg/m³	− DEQ EV9T (ELEV PADSTRG87) Pad+Bd − Power Strategy B =	Δ µg/m³	− DEQ EEH (ELEV PADSTRC87) Pad+Bd − Power Strategy C =	Δ µg/m³	− DEQ GEE8 (ELEV CYCSTRG87) Cyclone >10 T/yr Strategy B =	Δ µg/m³	− DEQ EBJ3 (ELEV RKCRSTRG87) − Rock Crushers Strategy B =	Δ µg/m³	− DEQ EV2V (ELEV PULPSTR G87) − Pulp Mill Strategy B =	Δ µg/m³	− DEQ LC2V (ELEV ALSTRG787) − Five Combined Strategies =	Δ µg/m³
1. Commerce (.835)	1.67 − .92 =	.75	−.65 =	1.02	−1.64 =	.03	−1.64 =	.03	−1.67 =	0	−1.65 =	.02	−1.67 =	0	−.61 =	1.06
2. Westmorland (.807)	0.95 − .89 =	.06	−.76 =	.19	−.90 =	.05	−.91 =	.04	−.93 =	.02	−.91 =	.04	−.95 =	0	−.69 =	.26
3. So. Eugene (.772)	0.94 − .70 =	.24	−.50 =	.44	−.92 =	.02	−.92 =	.02	−.93 =	.01	−.92 =	.02	−.94 =	0	−.46 =	.48
4. Oakway (.565)	2.01 − 1.62 =	.39	−1.10 =	.91	−1.99 =	.02	−2.00 =	.01	−2.00 =	.01	−1.97 =	.04	−2.01 =	0	−1.06 =	.95
5. Library (.859)	3.23 − 2.50 =	.73	−1.89 =	1.34	−3.22 =	.01	−3.22 =	.01	−3.19 =	.04	−3.17 =	.06	−3.22 =	.01	−1.76 =	1.47
6. Thurston (.817)	10.64 − 8.28 =	2.36	−7.28 =	3.36	−9.19 =	1.45	−8.68 =	1.96	−10.19 =	.45	−10.61 =	.03	−10.18 =	.46	−4.37 =	6.27
7. DMV (.880)	2.29 − 1.81 =	.48	−1.63 =	.66	−2.21 =	.08	−2.19 −	.10	−2.26 =	.03	−2.25 =	.04	−2.28 =	.01	−1.43 =	0.86
8. City Shops (.842)	2.72 − 2.13 =	.59	−1.88 =	.84	−2.63 =	.09	−2.60 =	.12	−2.67 =	.05	−2.68 =	.04	−2.70 =	.02	−1.63 =	1.09
9. 28th & C −	3.02 − 2.46 =	.56	−2.22 =	.80	−2.87 =	.15	−2.82 =	.20	−2.93 =	.09	−3.00 =	.02	−2.94 =	.08	−1.83 =	1.19
10. PNW Bell	3.18 − 2.42 =	.76	−2.10 =	1.08	−3.11 =	.07	−3.08 =	.10	−3.12 =	.06	−3.13 =	.05	−3.16 =	.02	−1.88 =	1.30
11. GRID (.83) 11,4	15 − 11 =	4	−9 =	6	−15 =	0	−15 =	0	−14 =	1	−15 =	0	−14 =	1	−8 =	7
12. GRID 3,4	1 − 1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0
13. GRID 4,5	3 − 3 =	0	−2 =	1	−3 =	0	−3 =	0	−3 =	0	−3 =	0	−3 =	0	−2 =	1
14. GRID 5,4	1 − 1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0
15. GRID 6,3	1 − 1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0
16. GRID 8,5	1 − 1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0
17. GRID 8,4	2 − 3 =	0	−1 =	1	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−1 =	1
18. GRID 7,4	6 − 5 =	1	−3 =	3	−6 =	0	−6 =	0	−6 =	0	−6 =	0	−6 =	0	−3 =	3
19. GRID 12,4	13 − 11 =	2	−9 =	4	−11 =	2	−11 =	2	−13 =	0	−13 =	0	−13 =	0	−5 =	8
20. GRID 5,5	2 − 2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0

* Uses 1977−78 (365 day) ave. regime frequencies

TABLE IV B "Average" Worst Case, 24 hr. ave TSP - Effectiveness of Point Source Control Strategies[2] on 1987 Attainment

	1987 Exceedance[1] of 150 µg/m³ Standard	HOG FUEL BOILERS Strategy B (0.1 gr/SCF)	HOG FUEL BOILERS Strategy E (0.05 gr/SCF)	Particle Board Dryers Strategy B (1 lb/1000 ft²)	Particle Board Dryers Strategy C (.35 lb/1000 ft²)	Cyclones >10 Tons/yr (Baghouse)	Rock Crushers (20% Opacity)	Pulp Mill (BACT on Furnace #4)	Toughest Strategies Combined
Tons/Yr Eliminated		1524	2230	158	249	115	88	200	4552
% Less 1987 Tons/Yr		46%	68%	53%	84%	99%	50%	33%	64%
1. Commerce	6.9	.77	1.34	.02	.02	.51	.04	.38	1.40
2. Westmorland	14.3	.27	.61	.04	.04	.04	.12	.43	.75
3. So. Eugene	0	.40	1.18	0	0	.01	0	.60	1.20
4. Oakway	0	.24	1.06	0	0	.01	.05	.24	1.11
5. Library	3.3	1.03	1.26	.11	.16	.20	.06	.69	1.69
6. Thurston	0	.64	.92	2.10	2.79	.35	.03	1.52	4.31
7. DMV	5.2	.48	.66	.19	.26	.25	.04	.44	1.20
8. PNW Bell	25.6	.95	1.06	.27	.38	.42	.06	.86	1.89
9. City Shops	70.2	.82	.99	.31	.44	.45	.06	1.0	1.94
10. GRID 11,4	0	1	2	1	1	2	0	0	6
11. GRID 3,4	0	0	0	0	0	0	0	0	0
12. GRID 4,5	0	1	2	0	0	1	1	0	2
13. GRID 5,4	0	1	0	0	0	0	1	0	1
14. GRID 6,3	0	1	2	0	0	0	0	0	2
15. GRID 8,5	0	0	0	0	0	0	0	0	0
16. GRID 8,4	0	0	1	0	0	0	0	0	1
17. GRID 7,4	0	0	4	0	0	0	0	0	4
18. GRID 12,4	0	1	1	4	5	0	0	0	7
19. GRID 5,5	0	0	0	0	0	0	0	0	0

* Each strategy's effectiveness (in 1987 ug/m³) was estimated by subtracting a 1987 "all point sources" model run with strategy(s) applied, from a 1987 basdeline "all point sources" run. Future point source emissions rates were estimated to decline from base year (1978) levels, because of (a) anticipated further emissions controls, and/or; (b) a 6% decline in business activity by 1987, associated primarily with wood products industry prospects. Model used "average worst case" meteorology (Regime 7).

1. From Table IB.
2. Point Source Control Stategies are descibed in Attachment, including cost estimates and energy requirements.

	DEQEE5C − DEQGLAR (EUGBAPTRVB01) (EUGHFBSTRB87)		− DEQEG9S (EUGHFBSTRE87)		− DEQEU97 (EUGPBDSTRB87)		− DEQEE11 (EUGPBDSTRC87)		− DEQEE68 (EUGCYCSTRB87)		− DEQEB5B (EUGRKCRSTRB87)		− DEQEU2V (EUGPULPSTRB87)		− DEQEU10 (EUGALSTRPT87)	
	All Point 1987 − HFBr Strat B =	Δ µg/m³	HFBr Strategy E =	Δ µg/m³	Part.Bd Power Strategy B =	Δ µg/m³	Part.Bd Power Strategy C =	Δ µg/m³	Cyclones (>10 T/yr) Strategy B =	Δ µg/m³	Rock Crushers Strategy B =	Δ µg/m³	Pulp Mill Strategy B =	Δ µg/m³	Five Combined Strategies =	Δ µg/m³
1. Commerce	2.32 − 1.55 =	.77	−.98 =	1.34	−2.30 =	.02	−2.30 =	.02	−2.31 =	.01	−2.28 =	.04	−1.94 =	.38	−.92 =	1.40
2. Westmorland	1.98 − 1.71 =	.27	−1.37 =	.61	−1.94 =	.04	−1.94 =	.04	−1.94 =	.04	−1.86 =	.12	−1.55 =	.43	−1.23 =	.75
3. So. Eugene	2.28 − 1.88 =	.40	−1.10 =	1.18	−2.28 =	0	−2.28 =	0	−2.27 =	.01	−2.28 =	0	−1.68 =	.60	−1.08 =	1.20
4. Oakway	2.34 − 2.10 =	.24	−1.28 =	1.06	−2.34 =	0	−2.34 =	0	−2.33 =	.01	−2.21 =	.05	−2.10 =	.24	−1.23 =	1.11
5. Library	4.78 − 3.75 =	1.03	−3.52 =	1.26	−4.67 =	.11	−4.62 =	.16	−4.58 =	.20	−4.72 =	.06	−4.09 =	.69	−3.09 =	1.69
6. Thurston	6.43 − 5.79 =	.64	−5.51 =	.92	−4.33 =	2.10	−3.64 =	2.79	−6.08 =	.35	−6.40 =	.03	−4.91 =	1.52	−2.12 =	4.31
7. DMV	3.96 − 3.48 =	.48	−3.30 =	.66	−3.77 =	.19	−3.70 =	.26	−3.71 =	.25	−3.92 =	.04	−3.52 =	.44	−2.26 =	1.20
8. [illegible]	6.20 − 5.31 =	.95	−5.20 =	1.06	−5.97 =	.27	−5.93 =	.38	−5.84 =	.42	−6.20 =	.06	−5.40 =	.86	−4.37 =	1.87
9. City Shops	6.29 − 5.46 =	.82	−5.29 =	.99	−5.97 =	.31	−5.84 =	.44	−5.83 =	.45	−6.22 =	.06	−5.28 =	1.0	−4.34 =	1.44
11. GRID 11,4	12 − 11 =	1	−10 =	2	−11 =	1	−11 =	1	−10 =	2	−12 =	0	−12 =	0	−6 =	6
12. GRID 3,4	2 − 2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0
13. GRID 4,5	6 − 5 =	1	−4 =	2	−6 =	0	−6 =	0	−5 =	1	−5 =	1	−6 =	0	−4 =	2
14. GRID 5,4	2 − 1 =	1	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−1 =	1	−2 =	0	−1 =	1
15. GRID 6,3	4 − 3 =	1	−2 =	2	−4 =	0	−4 =	0	−4 =	0	−4 =	0	−4 =	0	−2 =	2
16. GRID 8,5	1 − 1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0	−1 =	0
17. GRID 8,4	3 − 3 =	0	−2 =	1	−3 =	0	−3 =	0	−3 =	0	−3 =	0	−3 =	0	−2 =	1
18. GRID 7,4	9 − 9 =	0	−5 =	4	−9 =	0	−9 =	0	−9 =	0	−9 =	0	−9 =	0	−5 =	4
19. GRID 12,4	10 − 9 =	1	−9 =	1	−6 =	4	−5 =	5	−10 =	0	−10 =	0	−10 =	0	−3 =	7
20. GRID 5,5	2 − 3 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0	−2 =	0

Table IV C. "Worst", Worst Case, 24-hr Ave. TSP – Effectiveness of Point Source Strategies(3) In 1987 Attainment

	1987 Exceedance(1) of 150 µg/m³ Standard	HOG FUEL BOILERS Strategy B (.1 gr/SCF)	HOG FUEL BOILERS Strategy E (.05 gr/SCF)	PARTICLE BOARD DRYERS Strategy B (1 lb/ton(?))	PARTICLE BOARD DRYERS Strategy C (.5 lb/ton(?))	Cyclones >10 T/yr (Baghouse)	Rock Crushers (10% Credit)	Pulp Mill (BACT on Furnace #4)	Toughest Combined Strategies
Tons/Yr Eliminated		1524	2230	158	249	115	88	200	2552
% Less 1987 Tons/Yr		46%	68%	53%	84%	99%	50%	33%	64%
1. Commerce	9.9	2.7	5.0	.05	.08	.44	.07	.03	5.51
2. Westmorland	18.3	3.0	5.1	.06	.05	.19	.08	.01	5.35
3. So. Eugene	0	1.3	2.3	.03	.04	.66	.04	.02	2.40
4. Oakway	0	.4	1.2	.06	.10	1.16	.12	.06	2.59
5. Library	1.8	4.7	6.2	.50	.68	6.21	.13	.44	13.55
6. Thurston	0	.2	.3	1.9	2.5	.74	0	.07	3.47
7. DMV	1.4	2.7	3.6	.72	1.0	7.22	.04	.44	12.36
8. PNW Bell	25.4	4.5	6.4	.77	1.06	8.74	.06	.54	16.8
9. City Shops	71.1	3.8	5.0	.74	1.0	7.81	.08	.45	14.4
11. GRID 3,4	16.0	1	1	0	0	0	0	0	1
12. GRID 4,5	43.0	1	2	0	0	3	0	0	7
13. GRID 5,4	25.0	4	6	0	0	1	1	0	7
14. GRID 11,4	36.0	2	3	2	2	33	1	1	38
15. GRID 8,4	17.0	5	4	1	1	4	1	1	9
16. GRID 6,3	0	0	1	0	0	0	0	0	1
17. GRID 8,5	3.0	2	1	0	0	2	0	0	4
18. GRID 7,4	8.0	0	5	0	0	2	0	0	8
19. GRID 9,5	0	3	2	1	1	5	1	1	8
20. GRID 5,5	0	1	1	0	0	0	0	0	2
21. GRID 3,6	0	1	2	0	0	1	0	0	2

* Each strategy's effectiveness (in 1987 ug/m³) was estimated by subtracting a 1987 "all point sources" model run with strategy(s) applied, from a 1987 basdeline "all point sources" run. Future point source emissions rates were estimated to decline from base year (1978) levels, because of (a) anticipated further emissions controls, and/or; (b) a 6% decline in business activity by 1987, associated primarily with wood products industry prospects. Model used "worst worst case" meteorology (February 18, 1977).

1. From Table IC.
2. Point Source Control Stategies are descibed in Attachment, including cost estimates and energy requirements.

	DEQLV30 (LOGPDMVPCK) − DEQLV30 (LOGHFBRSTRB87) All Sources 1987 − HFBr Strategy B = Δ µg/m³	− DEQLV30 (LOGHFBSTRE87) HFBr Strategy E = Δ µg/m³	− DEQEV30 (EUGPBPSTRB87) Part. Bd. Dryer Strategy B = Δ µg/m³	− DEQEV30 (EUGPBPSTRC87) Part. Bd. Dryer Strategy C = Δ µg/m³	− DEQEV30 (EUGCYCSTRB87) Cyclones (>10T/yr) Strategy B = Δ µg/m³	− DEQLVIT (LOGPLPSTRB87) Pulp Mill Strategy B = Δ µg/m³	− DEQEVIT (EUGFLSTRP187) Fuel Combustion Strategies = Δ µg/m³	− DEQLE20 (EUGRCRSTRB87) Rock Crushers Strategy B = Δ µg/m³
1. Commerce	11.27 − 8.58 = 2.69	−6.30 = 4.97	−11.22 = .05	−11.19 = .08	−10.83 = .44	−11.24 = .03	−5.76 = 5.51	−11.20 = .07
2. Westmorland	9.47 − 6.48 = 2.99	−4.35 = 5.12	−9.41 = .06	−9.42 = .05	−9.28 = .19	−9.46 = .01	−4.12 = 5.35	−9.39 = .08
3. So. Eugene	4.62 − 3.29 = 1.33	−2.34 = 2.28	−4.59 = .03	−4.58 = .04	−4.56 = .06	−4.60 = .02	−2.22 = 2.40	−4.58 = .04
4. Oakway	9.83 − 9.44 = .39	−8.68 = 1.15	−9.77 = .06	−9.73 = .10	−8.67 = 1.16	−9.77 = .06	−7.24 = 2.59	−9.71 = .12
5. Library	41.12 − 36.38 = 4.74	−34.92 = 6.20	−40.62 = .50	−40.44 = .68	−34.91 = 6.21	−40.68 = .44	−27.57 = 13.55	−40.99 = .13
6. Thurston	8.54 − 8.32 = .22	−8.23 = .31	−6.65 = 1.89	−6.01 = 2.53	−7.80 = .74	−8.47 = .07	−5.05 = 3.49	−8.54 = 0
7. DIAV	37.54 − 34.83 = 2.71	−33.97 = 3.57	−36.82 = .72	−36.54 = 1.0	−30.32 = 7.22	−37.10 = .44	−25.18 = 12.36	−37.50 = .04
8. City Shops	48.73 − 44.98 = 3.75	−43.70 = 5.03	−47.99 = .74	−47.71 = 1.02	−40.92 = 7.81	−48.28 = .45	−34.33 = 14.4	48.65 = .08
9. 28th & C	58.65 − 55.17 = 3.48	−54.49 = 4.16	−57.64 = 1.01	−57.25 = 1.40	−47.05 = 11.60	−58.12 = .53	−40.78 = 17.87	−58.60 = .05
10. PNW Bell	54.76 − 50.22 = 4.54	−48.33 = 6.43	−53.99 = .77	−53.70 = 1.06	−46.02 = 8.74	−54.22 = .54	−37.95 = 16.81	−54.70 = .06
11. GRID 3,4	3 − 2 = 1	−2 = 1	−3 = 0	−3 = 0	−3 = 0	−3 = 0	−2 = 1	−3 = 0
12. GRID 4,5	28 − 27 = 1	−26 = 2	−28 = 0	−28 = 0	−25 = 3	−28 = 0	−21 = .7	−28 = 0
13. GRID 5,4	14 − 10 = 4	−8 = 6	−14 = 0	−14 = 0	−13 = 1	−14 = 0	−9 = 7	−13 = 1
14. GRID 11,4	49 − 47 = 2	−46 = 3	−47 = 2	−47 = 2	−16 = 33	−48 = .1	−11 = 38	−49 = 0
15. GRID 8,4	26 − 21 = 5	−22 = 4	−25 = 1	−25 = 1	−22 = 4	−25 = 1	−17 = 9	−26 = 0
16. GRID 6,3	2 − 2 = 0	−1 = 1	−2 = 0	−2 = 0	−2 = 0	−2 = 0	−1 = 1	−2 = 0
17. GRID 8,5	14 − 12 = 2	−13 = 1	−14 = 0	−14 = 0	−12 = 2	−14 = 0	−10 = 4	−14 = 0
18. GRID 7,4	25 − 26 = 0	−20 = 5	−25 = 0	−25 = 0	−23 = 2	−25 = 0	−17 = 8	−25 = 0
19. GRID 9,5	25 − 22 = 3	−23 = 2	−24 = 1	−24 = 1	−20 = 5	−24 = 1	−17 = 8	−25 = 0
20. GRID 5,5	7 − 6 = 1	−6 = 1	−7 = 0	−7 = 0	−7 = 0	−7 = 0	−5 = 2	−6 = 1
21. GRID 3,6	7 − 6 = 1	−5 = 2	−7 = 0	−7 = 0	−6 = 1	−7 = 0	−5 = 2	−7 = 0

Attachment II

Major Assumptions Used to Estimate 1978 and 1987 AQMA Emissions

Permit Source Emissions

1978 -- LRAPA estimates of individual point source emissions, stack parameters, operating schedules, etc.
-- RACT designations by LRAPA/CAC:
  -- Existing 1978 emissions = RACT, except for Kingsford and Veneer Driers
  -- RACT Emissions levels for Kingsford and Veneer Driers were provided by LRAPA, based on compliance schedules.

1987 -- Growth or decline in TSP emissions between 1978 and 1987 was estimated by LRAPA, based on anticipated further emissions controls, and general level of business activity. A six percent decline in TSP emissions by 1987 was applied to most point sources, based upon anticipated decline in wood products industry business activity.

Area Source Emissions

Chemical Mass Balance (CMB) estimates of total impacts (ug/m^3) were used to adjust model estimates, by adjusting the emissions base used in the model, resulting in the following basic assumptions for dust area source, corresponding to final model calibration.

1. Paved Road Dust (PRD) . . . Used Seton, Johnson & Odell, UPRD Equation with the following modifications:
   -- VMT/GRID from the SAPOLLUT regional transportation model.
   -- 2.81 g/VMT = paved road dust emission factor, without TRACKOUT surcharge.
   -- Add "TRACKOUT" surcharge to PRD emissions, based on:
      (a) The percent of land area in a GRID actually in industrial land use;
      (b) Assumed 19:1 increase in paved road dust loadings where trackout occurs (Seattle study);
      (c) Surcharge applied in proportion to the amount of PRD emissions calculated for the GRID.
   -- "Street Cleaning Credits" assigned to Eugene and Springfield core areas only; assigned only to grids with streets cleaned 2-3 time per week; with credit calculated using affected VMT in each GRID.
   -- % Entrainment of Road Dust = 100% in the absence of rainfall in any hour. Hence, % Entrainment = % of hours with < trace of rain, for any given period.
   -- 1978-87 Growth in PRD Emissions = 1978 to 1987 growth in VMT/GRID, from SAPOLLUT.

2. <u>Unpaved Road Dust (UPRD)</u>
   -- Used Seton, Johnson & Odell VPRD equation, with the following modifications:
      -- % Entrainment based on hours < trace of rain, as for PRD.
      -- A 30% reduction in calculated UPRD emissions was applied, to achieve optimal agreement between CMB and model results.
   -- 1978 to 1987 growth in UPRD emissions assumed = 1978 to 1987 growth in VMT/GRID, from SAPOLLUT.

3. <u>Agricultural Tilling</u>
   -- Seton, Johnson & Odell projection unchanged.
   -- No 1978 to 1987 TSP growth assumed.

4. <u>Wood Space Heating</u>
   -- Based on Talbott, Wong & Associates, Inc. telephone survey of wood burning during 1978-79 heating season, and LCOG projections of population and household growth through the year 2000, wood space heating TSP was estimated for future years. A Talbott-Wong trend-factor was a key element in projecting TSP emissions growth based on higher per capita average wood use--i.e., growth beyond that attributable to population and household growth.

5. <u>Motor Vehicle Exhaust</u>
   -- Increasing VMT/GRID, predicted from SAPOLLUT is more than offset by declining TSP exhaust emission factors, based upon EPA's phasedown of the lead content of gasoline, resulting in decreasing exhaust TSP emissions (tons/year) in future years.

The following area sources were assumed to remain the same as estimated by Seton, Johnson & Odell, and not to grow appreciable between 1978 and 1987:

6. Residential Space Heating (oil)
7. Residential Space Heating (gas)
8. Commercial Space Heating (oil)
9. Commercial Space Heating (gas)
10. Open Burning/Field Burning
11. Orchard Pruning
12. Railroad and Aircraft
13. Small Point Sources

Attachment III

Final Calibration of AQMA GRID MODEL

This attachment briefly describes the process and reasoning through which the Eugene/Springfield AQMA GRID Model was calibrated for use in this TSP SIP analysis.

Optimized Model Estimates of Local Dust Impacts using Chemical Mass Balance Date--For a Composite of 66 CMB Sample Days

The Willamette Valley Field and Slash Burning Study afforded extensive chemical analysis of 66 HIVOL filters during May-November, 1978. This chemical mass balance (CMB) data for 66 summer-fall days is summarized in Table A, as a composite average of all 66 CMB Sample Days. Table A indicates that local dust sources' average impact at Eugene Commerce was 24.5 ug/m^3, and at Springfield Library was 37.7 ug/m^3, during this 66-day composite period.

The AQMA dust emissions inventory includes paved and unpaved road dust, agricultural tilling, and five (5) rock crushers. The AQMA Grid Model with these sources as the only emissions input, should estimate dust only TSP from "local" (exclusively background) sources, for direct comparison with CMB estimates. The dust emissions inventory was adjusted unit model predicts, "local" dust impacts matched the CMB estimates as closely as possible. Emissions and adjustments were done only on the area sources--paved and unpaved road dust. Adjustments consisted mainly of changing the road dust emission factors (g/VMT), and percent entrainment, based on an assumed degree of dust entrainment suppression by rainfall. Trackout surcharges and Street Cleaning Credits were also devised and applied.

Figure A (lower right) illustrates that the optimal calibration achieved was a compromise, which balanced model overprediction of dust impacts at Commerce with underprediction at Library. The key emissions base changes to paved and unpaved road dust emissions inventories required to achieve this balance included:

1. Paved Road Dust
   - -- Use 2.81 g/VMT as PRD Emission Factor
   - -- Base % Entrainment on hours < trace of rainfall
   - -- Add Trackout Surcharge to PRD emissions for grids with industrial land use
   - -- Assign Street Cleaning Credits for Eugene and Springfield core areas (only), where streets were cleaned $\geq$ 3 times/week

2. Unpaved Road Dust
   - -- Reduce UPRD Emission Factor used by Seton, Johnson & Odell by 30%
   - -- Use same $ Entrainment as for PRD

Translation of Summer/Fall, CMB-Based Emissions Assumptions into a Final Model Calibration Based on Annual Average TSP Emissions

Emissions assumptions based on the (66) CMB Sample Days (HIVOL every sixth day) were translated into a second, year-round emissions base.

Modeling this emissions base, and comparing the model predictions with the actual air quality observed by HIVOL samplers, affords a final model calibration correlation coefficient (r) for annual average TSP levels, with a maximum number (8) of HIVOL sites for comparison.

Figure B illustrates the model correlation thus achieved, (r = 0.59). It is not the final calibration coefficient, because later assumptions--e.g., addition of selective plume trapping to grid model code--had not yet been made.

Figure C illustrates how inclusion of selective plumes trapping improved model correlation parameters using a slightly different, long-term average (LTA) 1978 emissions base.

Figure D shows the correlation (r = 0.71) for 24-hour average TSP model predictions using "worst worst case" (February 18, 1977) meteorology. A 1977 emissions base was used, after adjustment for (11) final model calibration assumptions (Attachment II), and (2) actual rainfall and heating degree days on February 18, 1977.

Overall, model calibration correlation coefficients range around 0.7, due primarily to chronic model overprediction at certain sites (e.g., South Eugene, Thurston) and chronic underprediction at others (e.g., Westmoreland). Future model improvement projects should examine how improved model inputs (emissions and/or meteorology) can improve output accuracy.

TABLE A

Total Suspended Particulate CMB Site Averages
May to November, - 1978
(micrograms per cubic meter)

SITE	TOTAL MEASURED	MARINE	DUST	AUTO EXHAUST	RESIDUAL OIL	BIOGENIC SOURCES (2)	VEG. (3) BURNING	KRAFT PROCESS	SECONDARY NITRATE	SECONDARY SULFATE	RESIDUAL CARBON	CALC. MASS	%OF MA ACCOUNT FOR (1)
Carus	28.6	0.40	15.00	0.65	0.30	2.68	8.59	1.40	1.07	1.34		31.4	109
Salem	41.0		21.81	2.00	0.50	6.94	7.10	1.90		0.57	3.28	43.5	106
Corvallis	28.4	0.29	14.08	0.77	0.42	4.09	6.90	2.62		0.45	2.55	32.1	113
Lebanon	43.2	0.52	24.46	1.00	0.51	8.77	9.84	2.50			3.87	50.9	117
Halsey	39.9		25.85	0.75	0.44	1.40	11.53	2.82	1.20			43.9	110
Junction City	41.5	0.37	24.59	0.65	0.59	5.51	10.89	1.85	0.06	0.39		44.9	108
Coburg	40.3	0.33	25.80	0.81	0.32	8.48	11.72	1.45	0.10	0.70		49.2	122
Eugene	54.5	0.44	24.45	2.98	0.45	7.79	20.63	2.93		1.00		61.6	112
Springfield	57.3		27.63	2.96	0.49	6.76	14.20	2.34			3.18	60.1	101
Creswell	30.6		14.25	0.73	0.27	4.23	8.97	2.28			3.22	34.1	111
Network Ave.	41.5	0.24	22.79	1.33	0.42	5.65	11.05	2.21	0.24	0.45	1.61	45.9	110
Percent of measured mass		0.5%	54.9%	3.20%	1.0%	13.6%	26.5%	5.3%	0.5%	1.0%	3.8%		

(1) Other source contributions less than 0.5 ug/m^3.
(2) Estimated biogenic sources coarse impact, table 5.
(3) Fine plus coarse impact estimate.

A-345

Source. From "Field Burning - A Review of Air Quality in Oregon's Willamette Valley" published by DEQ in January, 1980.

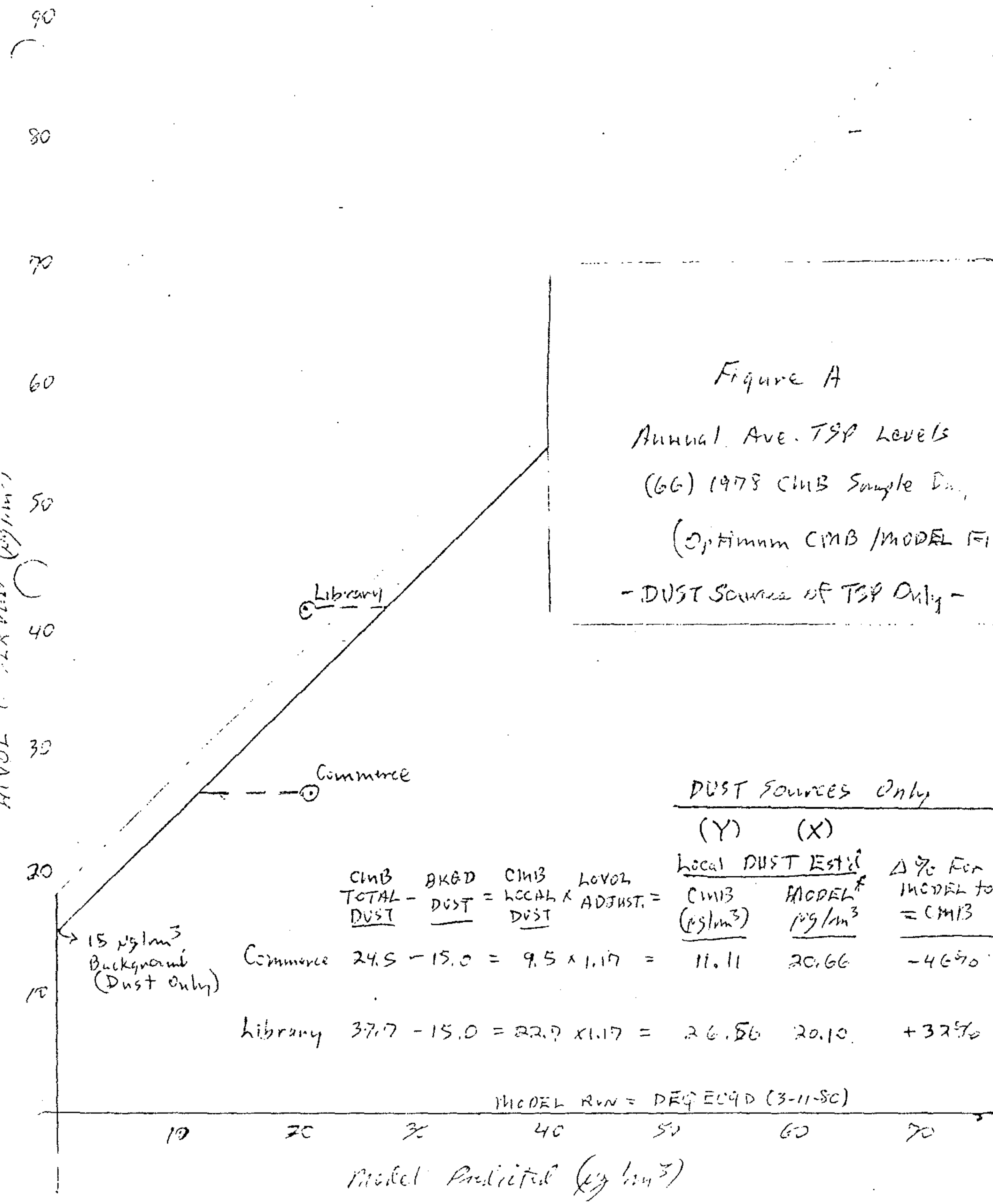
Figure A

Annual Ave. TSP Levels

(66) 1978 CMB Sample Da[illegible]

(Optimum CMB / MODEL FIT)

- DUST Source of TSP Only -



DUST Sources Only

	CMB TOTAL DUST	− BKGD DUST	= CMB LOCAL DUST	× LOVOL ADJUST.	= (Y) Local DUST Est'd CMB (µg/m³)	(X) MODEL* µg/m³	Δ% For MODEL to = CMB
Commerce	24.5	− 15.0	= 9.5	× 1.17	= 11.11	20.66	−46%
Library	37.7	− 15.0	= 22.7	x1.17	= 26.56	20.10	+32%

*MODEL RUN = DEQ EC9D (3-11-80)

Attachment IV

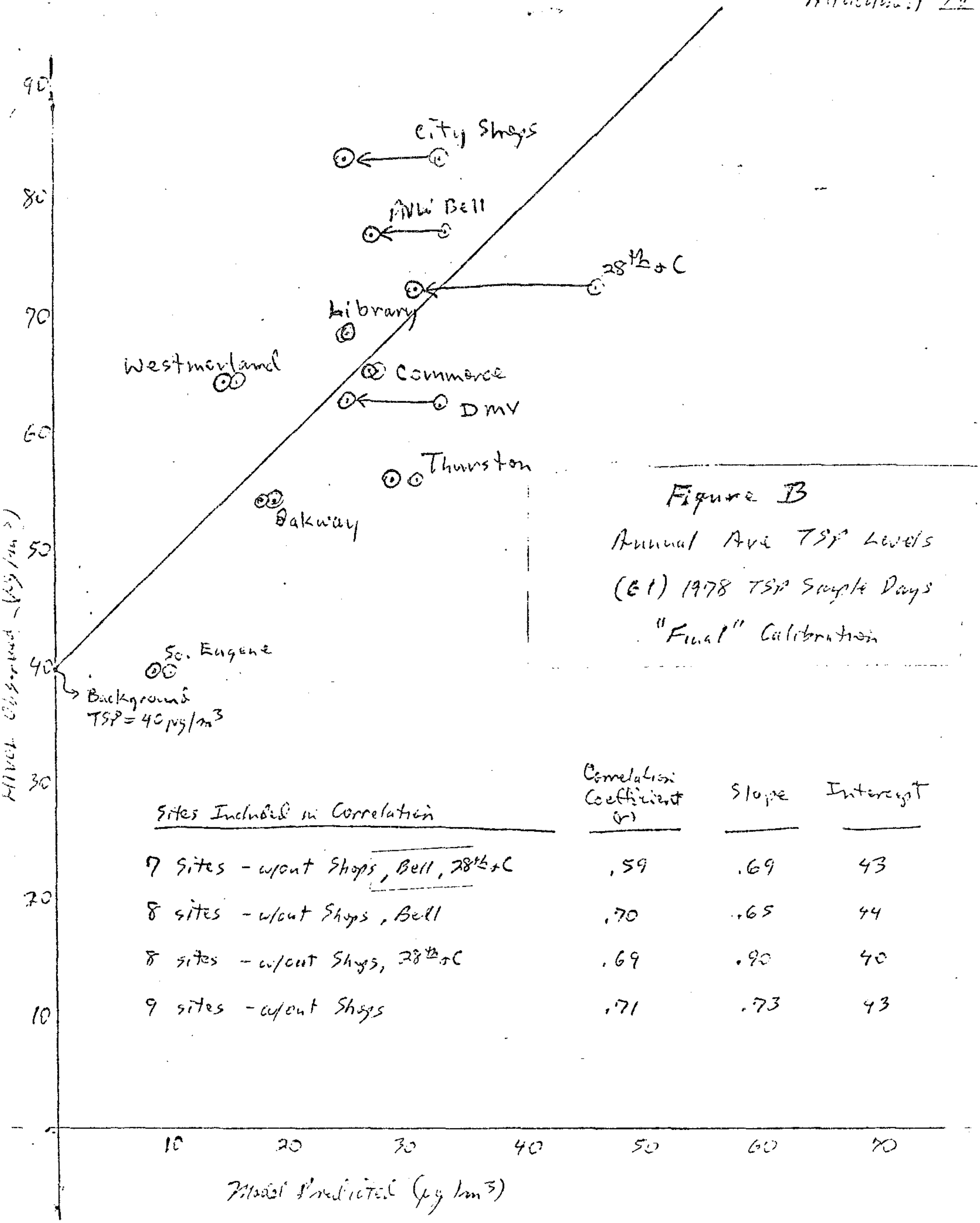


Figure B

Annual Ave TSP Levels

(61) 1978 TSP Sample Days

"Final" Calibration

Sites Included in Correlation	Correlation Coefficient (r)	Slope	Intercept
7 sites - w/out Shops, Bell, 28th + C	.59	.69	43
8 sites - w/out Shops, Bell	.70	.65	44
8 sites - w/out Shops, 28th + C	.69	.90	40
9 sites - w/out Shops	.71	.73	43

1978 PreRACT 1978 Pre-RACT
No Trafficing ~~[illegible]~~ Regime 4 ~~[illegible]~~
No Change in Regime 4 for 1978 TSP Sample Days

Site	Hi VOL (Y)	DEQECHM MODEL (X)	DEQGEIV MODEL (X')	Hi VOL (DEQ means)
Commerce	65.2	27.12	26.84	64.4
Westmoreland	64.3	15.27	14.34	64.0
So. Eugene	39.6	9.50	8.56	37.2
Oakway	54.3	18.47	17.53	53.7
Library	68.4	24.31	24.58	69.5
Thurston	56.0	30.13	28.51	55.7
DMV	62.3	32.17	24.82	62.2

r = 0.59 slp = .69 int = 43
0.65 .86 41

Shays	83.6	32.26	24.49	85.5

r = 0.67 slp = 1.0 int = 38
0.59 1.06 39

28th + C	72.5	45.54	30.37	71.7

r = .67 slp = .77 int. = 43
.63 1.08 39

Bell	(77.3)	(32.95)	26.89	(77.3)

r = .69 slp = .83 int. = 42
.65 1.17 38

w/out Shays & Bell:
r = .70 slp = .645 int = 44

w/out Shays (w/ Bell)
r = .71 slp = .73 int = 43

w/out Shays + 28th + C (w/ Bell)
r = .686 slp = .90 int = 40

Bkgd

Airport 38.16
Coburg 42.25
Creswell 34.73

$\left.\right\}$ ave(3) = 40
ave(2) = 40

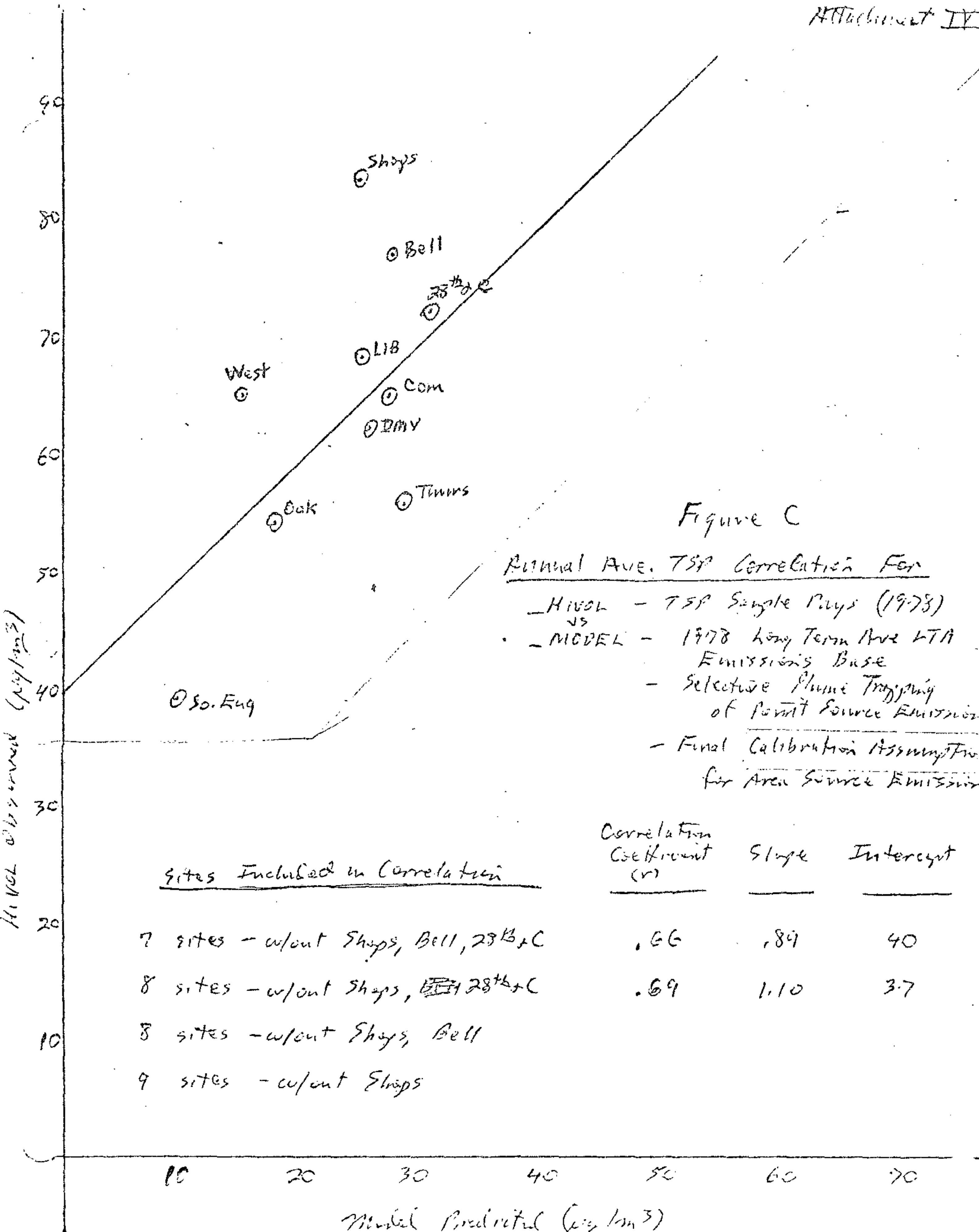


Figure C

Annual Ave. TSP Correlation For

_HIVOL – TSP Sample Days (1978)
vs
_MODEL – 1978 Long Term Ave LTA Emissions Base
– Selective Plume Trapping of Point Source Emissions
– Final Calibration Assumption for Area Source Emissions

Sites Included in Correlation	Correlation Coefficient (r)	Slope	Intercept
7 sites – w/out Shops, Bell, 28th & C	.66	.89	40
8 sites – w/out Shops, 28th & C	.69	1.10	37
8 sites – w/out Shops, Bell			
9 sites – w/out Shops			

SITE	1978 HIVOL OBS'd (Y)	~~DISPEEAO~~ (4-8-80) All Sources (X)	5/12/80 Ref EESC All Sources 1977-78 3x Scaling For Regime Frequencies	DEGGEN All Sources (Yrs Rec(1-78 Emis)) 1977-78 365 day	(Y)	1978 TSP Sample Days (X)
Commerce	65.2	26.97	26.92	27.08	65.2	26.84
Lot Morland	64.3	14.78	13.66	13.85	64.3	14.34
So. Eugene	39.6	9.22	8.16	8.35	39.6	8.56
Oakway	54.3	17.50	18.38	18.48	54.3	17.53
Library	68.4	24.82	24.37	24.90	68.4	24.58
Thurston	56.0	28.25	28.14	29.03	56.0	28.51
DMV	62.3	25.28	23.65		62.3	24.82
r = .66	slope = .89	int. = 40				
					80.0	26.89
				r = .67	slp = 1.10	int = 38
DMV Bell	80.0 (77.3)	27.16	26.35			
r = .64	slope = 1.10	int. = 37				
City Shops	83.6	24.53	23.63	24.85	83.6	24.44
r = .63	slope = 1.24	int. = 36		r = .63	slp = 1.23	int = 37
28th + C	72.5	30.53	28.99	30.83		30.37
r = .66	slope = 1.21	int. = 37				

Background - Annual Ave TSP

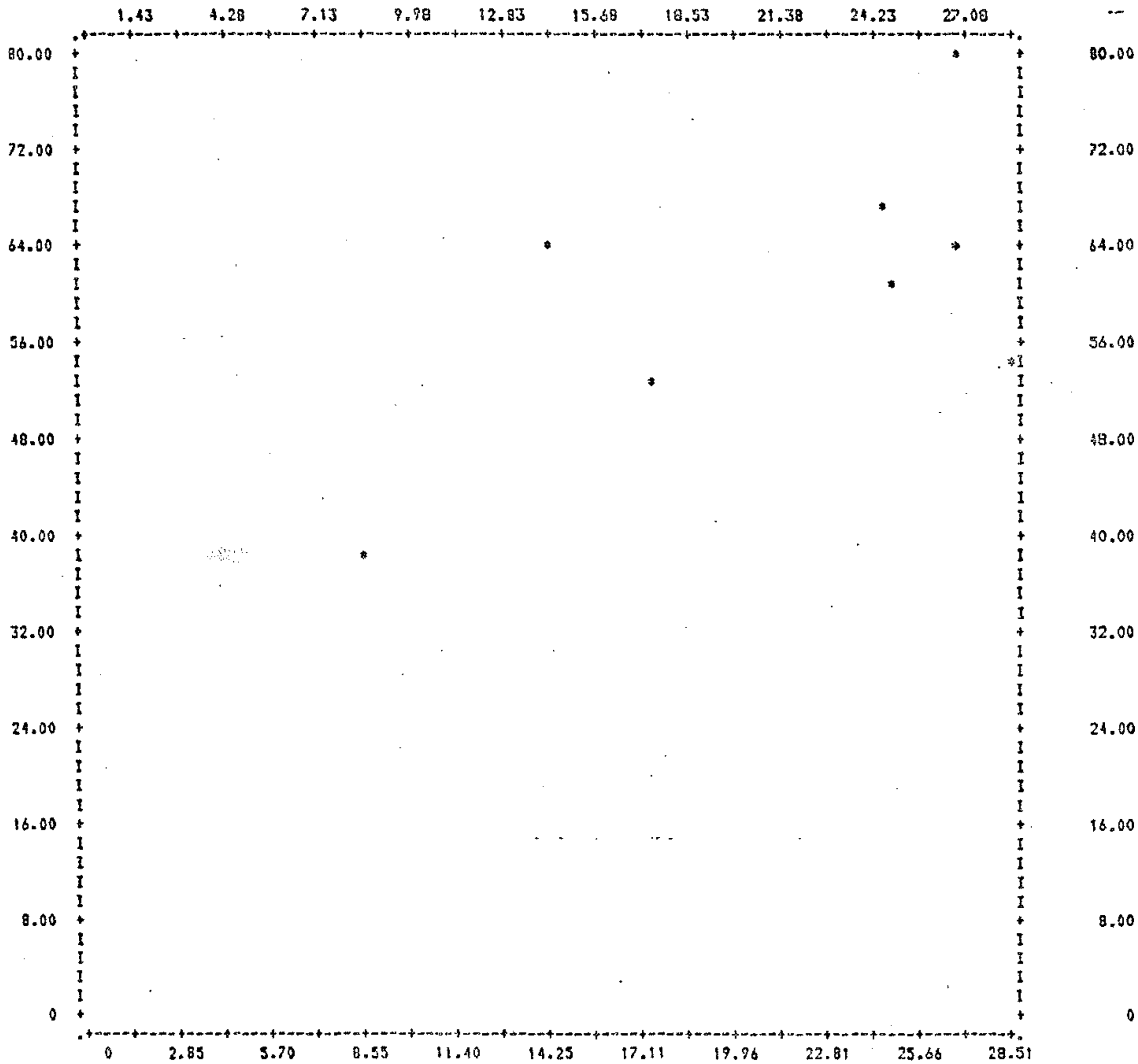
Coburg 42.25
Airport 39.73
Greenwell 38.16
} Ave. = 40 $\mu g/m^3$

E MODEL RESULTS 80/05/28. 11.29.58. PAGE 2

MODEL1 (CREATION DATE = 80/05/28.) EUGENE MODEL OUTPUT

LE (Figure C) Annual Ave TSP

ERGRAM OF (DOWN) Y OBSERVED TSP CONCENTRATION
(ACROSS) X MODEL CALIBRATION PREDICTED TSP



TATISTICS..

CORRELATION (R)-	.66873	R SQUARED -	.44719	SIGNIFICANCE R -	.03490
STD ERR OF EST -	9.46954	INTERCEPT (A) -	37.66770	STD ERROR OF A -	11.22084
SIGNIFICANCE A -	.00764	SLOPE (B) -	1.09699	STD ERROR OF B -	.49792
SIGNIFICANCE B -	.03490				

LOTTED VALUES - 8 EXCLUDED VALUES - 0 MISSING VALUES - 0

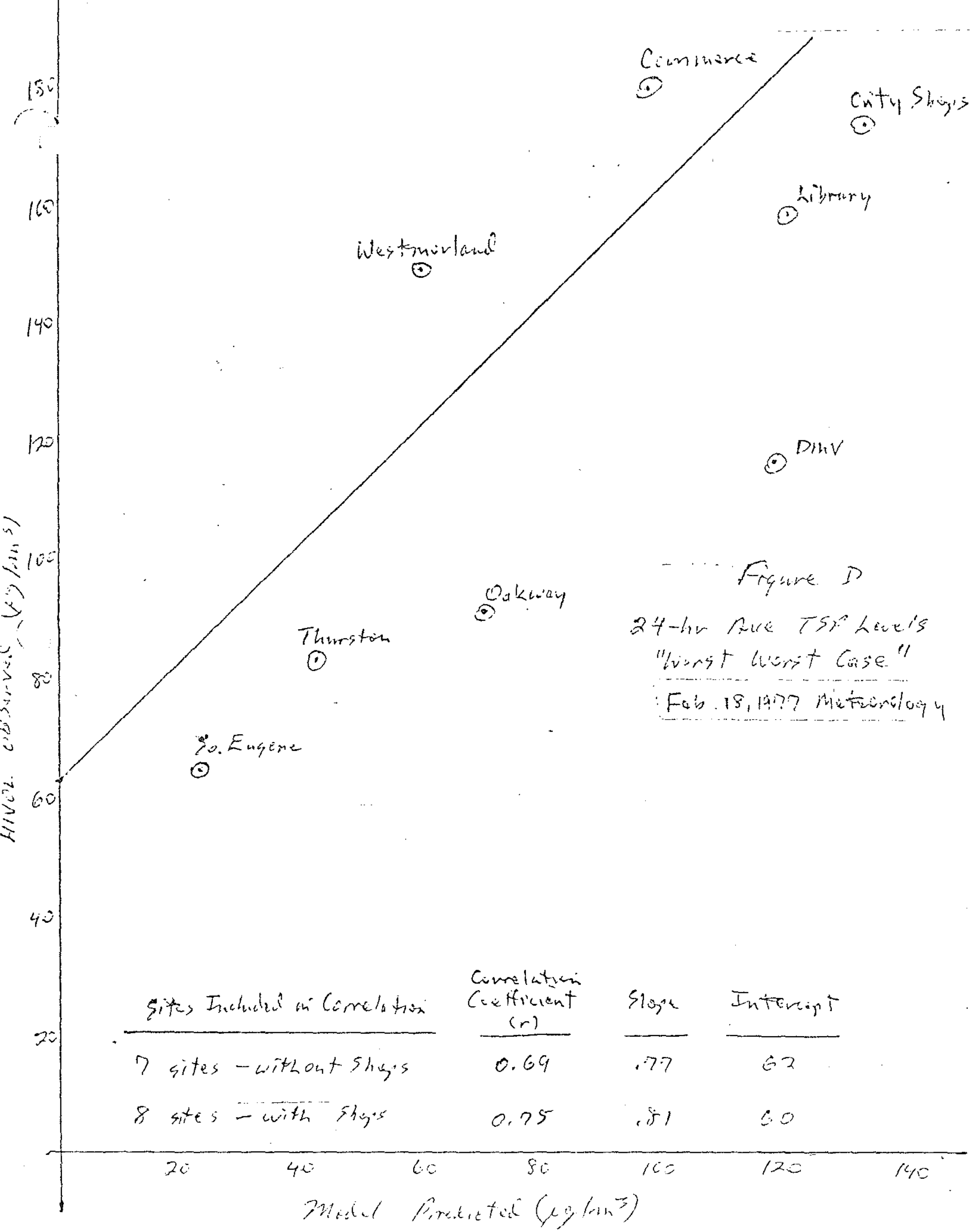


Figure D
24-hr Ave TSP Levels
"Worst Worst Case"
Feb. 18, 1977 Meteorology

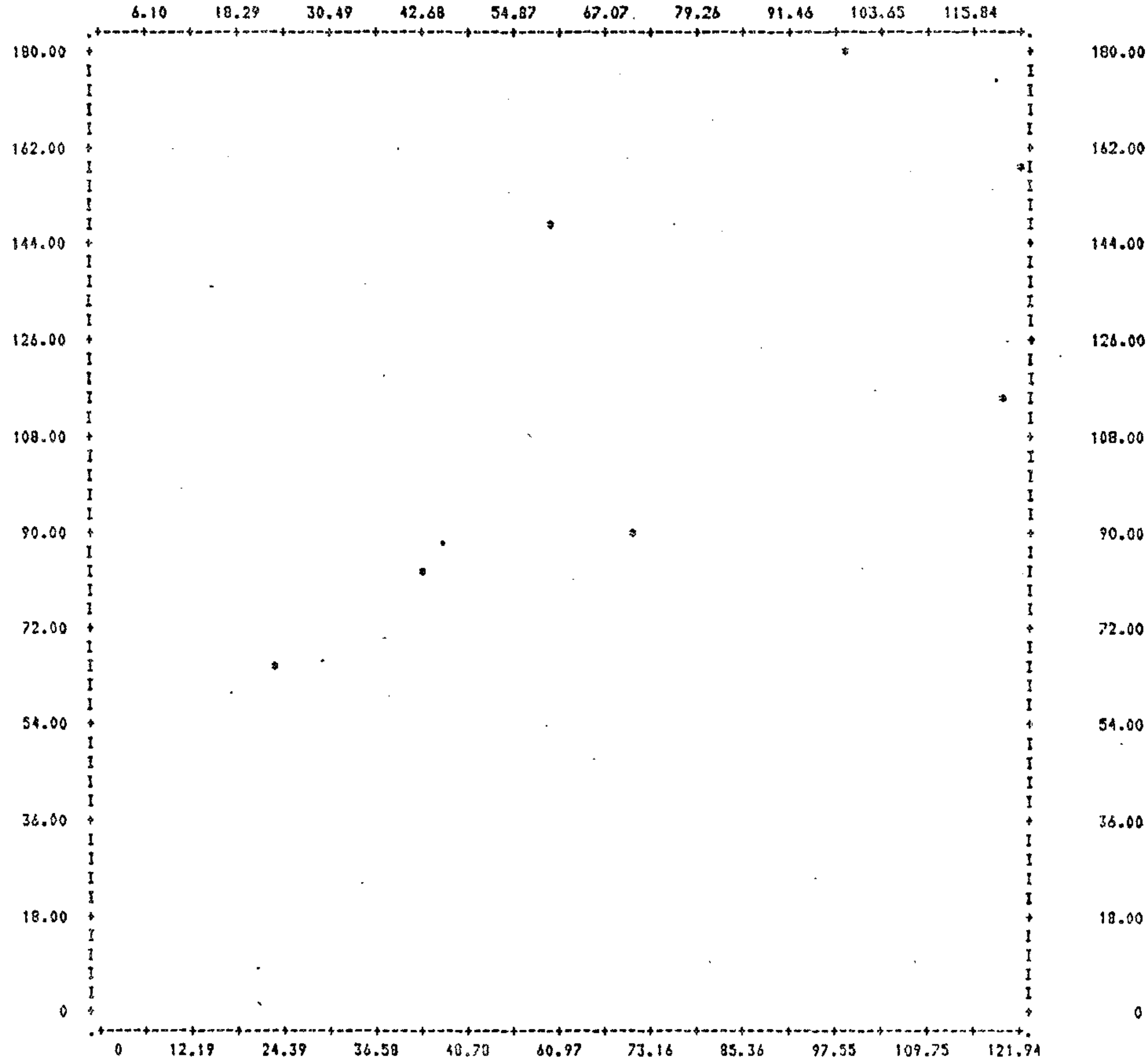
Sites Included in Correlation	Correlation Coefficient (r)	Slope	Intercept
7 sites - without Shops	0.69	.77	62
8 sites - with Shops	0.75	.81	60

G

******** IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

FILE MODEL1 (CREATION DATE = 80/05/28.) EUGENE MODEL OUTPUT
SUBFILE ~~FED~~ Figure D - 24hr Ave TSP with Feb 18th 1977 Meteorology

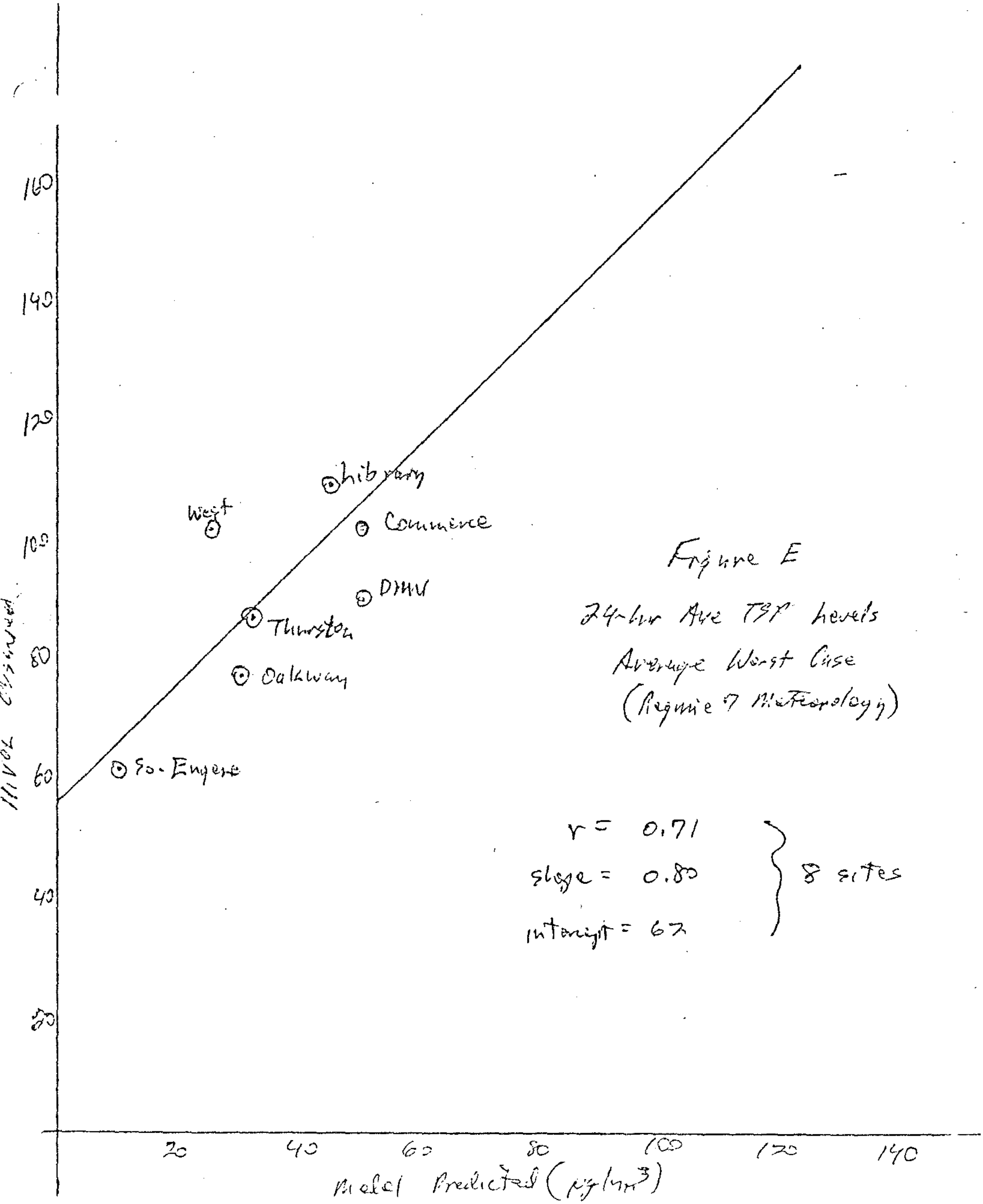
SCATTERGRAM OF (DOWN) Y OBSERVED TSP CONCENTRATION
(ACROSS) X MODEL CALIBRATION PREDICTED TSP



STATISTICS..

CORRELATION (R)-	.68579	R SQUARED -	.47031	SIGNIFICANCE R -	.04448
STD ERR OF EST -	34.04872	INTERCEPT (A) -	62.05917	STD ERROR OF A -	30.91498
SIGNIFICANCE A -	.05049	SLOPE (B) -	.77264	STD ERROR OF B -	.36670
SIGNIFICANCE B -	.04448				

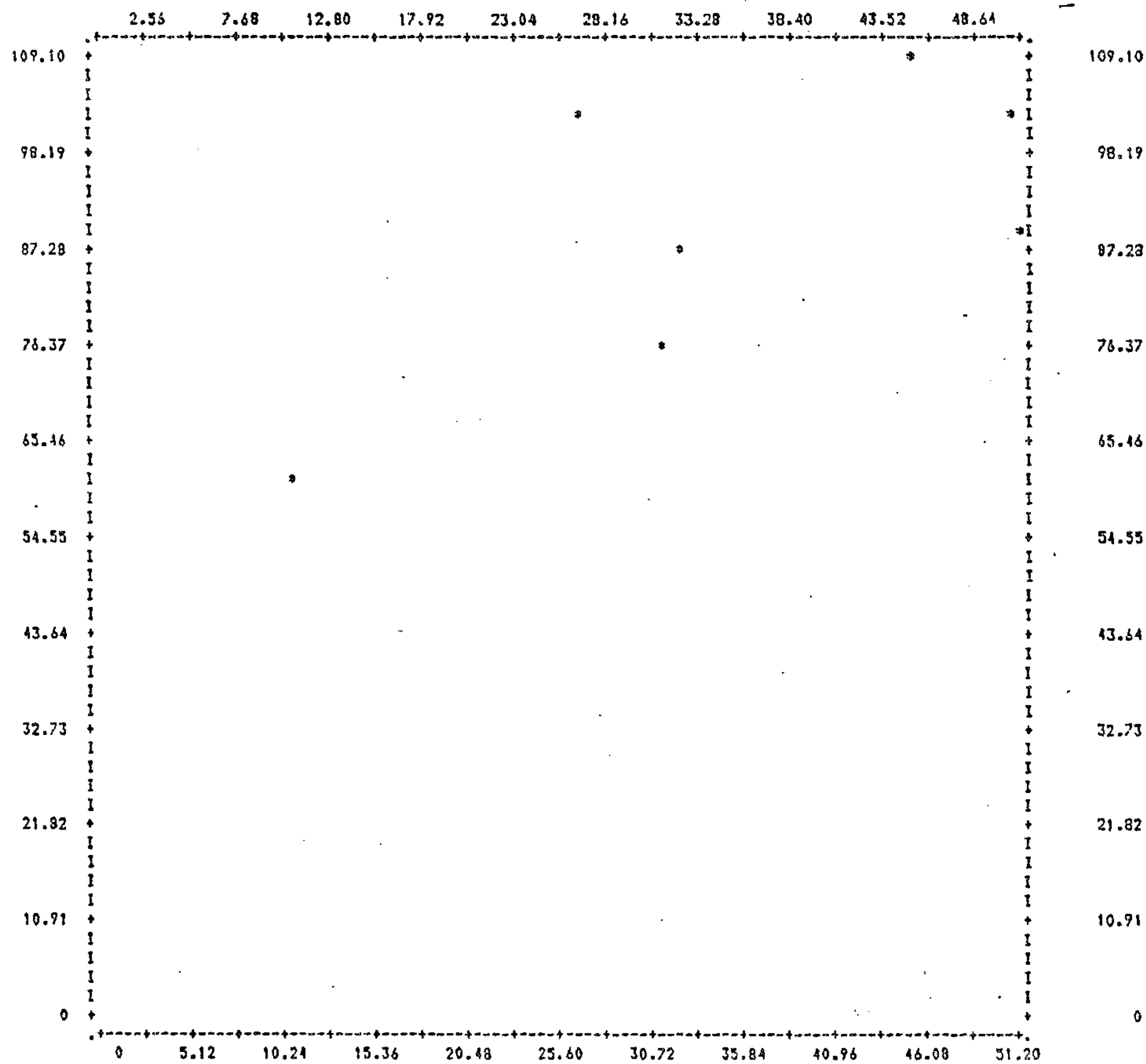
PLOTTED VALUES - 7 EXCLUDED VALUES - 0 MISSING VALUES - 0


Library
West
Commerce
DMV
Thurston
Oakway
So. Eugene
Figure E
24-hr Ave TSP Levels
Average Worst Case
(Regime 7 Meteorology)
r = 0.71
slope = 0.80
intercept = 62
8 sites
HIVOL Observed
40
60
80
100
120
140
160
20
40
60
80
100
120
140
Model Predicted (µg/m3)

******* IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.
UGENE MODEL RESULTS 80/05/28. 11.48.06. PAGE 4

ILE MODEL1 (CREATION DATE = 80/05/28.) EUGENE MODEL OUTPUT
UBFILE ~~AVERAGE~~ Figure E "Average Worst Case" 24-hr ave. TSP Figure 7 meteorology

SCATTERGRAM OF (DOWN) Y OBSERVED TSP CONCENTRATION
(ACROSS) X MODEL CALIBRATION PREDICTED TSP



STATISTICS..

CORRELATION (R)-	.70938	R SQUARED -	.50323	SIGNIFICANCE R -	.03711
STD ERR OF EST -	12.80112	INTERCEPT (A) -	61.81538	STD ERROR OF A -	13.47300
SIGNIFICANCE A -	.00295	SLOPE (B) -	.79957	STD ERROR OF B -	.35528
SIGNIFICANCE B -	.03711				

PLOTTED VALUES - 7 EXCLUDED VALUES - 0 MISSING VALUES - 0

Point Source CONTROL STRATEGIES and Costs

Category	Table A Reference
1. Kingsford: RACT	Strategy C

This company would require a 90% efficient collector. This would reduce emissions from 2,657 T/year to 361 T/year or produce a 2,296 T/year reduction. The 1980 initial costs are estimated to be \$6,000,000. The reduction would cost about \$2,600 per ton initial investment. The annualized cost would be \$1,398,500/year or \$610/T/year. Energy requirements would be about 4,663 kw and annual energy cost would be \$250,730.

2. Veneer Dryers — Strategy C

17 plants with 31 veneer dryers requiring 10% average opacity. This would reduce emissions from 630 T/year to 300 T/year or produce 330 T/year reduction. The 1980 initial costs are estimated to be 5,100,000. The reduction would cost about \$15,455 per ton in initial investment. The annualized cost of about \$835,000/year or \$2,530/T/year. Energy requirements would be 1,194 kw/year and an annual energy cost of \$64,201/year.

3. Hog Fuel Fired Boilers — Strategy B

Currently 13 plants with 27 wood-fired boilers. Current emissions 2,970 T/year. All boilers required to meet 0.1 grs/SCF, utilizing L.E.W.S., Mechanical Collector or Dry Scrubber. This would reduce emissions from 2,970 T/year to 1,395 T/year or produce a 1,575 T/year reduction. The 1980 initial costs are estimated to be \$5,500,000. The reduction would cost about \$3,500/T in initial investment. The annualized cost would be \$1,261,000/year or \$800/T/year. Energy requirements would be 3,893 kw and annual energy costs would be \$209,328/year..

4. Hog Fuel Fired Boilers — Strategy E

19 boilers > 35 x 10^6 BTU and 0.05 grs/SCF would require the initial pre-cleaning equipment plus added high efficient collectors. 8 boilers < 35 x 10^6 BTU and 0.1 grs/SCF would require only low energy lower efficiency collectors. This would reduce emissions from 2,970 T/year to 780 T/year or produce a 2,190 T/year reduction. The 1980 initial costs are estimated to be \$10,000,000. The reduction would cost about \$4,600 per ton in initial investment. The annualized cost would be \$2,105,000 per year or \$962/ton. Energy requirements would be 5,758 kw and annual energy costs would be \$309,611/year.

Category	Table A Reference

5. Cyclones — Strategy B, > 10 T/year Baghouse 99.9%

In the category of > 10 T/year cyclones we have 8 requiring baghouses at 99.9% efficiency. This would reduce emissions from 150 T/year to .15 T/year or produce 149.85 T/year reduction. The 1980 initial cost is estimated to be $300,000. The reduction would cost about $2,000/ton in initial investment. The annualized cost would be $70,000/year or $470/ton/year. Energy requirements would be about 149.2 kw and energy cost would be $8,022/year.

6. Particleboard Dryers — Strategy B, 1.0 lbs./1000 ft.^{2} on Dryers

Particleboard dryers would require a medium energy scrubber. This would reduce emissions from 381 T/year to 168 T/year or produce 213 T/year reduction. The 1980 initial cost is estimated to be $4,000,000. The reduction would cost $18,800/ton in initial investment. The annualized cost would be $685,000 or $3,200/T/ year. Energy requirements would be 1,259 kw and energy costs would be approximately $67,697/year.

7. Particleboard — Strategy C

For an additional 80% reduction, a high energy scrubbing media would be required. This would reduce emissions from 381 T/year to 52 T/year, or produce 329 T/year reduction. The 1980 initial costs are estimated to be $5,500,000. The reduction would cost about $16,700/ton in initial investment. The annualized cost would be $1,000,000 or $3,040/ton/year. Energy requirements would be 2,285 kw and energy cost would be $122,866/year.

8. Rock Crusher — Strategy B

6 plants requiring 10% opacity would require water sprays. This would reduce emissions from 191 T/year to 100 T/year, or produce 91 T/ year reduction. The 1980 initial cost is estimated to be $150,000. The reduction would cost about $1,650/ton in inital investment. The annualized cost of about $43,000 or $473/ton/year. Energy requirements would be 168 kw/year and an annual energy cost of $9,033.

9. Pulp Mill — Strategy B

Installation of a new electrostatic precipitator on Furnace #4 would reduce (actual) TSP emissions from 260 Tons/yr to 164 tons/year - a 96 ton/year reduction.

AES/ec

Category	Degree of Control	Emission Reduction Tons/YR.	Capital Cost $	Cost/Ton of Reduction $	Annualized Cost/YR. $	Cost/Ton Reduction /YR. $	Energy Required KW	Energy Cost/YR. $
Charcoal Mfg. Kingsford	10#/ton	2296	6,000,000	2600	1,398,500	610	4663	250,730
Veneer Dryers 17 Pl - 31 Dryers	10% Avg. opacity	330	5,100,000	15,455	835,000	2530	1194	64,201
Hog Fuel Boilers 13 pl. - 27 Boilers	0.1 gr/SCF 20% opacity	1575	5,500,000	3500	1,261,000	800	3893	209,328
Hog Fuel Boilers 19 Boiler > 35x10⁶	0.05 gr/SCF 20% opacity	2190	10,000,000	4600	2,105,000	962	5758	309,611
Cyclones > 10 T/YR 8 cyclones	99.9%	150	300,000	2000	70,000	470	149.2	8,022
Particleboard Dryers [illegible]	1.0 #/1000 ft²	213	4,000,000	18,800	685,000	3200	1259	67,697
Particleboard Dryers 5	0.35 #/1000 ft²	329	5,500,000	16,700	1,000,000	3040	2285	122,866
Rock Crushers 6 Plants	10% opacity	91	150,000	1650	43,000	473	168	9,033
[illegible] mill	[illegible] ([illegible]/ad T)	100	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

3-19-80
E. S.

LRAPA Copy

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMO

TO: Eugene-Springfield TSP SIP File DATE: Feb. 18, 1980

FROM: Bob Gay R L Gay

SUBJECT: Reduction of Paved Road Dust Emissions By Street Cleaning Credits

Summary: This memo describes estimated reductions in Base Year (1978) paved road dust (PRD) emissions, based on taking credit for street cleaning activity in the Eugene-Springfield AQMA. In this analysis only streets cleaned at least twice per week were assigned street cleaning credits - i.e. lower PRD emissions (ton/yr). While less frequent cleaning (sweeping and/or flushing), is carried out in many areas of the AQMA, and probably helps to abate PRD emissions - the current literature and available experimental data provide insufficient guidance to estimate such benefits quantitatively.

Streets cleaned twice per week or more in 1978 occurred only in the core areas of Eugene and Springfield. On these streets, the PRD emission factor (grams/vehicle mile) was assumed to be 1/3 of what it would have been without this cleaning (ie, a 67% reduction in the regular paved road dust emission factor). In affected Grids, the fraction of total traffic (VMT) using streets cleaned twice-a-week was used to calculate the revised PRD emissions, in order to account for street cleaning credit. The remaining VMT in these grids was translated into paved road dust emissions using the regular PRD emission factor.

Base year (1978) PRD emissions in six AQMA 2 km model grids were affected, as follows: (1) PRD emissions were reduced by a total of 152 tons/year in 4 grids in Eugene; (2) PRD emissions were reduced by 21 tons/year in 2 grids in Springfield - based on final model calibration assumptions. These street cleaning credits can be similarly applied to any special emissions bases created for model calibration purposes - e.g., the 66 1978 CMB sample days in June - Nov., 1978.

The inclusion of street cleaning credits in the final estimated 1987 emissions data base resulted in the following reductions in model-estimated annual average TSP levels: ug/m^3 @ Eugene Commerce, ug/m^3 @ Springfield Library, and ug/m^3 @ PNW Bell. Modeled "worst case" (Feb. 18, 1977 metegrology) 24-hr average TSP levels dropped by ug/m^3 @ Commerce, ug/m^3 @ Library, and ug/m^3 @ PNW Bell.

To date I haven't run the model "with, and without" street cleaning credits, to get these µg/m^3

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Background - Literature Review

A very brief review of recent and readily available literature confirmed that street cleaning reduces airborne particulate emissions and particulate concentrations near roadways.

All studies have great difficulty quantifying road dust emission factors (grams of reentrained road dust per vehicle mile of traffic), due to the many variables involved, including street dust loadings, road surface, traffic levels, wind and rainfall effects, adjacent land uses and erosion, etc. For example, recent studies report an overall range for average particulate emissions from roadways of 0.2 to 45 g/veh-mile. Most common values are in the 2-5 g/veh-mile range. Seton, Johnson and Odell's 1978 AQMA Report used a 4.016 g/VMT PRD emissions factor.

A more recent study entitled Demonstration of Nonpoint Pollution Abatement Through Improved Street Cleaning Practices[1] contains a good brief literature review. It also described road dust emission factors measured for several different types of street surfaces. Table I summarizes emission factors measured for three test areas, as a function of the time interval between street cleanings, or "significant" rains. Two of the test areas had asphalt street surfaces in good repair; the third street had an oil and screens surface with much higher dust emissions. The predominant land use near each was commercial and residential, with nearby schools. Street cleaning methods included vacuum sweeping and flushing.

Proposed Magnitude of Street Washing Credits

In Table I, an interval of 2-4 days between cleanings was assumed to be representative of twice-a-week street cleaning. The largest (60-75 day) interval could be representative of very infrequent or no street cleaning. The average interval represents the average time between significant rainfall events, or street cleaning events. This analysis assumes that the method of street cleaning (sweeping, flushing, etc.) is less important than cleaning frequency.

The last column in Table I shows the ratios of measured emission factors for: (A) twice-a-week vs no significant street cleaning, and; (B) twice-a-week vs average street cleaning. For the two tests on asphalt streets, emission factors differed in magnitude by a factor of four, but the ratios A and B were essentially the same in both cases. This indicates that twice-a-week street cleaning resulted in road dust emission factors about 1/3 as large as would occur with very infrequent cleaning.

This formed the basis for the key assumption in this analysis - that streets cleaned twice-a-week would have a PRD emission factor 1/3 as large as streets cleaned less frequently, or not at all. While it is recognized that less frequent cleaning will also have beneficial effects, available literature guidance was insufficient to provide quantitative estimates of these effects with any confidence. Perhaps this could become an element in future AQMA strategy evaluation or demonstration projects.

TABLE I. Road Dust Emission Factors vs. Street Cleaning Frequency

Time After Street Cleaning or Significant Rain (Days)		Paved Road Dust Emissions lb/Curb-Mile/day	Paved Road Dust Emissions Grams/Vehicle-Mile	Increase Over Initial Rate	Paved Road Dust Emission Ratios
Test Area #1 - Asphalt Street in Good Condition					
2	4	4	0.44	-	
4	10	4	0.44	1.0	
10	20	5	0.55	1.3	$A = \frac{.44}{1.3} = \frac{1}{3}$
20	30	7	0.77	1.8	
30	45	8	0.88	2.0	
45	60	9	0.98	2.3	$B = \frac{.44}{.66} = \frac{2}{3}$
60	75	12	1.3	3.0	
Average		6	0.66	-	
Test Area #2 - Asphalt Streets in Good Condition					
2	4	4	1.7	-	
4	10	4	1.7	1.0	
10	20	5	2.1	1.3	$A = \frac{1.7}{5.0} = \frac{1}{3}$
20	30	7	2.9	1.8	
30	45	8	3.3	2.0	
45	60	9	3.7	2.3	$B = \frac{1.7}{2.5} = \frac{2}{3}$
60	75	12	5.0	3.0	
Average		6	2.5	-	
Test Area #3 - Oil and Screens Street Surface					
2	4	1	4.5	—	
4	10	3	14	3.1	$A = \frac{4.5}{45} = \frac{1}{10}$
10	20	4	18	4.0	
20	30	5	23	5.1	
30	45	10	45	10	$B = \frac{4.5}{18.0} = \frac{1}{4}$
Average		4	18	—	

Source: Reference 1, pp. 125-129

The oil and screens test area was considered less representative of Eugene-Springfield paved streets, because its dust loadings were considerably higher than those found in a 1977 local study of surface loadings.[2] Thus, the key assumption stated above was assumed to hold for the paved roads found in the AQMA, regardless of the specific magnitude of the PRD emission factor ultimately used in final model calibration, provided it does not vary too much from EPA's most typical range (2-5 g/VMT).

Correlation of Street Cleaning Frequency and Traffic Volume Affected

Table II and Figures I and II summarize the street cleaning programs existing in Eugene and Springfield during 1978 - the base year for TSP SIP analysis. The only streets receiving twice-a-week cleaning are in the core areas of the two cities.

Regional transportation model (SAPOLLUT) maps, and a corresponding Historical Record Printout for SAPOLLUT were used to tabulate VMT associated with twice-a-week street cleaning by 2 km grids used in the AQMA particulate dispersion (GRID) model. Only six grids were significantly affected, as summarized in Table III (and Attachment I). Attachment II summarizes the SAPOLLUT data on VMT/Grid in the AQMA. Use of SAPOLLUT data assures that street cleaning credits will be calculated consistent with other VMT-based emission factors used in the overall TSP SIP analysis.

TABLE II. Street Cleaning Frequencies in Eugene and Springfield (1978)

	Sweeping	Flushing
City of Eugene		
1. Core and Surrounding Area (Figure I)	twice/week	twice/week
2. University Area	twice/week	once/2 weeks
3. Industrial Area	once/week	once/2 weeks
4. Arterials outside Core and Industrial Areas	twice/week	once/6 weeks
5. Residential	once/2 weeks	once/6 weeks
City of Springfield		
1. Core Area (Figure II)	1-5 times/week	1-5 times/week
2. Major arterials	twice/week	once/month
3. Collector streets	once/week	once/month
4. Residential areas	once/2 weeks	once/month

Source: Public Works Depts., Cities of Eugene and Springfield.

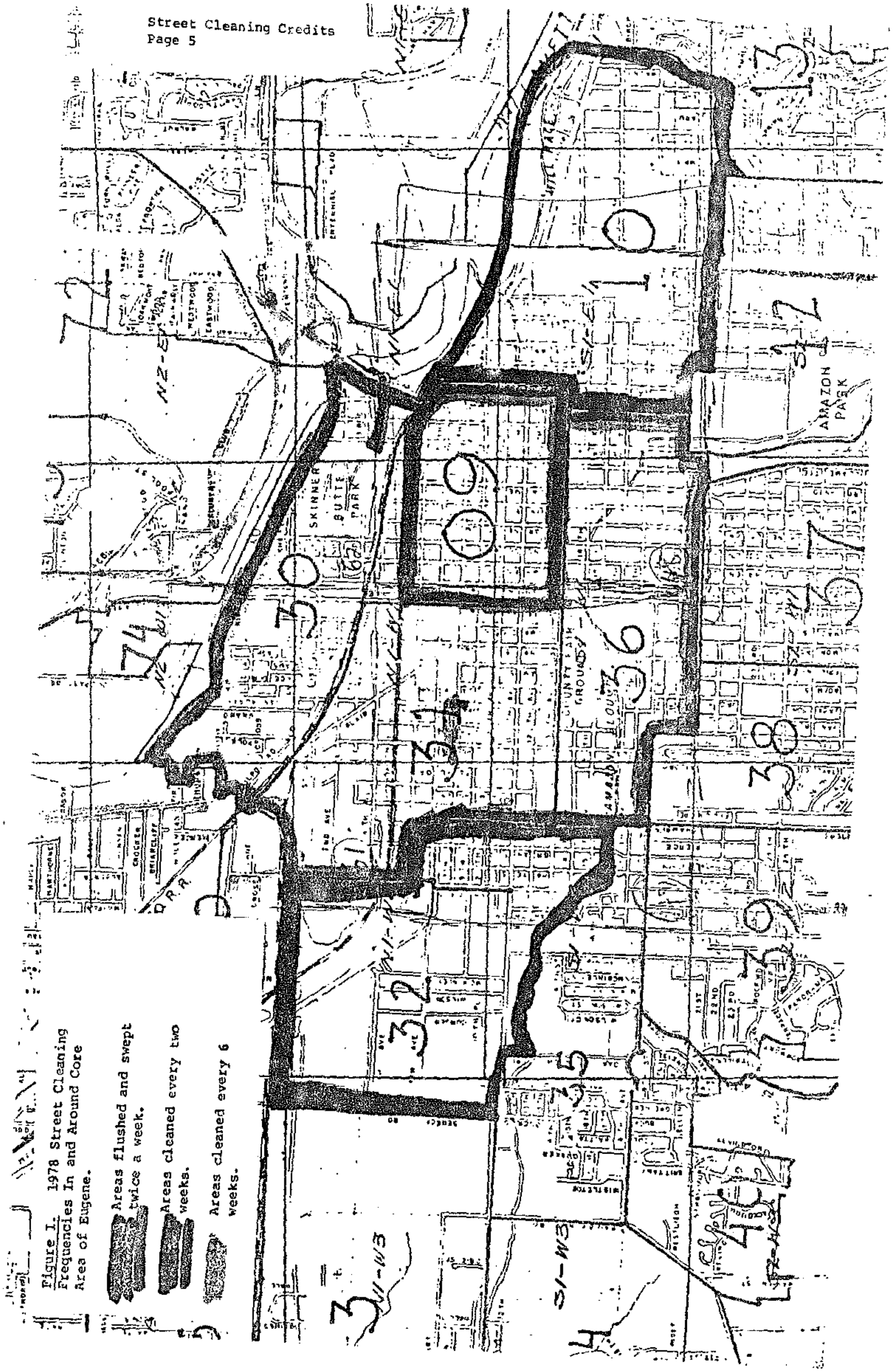

Figure I. 1978 Street Cleaning Frequencies In and Around Core Area of Eugene.

Areas flushed and swept twice a week.

Areas cleaned every two weeks.

Areas cleaned every 6 weeks.

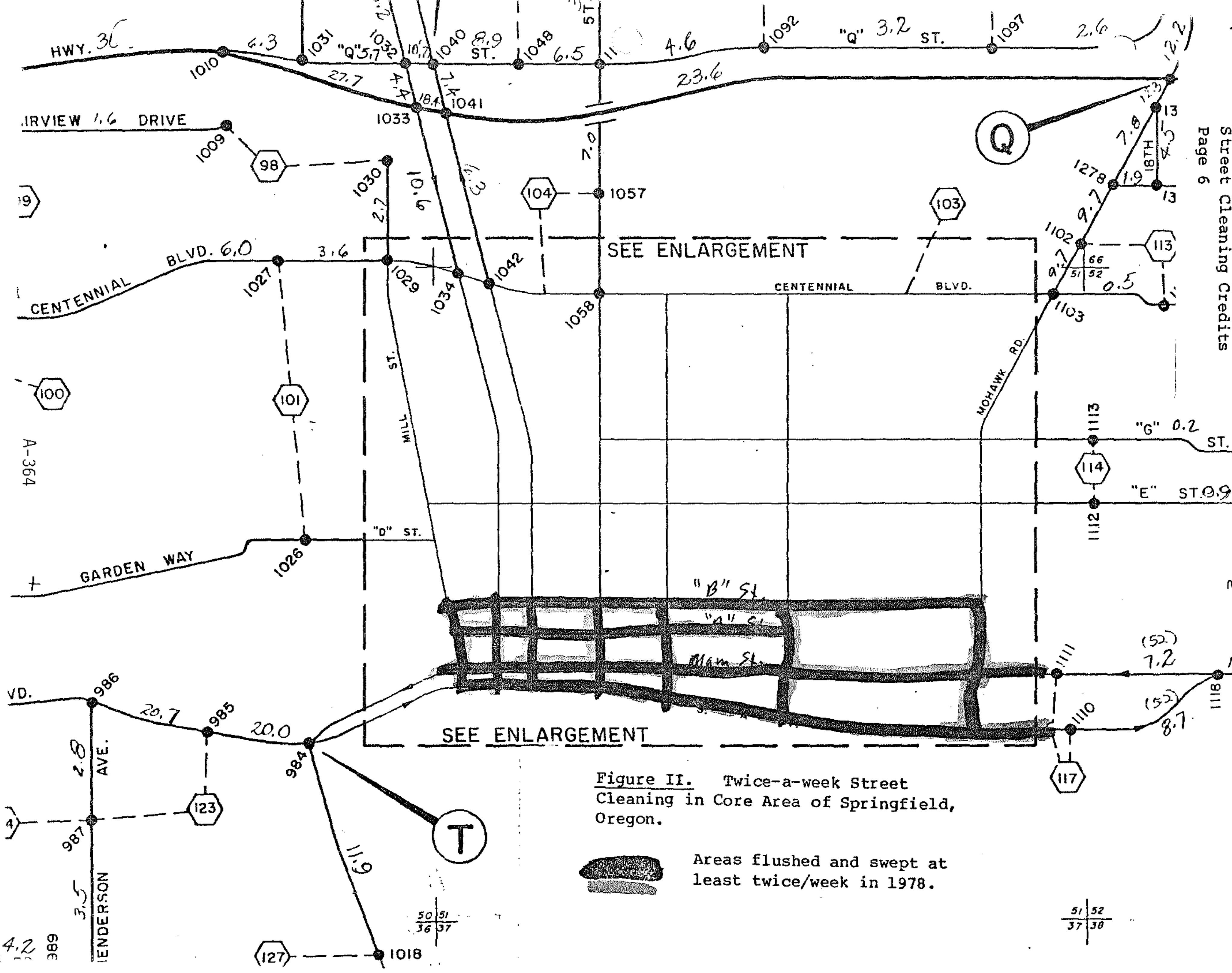

Figure II. Twice-a-week Street Cleaning in Core Area of Springfield, Oregon.

Application of Street Cleaning Credits to Other PRD Emissions Bases

Table III illustrates how paved road dust emissions (T/yr) for a 1978 Base Year Emission Inventory were calculated, accounting for street cleaning credits. The sum of PRD emissions in Columns (5) and (6) are the total 1978 annual PRD emissions in the six grids affected by street cleaning credits, assuming the "SJO Rainfall Factor", as discussed in the next section.

Using the VMT-fraction associated with street cleaning, and the 1/3 PRD emission factor assumption, general street cleaning credits may be calculated as follows:

VMT Fraction Associated With Street Cleaning x (1/3) +	VMT Fraction Not Associated With Street Cleaning	(1.0)

Table IV summarizes the street cleaning credits thus calculated for the six affected grids, using VMT-Fractions from Table III.

TABLE IV - Street Cleaning Credits

Grid No. (X,Y)		VMT - Fraction Associated With: Twice-a-Week Cleaning	Less or No Cleaning	Street Cleaning Credit: As Percent	As Multiplier
34	(6,3)	.037	.963	2.4	.976
47	(5,4)	.839	.161	56.0	.44
48	(6,4)	.64	.36	42.7	.573
61	(5,5)	.548	.452	36.7	.633
-		0	1.0	0	1.0
51	(9,4)	.52	.48	34.7	.653
52	(10,4)	.21	.79	14.0	.86

See memo on ~~[illegible]~~ Paved Road Dust, for use of these multipliers, including its Attachment I

Several special emissions data bases have been created for model calibration purposes, including: (1) 12-Day Composite of rainless Regime 1 and Regime 3 days during June - Sept. 1978; (2) Regular 1978 TSP Sample Days (6th Day Hi-Vol); (3) a 66 day composite of all CMB Data available during June-Nov. 1978 (mixture of Regimes), and (4) the 12-Day Composite with a paved road dust Trackout Factor. In all these cases, street cleaning credits can be applied after PRD emissions have been calculated for an affected grid, as follows:

PRD Emissions Calculated Using Any PRD Emission Factor (Tons/Yr)	x 1/3 x VMT Fraction Associated with Street Cleaning (Table III, Col. 3)	= PRD Emissions from Streets Cleaned Twice/Week
	+	+
	x VMT Fraction Not Associated with Street Cleaning (Table III, Col. 4)	= PRD Emissions from Other Streets
	TOTAL	= Total PRD Emissions/Grid Adjusted for Street Cleaning

TABLE III. Traffic Levels (VMT) and Paved Road Dust Emissions (Tons/Yr) Associated with Twice-A-Week (1978) Street Cleaning

Grid No. (X,Y)	Streets Cleaned Twice/Week (miles)	Streets Cleaned Twice/Week (VMT/day)	VMT/Grid Affected by Cleaning: Total 1978 VMT/day	VMT/Grid Affected by Cleaning: VMT-Fraction Assoc'd with Cleaning	VMT/Grid Affected by Cleaning: VMT-Fraction Not Assoc'd With Cleaning	Paved Road Dust Emissions (T/yr): Emissions Twice/Week Cleaned Streets	Paved Road Dust Emissions (T/yr): Emissions on Streets Cleaned Less Often	Paved Road Dust Emissions (T/yr): Emissions Eliminated By Cleaning
	(1)		(2)	(3)	(4)	(5)	(6)	(7)
Eugene								
34 (6,3)	.81	2,590	70,518	.037	.963	.77	60.0	1.5
47 (5,4)	10.25	112,465	134,127	.839	.161	33.1	19.1	66.3
48 (6,4)	13.82	103,571	161,868	.64	.36	30.5	51.5	61.0
61 (5,5)	2.50	38,756	70,724	.548	.452	11.4	28.2	22.8
62 (6,5)	.10	20	91,237	0	1.0	0	80.6	0
								151.6
Springfield								
51 (9,4)	5.06	29,497	57,043	.52	.48	8.7	24.2	17.5
52 (10,4)	.73	6,519	31,534	.21	.79	2.0	22.0	3.9
								21.4

NOTE: (1) Street segments and cleaning frequencies from public works officials. Mileage and VMT affected from SAPOLLUT Historical Record Printout and traffic street system loading maps for SAPOLLUT runs dated August 1977 for the E-SATS area. (Attachment I)

(2) From SAPOLLUT regional transportation model. (Attachment II)

(3) Col. (1) VMT/Col. (2) VMT

(4) 1.0 - Col. (3)

(5) Col. (2) x Col. (3) x PRD Emission Factor/3 x Other Factors = PRD Emissions (Tons/Yr) for cleaned streets. Final calibration assumptions were used, including: a) paved road dust (PRD) emission rate = 2.81 g/VMT; b) trackout surchange to PRD emissions for 41 affected grids; c) 78.5% entrainment (LTA), based on hours a trace of rainfall; d) correction factors for 90% assumed aerodynamic (30 micron) particle size; and for 3% heavy trucks (1.105), and e) 0.0004028 to convert grams/day to tons/year.

(6) Col. (2) x Col. (4) x PRD Emision Factor x Other Factors (Note 5).

(7) Col. (2) x PRD Emission Factors x Other Factors (Note 5) - (Col. (5) + Col. (6)).

AQ0093.A

<u>References</u>

(1) Robert Pitt, Woodward-Clyde Consultants, San Francisco, Calif. <u>Demonstration of Nonpoint Pollution Abatement Through Improved Street Cleaning Practices,</u> EPA-600/2-79-161, August, 1979.

(2) Unpublished report on street dust loading study conducted in 1977 by the Lane Regional Air Pollution Authority, 16 Oakway Mall, Eugene, Oregon 97401.

(3) Seton, Johnson and Odell's Feb. 15, 1978 report entitled "Eugene-Springfield Air Quality Maintenance Area - Data Base Development", Feb. 15, 1978.

RG:kmm

Attachments:

I. VMT associated with street cleaning, by Grid
II. Total VMT/Grid

AQ0093

CITY: EUGENE ATTACHMENT I 1978 VMT Levels Associated with Street Washing, By GRID

STREET WASHING ZONE: (Yellow) verticle

LINK NODES	LINK LENGTH (miles)	LINK TRAFFIC LEVELS AWDT	LINK TRAFFIC LEVELS VMT	GRID No.
161-[illegible]6	.08	5.4	.432	48
961-962	.08	5.0	.40	48
962-967	.07	.5	.035	
957-(955)	.08* est	10.5	.84	
957-960	.08	13.3	1.064	
960-963	.08	16.5	1.32	
963-966	.07	19.9	1.393	
966-1015	.21	27.7	5.817	
1015-973	.10	23.7	2.37	
973-976	.12	23.5	2.82	48
976-978	.11	20.9	2.299	47
978-979	.11	20.9	2.299	
979-639	.35	18.3	6.405	
639-640	.25	17.1	4.275	
638-599	.28	8.6	2.408	
599-924	.27	9.5	2.565	
924-912	.27	9.1	2.457	
912-908	.15	14.5	2.175	
908-896	.03	19.0	.57	47
896-882	.04	20.2	.808	48
882-881	.07	12.6	.882	
881-871	.10	12.9	1.29	
871-870	.06	9.1	.546	
870-853	.07	11.2	.784	
853-849	.08	10.0	.80	
849-832	.07	6.8	.476	
832-831	.04	7.8	.312	
831-926	.04	5.5	.22	
926-929	.08	6.7	.536	
929-930	.12	7.5	.9	
930-(931)	.06* est.	8.5	.510	
800-(799)	.06* est	9.0	.54	
800-801	.11	9.6	1.056	
801-816	.08	8.2	.656	
816-830	.04	5.9	.236	
830-834	.04	9.2	.368	
834-848	.08	10.1	.808	48
	4.03			

LINK NODES	LINK LENGTH (miles)	LINK TRAFFIC LEVELS AWDT	LINK TRAFFIC LEVELS VMT	GRID No.
848-854	.08	10.1	.808	48
854-860	.04	11.2	.448	48
860-869	.03	13.0	.39	48
869-880	.16	13.7	.822	48
880-884	.07	14.3	1.001	48
884-906	.07	12.4	.868	47
906-914	.15	18.9	2.835	47
914-923	.11	13.5	1.485	47
923-600	.27	12.9	3.483	47
600-598	.28	11.1	3.108	47
611-601	.30	11.6	3.48	47
601-922	.09	12.4	1.116	47
922-916	.24	13.0	3.12	47
916-911	.09	17.6	1.584	47
911-902	.11	17.6	1.936	47
902-888	.07	15.9	1.113	47
888-874	.10	8.5	.85	48
874-864	.13	7.9	1.027	48
864-856	.07	8.2	.574	48
856-852	.03	8.2	.246	48
852-846	.05	8.9	.445	48
846-840	.07	9.3	.651	48
840-827	.04	10.4	.416	48
827-821	.04	8.8	.352	48
821-813	.04	8.0	.32	48
813-806	.04	8.2	.328	48
806-784	.02	18.4	.368	48
784-785	.04	12.8	.512	48
785-(781)	.11* est.	22.8	2.508	48
781-787	.08	5.6	.448	48
788-787	.02	10.4	.208	48
787-789	.11	16.0	1.76	48
805-788	.07	6.2	.434	48
789-786	.15	16.5	2.475	48
786-785	.03	10.	.30	48
786-783	.15	6.6	.33	48
782-783	.06	4.8	.288	48
	3.61			

(TOTALS)

CITY: EUGENE ATTACHMENT I 1978 VMT Levels Associated with Street Washing, By GRID

STREET WASHING ZONE: (Yellow)

LINK NODES	LINK LENGTH (miles)	LINK TRAFFIC LEVELS AWDT	LINK TRAFFIC LEVELS VMT	GRID No.	
783-808	.05	11.4	.57	48	
808-812	.04	11.0	.44	48	
812-823	.04	11.1	.488	48	
823-826	.04	11.8	.472	48	
826-842	.04	11.6	.464	48	
842-845	.07	14.0	.98	48	
845-851	.05	13.8	.69	48	
851-857	.03	14.6	.438	48	
857-862	.07	14.2	.994	48	
862-875	.13	12.1	1.573	48	
875-890	.10	12.2	1.22	48	
890-894	.03	13.2	.396	48	bor.
894-900	.04	18.8	.752	47	
900-910	.13	18.1	2.353	47	
910-917	.13	18.0	2.34	47	
917-921	.18	14.9	2.682	47	
921-602	.09	14.3	1.287	47	
602-603	.30	12.9	3.87	47	
603-604	.20	18.7	3.74	47	
757-755	.13	2.6	.338	61	
755-754	.37	3.3	1.221	61	
918-909	.14	2.2	.308	47	
909-899	.17	3.6	.612	47	
899-891	.08	3.1	.248	47	ford
891-876	.13	3.2	.416	48	
876-861	.10	3.3	.33	48	
861-858	.07	2.9	.203	48	
858-850	.05	2.5	.125	48	
850-844	.03	2.6	.078	48	
844-843	.08	2.1	.168	48	
843-825	.06	1.9	.114	48	
825-824	.02	2.4	.048	48	
824-809	.08	.9	.072	48	
811-	.15	.7	.105	48	
810-(781)	[illegible]	1.4	.168	48	
705-(704)	.5(est)	22.2	3.33	61	
705-706	.20	26.6	5.32	61	
	3.59				

LINK NODES	LINK LENGTH (miles)	LINK TRAFFIC LEVELS AWDT	LINK TRAFFIC LEVELS VMT	GRID No.	
706-897	.38	.5	.19	61	
897-893	.07	.2	.014	61	b.
905-885	.08	3.4	.272	47	bor.
885-879	.07	6.6	.462	48	
879-872	.11	6.7	.737	48	
872-867	.06	3.2	.192	48	
867-859	.04	6.9	.276	48	
859-836	.19	6.7	1.273	48	
836-829	.04	10.	.40	48	
829-817	.04	9.8	.392	48	
817-815	.04	6.0	.24	48	
815-802	.04	5.5	.22	48	
837-818	.08	0	0	48	
818-803	.08	4.1	.328	48	
803-789	.10	9.1	.91	48	
789-(790)	.06* est.	41.7	2.502	48	
903-887	.07	0	0	47	b.
887-878	.07	2.1	.147	48	
878-873	.12	2.5	.30	48	
873-865	.05	4.2	.210	48	
865-855	.07	2.5	.175	48	
855-847	.08	2.5	.20	48	
847-839	.07	2.5	.175	48	
839-828	.04	5.3	.212	48	
828-820	.04	2.8	.112	48	
820-814	.04	9.9	.396	48	
814-805	.04	10.0	.40	48	

(TOTALS)

CITY: EUGENE ATTACHMENT I [illegible] VMT Levels Associated with Street Washing, By GRID

STREET WASHING ZONE: (Yellow)

LINK NODES	LINK LENGTH (miles)	LINK TRAFFIC LEVELS AWDT	LINK TRAFFIC LEVELS VMT K	GRID No.		LINK NODES	LINK LENGTH (miles)	LINK TRAFFIC LEVELS AWDT	LINK TRAFFIC LEVELS VMT	GRID No.
102[illegible]1	.02	14.2 K	.284	47		966-965	.19	2.7	.513	48
901-900	.06	3.3	.198	47		965-849	.19	3.3	.627	48
900-899	.08	2.6	.208	47		849-848	.15	0	0	48
899-898	.20	1.1	.22	47	border	847-846	.07	0	0	48
898-897	.10	.3	.03	61		846-845	.08	.4	.032	48
896-882	.04	19.0	.76	48		845-844	.08	.5	.04	48
882-883	.08	7.6	.608	48		968-962	.12	5.5	.66	34
883-884	.07	7.6	.532	48		962-963	.08	9.1	.728	48
884-885	.08	9.5	.76	48		963-964	.19	9.5	1.805	48
885-886	.09	6.3	.567	48		964-832	.19	9.6	1.824	48
886-887	.06	7.2	.432	48		832-833	.09	8.5	.765	48
887-888	.07	9.2	.644	48		833-834	.06	8.5	.510	48
888-889	.02	16.7	.334	48		834-835	.03	7.7	.231	48
889-890	.06	3.8	.228	48		835-836	.05	6.1	.305	48
890-891	.08	2.9	.232	48		836-837	.07	2.9	.203	48
891-892	.20	1.1	.22	48	border	837-838	.04	2.9	.116	48
892-893	.10	.2	.02	62		838-839	.04	2.9	.116	48
97[illegible]15	.19	2.9	.551	48	border	839-840	.07	5.6	.392	48
1015-972	.19	7.3	1.387	48		840-841	.04	4.6	.184	48
972-871	.19	7.1	1.349	48		841-842	.04	3.4	.136	48
871-870	.06	9.1	.546	48		842-843	.08	1.0	.08	48
870-869	.15	2.1	.315	48		961-960	.08	5.9	.472	48
869-868	.03	2.8	.084	48		960-959	.19	8.4	1.596	48
868-867	.05	2.8	.14	48		959-926	.19	8.9	1.691	48
867-866	.07	6.5	.455	48		926-927	.09	10.2	.918	48
866-865	.08	1.3	.104	48		927-816	.06	11.2	.672	48
865-864	.07	3.0	.21	48		816-817	.08	8.8	.704	48
864-863	.03	3.3	.099	48		817-818	.07	5.0	.35	48
863-862	.05	2.8	.140	48		818-819	.04	9.1	.364	48
862-861	.08	.7	.056	48		819-820	.04	10.6	.424	48
853-854	.15	1.2	.18	48		820-821	.07	3.5	.245	48
855-856	.07	0	0	48		821-822	.04	2.7	.108	48
856-857	.08	?	0	48		822-823	.04	.8	.032	48
857-858	.08	.4	.032	48		823-824	.08	1.5	.12	48
96[illegible]58	.07	15.8	1.106	34		956-957	.08	3.6	.288	48
968-967	.08	10.3	.824	34		957-958	.19	6.5	1.235	48
967-966	.05	9.8	.784	48		958-929	.19	7.5	1.425	48
	3.36				(TOTALS)		[illegible]			

CITY: EUGENE

1990 VMT Levels Associated with Street Washing, By GRID

STREET WASHING ZONE: (YELLOW)

ATTACHMENT I

LINK NODES	LINK LENGTH (miles) ×	LINK TRAFFIC LEVELS AWDT (MAP) =	(VMT)	GRID No.		LINK NODES	LINK LENGTH (miles)	LINK TRAFFIC LEVELS AWDT	VMT	GRID No.
640-638	.37	12.4 K	4.588	47		929-928	.09	6.8	.612	48
638-598	.15	12.9	1.935	47		928-801	.06	5.2	.312	48
598-611	.31	14.2	4.402	47		801-802	.08	6.5	.52	48
611-603	.08	6.9	.552	47		802-803	.07	12.0	.84	48
603-604	.20	18.7	3.74	47		803-804	.04	14.8	.592	48
604-756	.12	11.2	1.344	47		804-805	.04	14.5	.58	48
756-757	.18	6.6	1.188	47	border	805-806	.07	10.8	.756	48
757-	.20*	6.8	1.36	61		806-807	.04	.6	.024	48
639-983	.18	4.6	.828	47		807-808	.04	.1	.004	48
983-599	.18	5.4	.972	47		808-809	.08	.5	.04	48
599-600	.15	4.7	.705	47		809-810	.07	1.4	.098	48
600-925	.14	4.2	.588	47		810-811	.08	1.0	.08	48
925-601	.16	4.6	.736	47		901-895	.06	10.9	.654	47
601-602	.08	2.9	.232	47		889-895	.06	12.9	.774	48
602-754	.30	1.1	.33	47	border	895-894	.03	23.8	.714	47
980-979	.19	4.7	.893	47	border	894-(765)	.69*	32.1	22.149	61
912-913	.08	6.6	.528	47						
913-914	.07	6.4	.448	47						
914-915	.17	11.6	1.972	47						
915-916	.14	11.3	1.582	47		EUGENE				
916-917	.10	13.2	1.32	47						
917-918	.10	21.7	2.17	47		GRID		MILES		VMT
918-919	.09	22.2	1.998	47						
919-920	.02	23.4	.468	47		34		.81		2,590
920-754	.21	4.4	.924	61	border	47		10.25		112,465
920-706	.20	26.2	5.24	61	border	48		13.82		103,571
975-976	.19	4.1	.779	47	border	61		2.50		38,756
976-977	.18	5.6	1.008	47		62		.10		20
977-896	.18	6.1	1.098	47				27.48		257,402
896-908	.03	19.0	.57	47						
908-907	.08	4.6	.368	47						
907-906	.07	5.5	.385	47						
906-905	.08	11.9	.952	47						
905-904	.07	15.4	1.078	47						
904-903	.08	15.9	1.272	47						
903-902	.07	15.9	1.113	47						
	5.20				(TOTALS)		1.00			

CITY: SPRINGFIELD

Attachment I

1978 VMT Levels Associated with Street Washing, By GRID

STREET WASHING ZONE: (YELLOW)

LINK NODES	LINK LENGTH (miles)	LINK TRAFFIC LEVELS AWDT	LINK TRAFFIC LEVELS VMT	GRID No.	
019-1039	.07	14.1	.987	51	
039-1047	.06	17.3	1.038		
047-1054	.06	11.6	.696		
054-1066	.06	11.2	.672		
066-1067	.13	11.8	1.534		
067-1082	.21	10.6	2.226		
1082-1093	.17	10.9	1.853		
1093-1109	.20	10.7	2.14		
1109-1110	.18	9.8	1.764	51	
1110-1118	.32	8.7	2.784	52	border
1118-1119	.09	15.9	1.431	52	
1118-1111	.32	7.2	2.304	52	border
1111-1108	.14	8.3	1.162	51	
1108-1094	.18	6.8	1.224		
1094-1083	.18	6.9	1.242		
1083-1068	.22	5.9	1.298		
068-[illegible]5	.12	6.2	.744		
[illegible]-1053	.06	6.0	.36		
1053-1046	.06	6.5	.39		
1046-1038	.06	7.3	.438		
1038-1020	.07	13.4	.938		
1021-1037	.09	.6	.054		
1037-1045	.06	3.8	.228		
1045-1052	.06	5.4	.324		
1052-1064	.06	4.6	.276		
1064-1069	.12	3.8	.456		
1069-1079	.11	4.2	.462		
1079-1081	.11	3.6	.396		
1022-1036	.11	1.7	.187		
1036-1044	.06	2.1	.126		
1044-1051	.06	1.7	.102		
1051-1063	.06	1.1	.066		
1063-1071	.12	1.2	.144		
1071-1080	.11	2.9	.319		
10[illegible]-1086	.11	2.4	.264		
1086-1121	.18	4.7	.846		
1121-1107	.18	4.4	.792	51	

LINK NODES	LINK LENGTH (miles)	LINK TRAFFIC LEVELS AWDT	LINK TRAFFIC LEVELS VMT	GRID No.
1022-1021	.06	2.9	.174	51
1021-1020	.06	2.2	.132	
1020-1019	.03	1.3	.039	
1036-1037	.06	8.3	.498	
1037-1038	.06	9.3	.558	
1038-1039	.03	3.2	.096	
1044-1045	.06	6.5	.390	
1045-1046	.06	4.9	.294	
1046-1047	.03	5.6	.168	
1066-1065	.03	.6	.018	
1065-1064	.06	.4	.024	
1064-1063	.06	1.4	.084	
1071-1070	.03	.9	.027	
1070-1069	.03	.9	.027	
1069-1068	.06	1.6	.096	
1068-1067	.05	1.7	.085	
1086-1085	.03	2.3	.069	
1085-1084	.03	2.3	.069	
1084-1083	.06	1.3	.078	
1083-1082	.09	.3	.027	
1107-1108	.14	3.8	.532	
1108-1109	.11	2.4	.264	51

SPRINGFIELD

GRID	MILES	VMT
51	5.06	29,497
52	.73	6,519
	5.79	36,016

(TOTALS)

~~Table II~~ Average Daily ~~VMT/Grid~~ From SA Pollut - 1977, 1978, 1983
1985, 1987

ATTACHMENT ~~III-2~~

MODEL GRIDS		1977 SA Pollut (VMT/day)	1983 SA Pollut (VMT/day)	1987 SA Pollut (VMT/day)	1977-83 ΔVMT/yr (VMT/day	1983-87 ΔVMT/yr (VMT/day)	1978 (VMT/day)	1985 (VMT/day)	1976 VMT/yr SA Pollut x10⁶	1976 VMT/yr OSU/SJO x10⁶	Δ 1976 VMT/yr (± %) Change in OSU-VMT
~~1~~	~~1~~										
~~2~~	~~15~~										
3	29										
4	43										
5	57										
6	71									✓	
7	85	✓	✓	✓	✓	✓	✓	✓	✓		
,8	99	4075	4961	5553	147.7	148.0	4223	5257	1.433		—
~~,9~~											
~~2,1~~											
~~2,2~~											
2,3	30	427	487	522	10	8.75	437	5045	.152		—
2,4	44	8,904	10,163	10,910	210	188	9,114	10,539	3.17	6.09	-48%
2,5	58	4,785	5,855	8,303	408	612	5,193	7079	1.598	4.65	-66%
2,6	72	7,436	9,998	11,029	427	257.75	7863	10,513.5	2.558	3.15	-19%
2,7	86	5,880	7,231	8,154	225.16	230.75	6105.16	7692.5	2.064	2.88	-28%
2,8	100	17,117	20,839	23,325	620	622	17,737	22,083	6.02	5.42	+11%
~~2,9~~											
~~3,1~~											
3,2	17	3703	4,969	5,809	211	210	3914	5389	1.275	—	—
3,3	31	13,731	17,037	19,378	551	585.25	14,282	18207.5	4.811	4.03	+19%
3,4	45	14,655	26,603	29,632	19,913	757.25	16,6463	28,117.5	4.622	7.94	-42%
3,5	59	17,579	14,332	15,931	-541	399.75	17,038	15,131	6.61	3.98	+66%
3,6	73	50,840	58,509	63,999	1278	1372.5	52,118	61,254	18.090	17.81	+2%
3,7	87	34,528	44,478	47,836	1658.33	839.5	36,186.33	46,157	11.997	19.75	-39%
3,8	101	5524	8,241	9,040	452.83	199.75	5976.83	8640.5	1,851	3.42	-46%
3,9	115										
~~4,1~~											
~~4,2~~	~~18~~	2,307	2870	3232	94	91	2401	3052	.808	—	—
4,3	32	1,679	2434	2969	125.83	133.75	1804.83	2701.5	.567	.40	+42%
4,4	46	46,321	53,788	59,592	1244.5	1451.	47,565.5	56,690	16.453	21.10	-22%
4,5	60	50,226	61,381	64,006	1859.16	656.25	52,085.16	62,693.5	17.654	23.08	-24%
4,6	74	30,114	41,980	40,758	1977.67	-305.5	32,091.67	41,369	10.270	10.81	-5%
4,7	88	62,370	70,362	74,829	1332.	1116.75	63,702	72,595.5	22,279	36.32	-39%
4,8	102	20,717	25,383	28,309	777.66	731.5	21,494.66	26,846	7.278	4.66	+56%
4.9	116	5080	5666	6319	97.7	163.25	5177.7	5992.5	1.82	—	—

Average Daily VMT/Grid From SA Pollut - 1977, 1978, 1983, 1985, 1987

Attachment ~~III~~ II

MODEL Gr	S	1977 SA Pollut	1983 SA Pollut	1987 SA Pollut	1977-83 ΔVMT/yr	1983-87 ΔVMT/yr	1978	1985	1976 VMT/yr SA Pollut $\times 10^6$	1976 VMT/yr OSU/SJO $\times 10^6$	Δ 1976 VMT/yr (± %) Change i OSU-VM
		✓	✓	✓	✓	✓	✓	✓	✓		
5,1	5	175	253	280	13	11.25	188	276	0.059	✓	
5,2	19	3643	4404	4881	126.83	119.25	3770	4642.5	1.283	2.58	- 50%
5,3	33	26,512	30,035	34,156	587.16	1030.25	27,099.16	32,095.5	9.463	12.63	-25%
5,4	47	130,877	150,376	162,703	3249.83	3081.75	134,126.83	137,040.5	46.584	60.39	-23%
5,5	61	70,380	72,444	75,418	344	743.5	70,724	73,931	25.563	31.87	-20%
5,6	75	56,086	60,055	68,630	661.5	2143.75	56,747.5	64,342.5	20.230	17.04	+19%
5,7	89	43,631	51,788	63,474	1359.5	2921.5	44,990.5	57,631.	15.429	20.63	- 25%
5,8	103										
5,9	117										
6,1	6	2510	3012	3345	84	83.25	2594	3178.5	,885	—	—
6,2	20	23,387	28,068	31,174	780.16	776.5	24,167.16	29,621	8.25	10.69	-23%
6,3	34	69,366	76,278	81,568	1152	1322.5	70,518	78,923	24.90	31.99	-22%
6,4	48	157,181	185,306	199,794	4687	3622.	161,868	192,550	55.66	63.18	-12%
6,5	62	88,763	103,605	108,469	2474	1216	91,237	106,037	31.50	32.46	-3%
6,(	76	33,877	39,402	48,195	920.83	2198.25	34,797.83	43,798.5	12.03	14.50	-17%
6,	90	6754	9815	11,753	510.16	484.5	7,264.16	10,784	2.28	1.56	-46%
6,8	104										
~~6,9~~											
7,1	7	109	147	173	6.33	6.5	115.33	160	.037	—	—
7,2	21	1,245	1682	1978	72.83	74	1317.83	1830.	.428	.97	-56%
7,3	35	17,436	18,541	19,626	184.16	271.25	17,620.16	19,083.5	6.30	6.64	-5%
7,4	49	48,876	55,849	59,702	1162.16	963.25	50,038.16	57,775.5	17.42	22.32	-22%
7,5	63	88,625	101,582	101,928	2159.5	86.5	90,784.5	101,755	31.56	29.69	+ 6%
7,6	77	35,394	42,657	55,380	1210.5	3180.75	36,604.5	49,018.5	2.358	18.84	-88%
7,7	91	6636	7,696	8,602	176.66	226.5	6812.66	8149.	2.36	3.33	-29%
7,8	105			—							
~~7,9~~											
8,1	8										
8,2	22	38,140	36,691	38,571	241.5	470.	38,381.5	37,631	2.28	10.12	-77%
8,3	36.	63,372	79,799	87,174	2737.83	1843.75	66,109.83	83,486.5	13.832	19.74	-30%
8,4	50	91,303	105,774	114,248	2411.83	2118.5	93,714.83	110,011	32.446	28.69	+13%
8,5	64	86,110	102,815	112,068	2784	2313.25	88,894	107,441.5	30.413	.44	+68%
8,	78	43,726	52,209	56,908	1414	1174.75	45,140	54,558.5	15.444	18.56	-17%
8	92	21,890	26,137	28,489	708	588.	22,598	27,313	7.73	9.28	-17%
8,8	106	4260	4940	5524	113.3	146	4373.3	5167	1.514	—	—
~~8,9~~											
		1,260,264	1,451,360	1,584,211	32,332.57	33,217.25	1,292,596.7	1,498,231	418.238	465.14	

Average Daily VMT/Grid From SA Pollut - 1977, 1978, 1983, 1985, 1987

Attachment ~~III~~ II

10 DEL GR	S	1977 SA Pollut	1983 SA Pollut	1987 SA Pollut	1977-83 ΔVMT/yr	1983-87 ΔVMT/yr	1978	1985	1976 VMT/yr SA Pollut x 10^6	1976 VMT/yr OSU/SJO x 10^6	Δ 1976 VMT/yr (± % Change OSU-VMT)
		✓	✓	✓	✓	✓	✓	✓	✓	✓	
1,1	9	37,249	43,877	48,256	1105	1095	38,354	46,066	13.2	—	
1,2	23	29,531	34,786	38,256	875.83	868	30,407	36,522	10.46	10.12	+3%
1,3	37	1233	1386	1464	+25.5	+19.5	1259	1425	0.44	—	—
1,4	51	55,886	62,828	66,342	1157	878.5	57,043	64,585	19.98	22.31	-10%
1,5	65	53,060	62,583	68,531	1587	1487	54,647	65,557	18.79	25.53	-2[illegible]
1,6	79	–	–	–							
1,7	93	–	–	–							
~~1,8~~											
~~1,9~~											
10,1	10	–	–	–							
10,2	24	–	–	–							
10,3	38	1357	1535	1672	+30	+34	1387	1603	0.48	—	—
10,4	52	30,858	34,912	38,025	675.66	778.25	31,533.66	36,468.5	11.017	13.17	-16%
10,5	66	41,707	48,935	53,585	1204.66	1162.5	42,911.66	51,260	14.783	15.98	-7%
10,6	80	1,110	1,229	1,458	29.75	57.25	1139.75	1343.5	.394	.58	-32%
~~10,7~~											
~~10,8~~											
~~10,9~~											
~~11,1~~											
~~11,2~~											
11,3	39	3175	3737	1250	+93.7	-622	3269	2493	1,125	—	—
11,4	53	25,749	30,692	27,633	815.5	-752.25	26,564.5	29,137.5	9.10	10.63	-14%
11,5	67	20,938	24,743	32,038	634.16	1823.75	21,572.16	28,390.5	7.411	39.16	-81%
11,6	81	302	357	462	9.2	26.3	311	410	.107	—	—
~~11,7~~											
~~11,8~~											
~~11,9~~											
~~12,1~~											
~~12,2~~											
12,3	40	9,288	10,881	10,872	265.5	-2.25	9553.5	10,876.5	3.30	2.43	+36%
12,4	54	18,947	23,361	31,311	735.66	1987.5	19,682.66	27,336	6.65	10.64	-37%
12,5	68	4971	6129	8215	193	521.5	5164	7172	1.74	—	—
~~12,6~~											
~~12,7~~		335,361	391,921	429,372	9437.12	9360.55	344,798.59	410,645.5	1242.552	150.55	
~~12,8~~											
~~12,9~~											

Average Daily VMT/Grid From SA Pollut - 1977, 1978, 1983, 1985, 1987

Attachment ~~III~~ II

MODEL GRIDS		1977 SA Pollut	1983 SA Pollut	1987 SA Pollut	1977-83 ΔVMT/yr	1983-87 ΔVMT/yr	1978	1985	1976 VMT/yr SA Pollut	1976 VMT/yr OSU/SJO	Δ 1976 VMT/yr (± %) Change i OSU-VM
~~13,1~~											
~~13,2~~	~~27~~	1487	1748	1926	43.5	43.75	1531	1836	.527	—	—
13,3	41										
13,4	55	13,970	17,206	19,551	539.33	586.25	14,509.33	18,378.5	4.902	3.22	+52
13,5	69	1832	2256	2563	70.7	76.75	1903	2409.5	0.643	—	—
~~13,6~~											
~~13,7~~											
~~13,8~~											
~~13,9~~											
~~14,1~~											
~~14,2~~											
14,3	42										
14,4	56	17,260	20,573	22,749	552.16	544	17,812.16	21,661	6.098	2.48	+146%
14,	70										
~~14,6~~											
~~14,7~~		34,549	41,783	46,789	1205.69	1250.75	35,755.49	44,285	12.17	5.7	
~~14,8~~											
~~14,9~~											
TOTAL		2,038,172	2,382,631	2,599,807	74,580.92	52,675.3	2,096,307	2,476,207	1816.64	799.88	

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMO

TO: Eugene-Springfield AQMA File DATE: June 20, 1980

FROM: Bob Gay

SUBJECT: Motor Vehicle Exhaust TSP Emissions

This memo describes how motor vehicle exhaust TSP emissions ("tailpipe TSP") was estimated for the Eugene/Springfield TSP SIP preparation. The regional transportation model (SAPOLLUT) for Eugene/Springfield was the source of traffic levels (VMT/Grid). Factors were used to correct SAPOLLUT output to:

1. Reduce TSP emission factors, to reflect increasing use of nonleaded gasoline and lower lead content of gasoline.

2. Include a 7.5 percent contribution to total VMT/Grid from "local roads," which feed arterials and freeways (ODOT recommendation).

3. Convert average weekday (Monday through Friday) to average daily (Monday through Sunday) TSP/Grid and VMT/Grid.

Correction For Local Roads VMT

SAPOLLUT runs for 1977, 1983, and 1987 (dated August 16, 17, and 23, 1978) were used. The output VMT/Grid and TSP/Grid from the long table at the end of each SAPOLLUT run, represents average weekday (Monday through Friday) values, and does not include a 7.5 percent contribution to total VMT from "local roads" estimated by the ODOT. This 7.5 percent extra VMT (and TSP) is included in individual Area/Function outputs elsewhere in each run, but is not printed out by AQMA Model Grid (District). Accordingly, SAPOLLUT's VMT/District (and TSP/District) was scaled up to include ODOT's estimated impact of local roads, which feed traffic onto the arterials and freeways which SAPOLLUT models.

Correcting Average Weekday to Average Daily VMT

To convert average weekday VMT (and TSP) by DISTRICT to average daily values, an approximate 7 percent decrease was applied, based upon 1978 Oregon State Highway Division data from Eugene's two permanent traffic counting stations (Attachment I), found in OSHD's annual Traffic Volume Tables. This calculated guess was reinforced by discussions with ODOT

(Von Hemmert and Norm Hinges, 378-3422) and LCOG (John Replinger, 687-4283) and the City of Eugene (Mike Weishar, 687-5242). This correction was assumed to cancel out the 7.5 percent VMT increase for local roads, such that SAPOLLUT's VMT (or TSP) by District (Grid) may be read either of two ways, as follows:

1. Average Daily VMT (or TSP)/Grid, including local roads, or

2. Average Weekday VMT (or TSP)/Grid, excluding local roads

Correction For Declining Lead Content of Gasoline

Tailpipe TSP Emission Factors used in the original August 1978 SAPOLLUT runs included a factor for heavy duty vehicle emissions, but did not consider the substantial reduction in tailpipe TSP emissions attributable to federal requirements, which are steadily reducing the average lead content of gasoline, and increasing the proportion of catalyst equipped, light duty vehicles (LDV) which use nonleaded gasoline. Steadily declining lead emissions from LDV's significantly reduces tailpipe TSP Emission Factors for 1977, 1983 and 1987.

Accordingly, new tailpipe TSP emission factors were calculated, and the ratio of new to old emission factors were used to correct the original SAPOLLUT output of TSP/Grid (kg/day). The old and new emission factors are shown in Table I, along with the tailpipe TSP emission factors for individual vehicle classes (LDV, HDG, etc.) used for calculation. Note that tailpipe TSP emission factors for LDV decrease dramatically during 1977-1987, but remain constant for HDG and HDD vehicles. These two vehicle classes are not affected by lead phasedown or catalyst requirements.

The LDV, HDG, and HDD emission factors in Table I were those used in SAPOLLUT runs for the Portland AQMA. They are derived from EPA's standard reference for such factors (AP-42), and data on vehicle age/population. National average data on vehicle age/population was used to estimate LDV emission factors.

Correction For Heavy Duty Vehicles

Heavy duty vehicles (HDG, HDD) emit considerably more tailpipe TSP per mile, than LDV. ODOT's assumption, used in SAPOLLUT, was that heavy duty trucks represent 3 percent of the total (areawide) VMT. Seton, Johnson, and Odell (SJO) used OSHD data to conclude that 10 percent of freeway VMT, and 5 percent of VMT on all other roads, is from HDV. This may be too high as an areawide average. Better information on HDV VMT by Grid would help refine motor vehicle TSP estimates. However, ODOT sensitivity tests suggest higher percent HDT have minimal affect on total emissions.

Accordingly, in calculating TSP emission factors for the LDV, HDG, and HDD vehicle classes used in SAPOLLUT (see Table I, note C), the assumed traffic mix was 97 percent LDV and 3 percent heavy duty trucks (HDT). HDT were assumed to be 50 percent diesel and 50 percent gasoline-powered.

Table I. Tailpipe TSP Emission Factors

Tailpipe TSP Emission Factors
(g TSP/veh-mile 20 mph)

Entry	Vehicle Category	Pre-1973	1977	1983	1987	Source
1	LDV	0.34 (leaded) 0.05 (non-leaded)	0.25	0.12	0.07	AP-42; Portland AQMA SAPOLLUT run (Jan. 1979) Note a
2	HDG	___	0.91	0.91	0.91	AP-42
3	HDD	___	1.3	1.3	1.3	AP-42
4	Composite Traffic 97% LDV 3% HDT	___	.310	.2997	.298	Note b
5	Composite Traffic 97% LDV 3% HDT	___	.2756	.1496	.1011	New Emission Factors used to correct 1978 SAPOLLUT output. Note c

a. See memo by R. L. Gay dated October 29, 1979, for Lead SIP (Attachment VI). See also "EPA's Compilation of Air Pollutant Emission Factors," AP-42, Tables: D.1-21; 3.1.2-13; 3.1.4-7; 3.1.4-13; 3.1.5-1

b. August 16, 17, and 23, 1978, SAPOLLUT runs for Eugene/Springfield area (ESATS) for these years.

c. Calculated as follows, assuming 3 percent of total VMT is from heavy duty trucks (HDT), which are 50:50 diesel: gasoline powered.

Example (1977) LDV: (.97)(.25) + (.03) (.91 + 1.3)/2 = .2756 g/veh-mi

HDG: (.97)(.12) + (.03) (.91 + 1.3)/2 = .1496 g/veh-mi

Translation of SAPOLLUT Data to Tailpipe TSP Emissions

Corrections for local road's contribution, and for conversion of average weekday to average daily traffic levels, were assumed to cancel each other out. SAPOLLUT data on TSP (kg/day) and traffic levels (VMT/day), by

District (Grid), was read as average daily (Monday-Sunday) TSP/Grid or VMT/Grid, including local roads' contributions. TSP/Grid was then corrected for decreasing lead content, and converted to tons per year, as follows:

$$\underset{\text{(kg/day)}}{\text{SAPOLLUT Tailpipe TSP/District}} \times \underset{\left(\frac{\text{EF Corrected}}{\text{EF Original}}\right)}{\text{Emission Factor Ratio}} \times \underset{\left(\frac{\text{day-tons}}{\text{kg-yr}}\right)}{\text{Conversion Factor (365/906)}} = \underset{\text{(tons/yr)}}{\text{Corrected TSP/Grid}}$$

Using Table I Emission Factors,

Uncorrected (Aug. 1978) SAPOLLUT TSP/District	X	Correction Factors	=	Corrected SAPOLLUT TSP/Grid

1. $\text{1977 TSP/District (kg/day)} \times \underbrace{\frac{.2756}{.310} \times \frac{365}{906}}_{0.358} \frac{\text{day-tons}}{\text{kg-yrs}} \approx \text{1977 TSP/Grid (tons/yr)}$

2. $\text{1983 TSP/District (kg/day)} \times \underbrace{\frac{.1496}{.2997} \times \frac{365}{906}}_{0.201} \frac{\text{day-tons}}{\text{kg-yrs}} \approx \text{1983 TSP/Grid (tons/yr)}$

3. $\text{1987 TSP/District (kg/day)} \times \underbrace{\frac{.1011}{.298} \times \frac{365}{906}}_{0.137} \frac{\text{day-tons}}{\text{kg-yrs}} = \text{1987 TSP/Grid (tons/yr)}$

Attachment I shows the SAPOLLUT output data for 1977, 1983, and 1987.

Attachment II shows corrected TSP/Grid for 1977, 1978, 1983, 1985, and 1987. Attachment III shows average daily VMT/Grid for these years. 1978 and 1985 values were obtained by straight line extrapolation of SAPOLLUT data for 1977, 1983, and 1987.

Estimates For AQMA Grids Not Addressed by SAPOLLUT

VMT/Grid was estimated for about 15 grids not addressed by SAPOLLUT, but where VMT/Grid was estimated by Seton, Johnson, and Odell (SJO), or available from other sources. This was done by comparing 1976 VMT/yr from both sources for an adjacent grid, to determine a correction factor, which was then used to adjust SJO's VMT/Grid to SAPOLLUT's VMT/Grid. Both VMT values, and the resulting correction factor are shown in the last three columns of Attachment III.

The correction factor was used to adjust SJO's VMT/Grid estimates where SAPOLLUT estimates were not available. These adjustments, for 15 grids, are summarized in Attachment IV. The resulting estimates were regarded as 1977 VMT/Grid. They were extrapolated to obtain 1978, 1983, 1985, and 1987 VMT/Grid, using the VMT growth rates for the adjacent grid.

Correction of Three Grids For Maldistribution of VMT/Grid

SAPOLLUT occasionally distributes VMT to grids unreasonably. This can occur when a roadway link spans a grid boundary, or a whole grid. SAPOLLUT can allocate more or less of the VMT on that link to each grid than is appropriate.

Lane Council of Government (LCOG) staff pointed out that SAPOLLUT output for GridS 92, 78 and 64 appear to have this problem, due to maldistribution of VMT from Interstate 5. The following summary compares SAPOLLUT's distribution of VMT for 1977 with Seton, Johnson and Odell's distribution of (1976) VMT for these three grids.

Grid (X,Y)	Grid No.	Estimated VMT/Yr Yr X 10^6 1977 SAPOLLUT	Estimated VMT/Yr Yr X 10^6 Seton, Johnson & Odell
8,7	92	14.26	9.28
8,6	78	2.21	18.56
8,5	64	38.96	36.50

The questionable SAPOLLUT VMT estimates were reallocated among the three Grids, using the SJO distribution and the magnitude of VMT projected by SAPOLLUT, as described in Attachment V. Corrected values of VMT/Grid appear in Attachment III.

RLG:f
AF0753.A (2)

Attachments I–VI

SAPOLLUT AIR QUALITY ANALYSIS   TSP, VMT   8-78   00001180   SAPOLLUT 08/15/78 23.28.15   E 26
1977 ANALYSIS FOR ESATS. TSP AND VMT. 3% HDT   00001190
CO COLUMN=TSP; NO AND HC COLUMNS=VMT.   00001200
ESATS FTS1(77)   00000140

VMT/Day
Average Weekday (M-Fri)
Assume Sat & Sun have 90% of this VMT/day

KILOGRAMS OF POLLUTANT WITHIN POLLUTION DISTRICT (FOR FUNC=1-2 ONLY)

TSP (Kg/day)
- average weekday (Mon-Fri) excluding local roads
- average daily (Mon-Sun) including local roads

VMT
- average weekday (Mon-Fri) excluding local roads
- average daily (Mon-Sun) including local roads

AGMA MODEL GRID DISTRICT	TSP Kg/day	Average Daily VMT	VMT
6	0	59	59
17	1	3,703	3,703
18	1	2,307	2,307
19	1	3,643	3,643
20	7	23,387	23,387
21	0	1,245	1,245
22	12	38,140	38,140
23	10	29,531	29,531
27	0	1,487	1,487
31	4	13,731	13,731
32	1	1,679	1,679
33	8	26,512	26,512
34	22	69,366	69,366
35	6	17,436	17,436
36	21	63,372	63,372
39	1	3,175	3,175
40	3	9,288	9,288
44	3	8,904	8,904
45	5	14,655	14,655
46	15	46,321	46,321
47	41	130,877	130,877
48	49	157,181	157,181
49	15	48,876	48,876
50	29	91,303	91,303
51	18	55,886	55,886
52	10	30,858	30,858
53	8	25,749	25,749
54	6	18,947	18,947
55	4	13,970	13,970
56	6	17,260	17,260
58	2	4,785	4,785
59	6	17,579	17,579
60	16	50,226	50,226
61	22	70,380	70,380
62	28	88,763	88,763
63	28	88,625	88,625
64	34	106,733	106,733
65	17	53,060	53,060
66	13	41,707	41,707
67	7	20,939	20,939
72	2	7,436	7,436
73	16	50,840	50,840
74	10	30,114	30,114
75	18	56,086	56,086
76	11	33,877	33,877
77	11	35,394	35,394
78	2	6,043	6,043

12-11-99 VMT = Average Weekday (Mon-Fri) VMT/GRID. "Total/Total" = Average Weekday (Mon-Fri) VMT, including 7.5% more VMT to account for "local roads", which fuel AGMB arterials and freeways.

OSHP 1998 Traffic Volume Tables for the two Eugene-Spr counting stations, and other considerations, suggest that average daily (Mon-Sunday) VMT is 7% less than average weekday VMT.

These two corrections cancel each other (1.075 x .93 = 0.99975), so that the VMT shown here by GRID is both:

- 1977 Average Daily VMT/GRID including local roads' VMT, and
- 1977 Average weekday VMT/GRID excluding local roads' VMT.

RF Day

The same is true for TSP/GRID

ATTACHMENT I

Grids for which [illegible] not [illegible] / GRID, [illegible]
and for which VMT / GRID is available from OSU Study

GRID (X,Y)	No	Grid No	OSU (1976) VMT $\times 10^6$/Yr ($\div 365 \rightarrow$) OSU (1976) VMT/day	
1,8	99	100	1.34	(Airport)
2,3	30	44	.3	
4,9	116	102	1.22	
5,1	5	19	.16	
7,1	7	19	.09	
6,1	6	20	1.19	
8,8	106	—	—	(10,12) WTG ?
9,3	37	51	.50	
10,3	38	39	.59	
11,6	81	67	.58	
12,5	68	54	2.88	
13,5	69	55	.44	
	9	23	~~[illegible]~~	(13.20) WTG ?

"1977"
X = TSP/GRID
Kg/day $\xrightarrow{.358}$ Tons/yr

3671   3671/17,117 = x/6; x = 1.29   .46
822   822/8904 = x/3; x = No .28   .10
3342   3342/20,717 = x/7; x = 1.13   .40
438   438/3643 = x/1; x = .12   .04
247   247/3643 = x/1; x = .07   .02
3260   3260/23,387 = x/7; x = .98   .35
6000   ~~27,726~~   .2
1370   1370/55,886 = x/18; x = No .44   .16
1616   1616/3175 = x/1; x = No .51   .18
1584   1584/20,939 = x/7; x = .53   .19
7890   7890/18,947 = x/6; x = No 2.50   .89
1205   1205/13,970 = x/4; x = No .35   .12
—   36,164/29531 = x/10; x = 12.25   4.3

9,1

GRID (X,Y)	No	1977 VMT/day	1977 Kg/day	GOSHEN VMT/day	GOSHEN Kg/Day	1987 VMT/day	1987 Kg/day
8)	99	4075	1.36	4961	1.65	5553	1.85
,3)	30	427	0.14	487	0.16	522	0.17
,2)	17	3703	1.23	4969	1.66	5809	1.94
,2)	18	2307	.77	2870	.96	3232	1.08
,9)	116	5080	1.69	5666	1.89	6319	2.11
5,1)	5	175	.06	253	.08	280	.09
6,1)	6	2510	.84	3012	1.00	3345	1.12
7,1)	7	109	.04	147	.05	173	.06
8,8)	106	4260	1.42	4940	1.65	5524	1.84
9,1)	9	37,249	12.42	43,877	14.63	48,256	16.09
9,3)	37	1233	.41	1386	.46	1464	.49
0,3)	38	1357	.45	1535	.51	1672	.56
1,6)	81	302	.10	357	.12	462	.15
2,5)	68	4971	1.66	6129	2.04	8215	2.74
3,5)	69	1832	.61	2256	.75	2563	.85

Assumes: 3000 VMT/Day $\approx$ 1.0 Kg/Day

ANALYSIS FOR ESATS. TSP AND VMT. 3% HOT 00001190
CO COLUMN=TSP; NO AND HC COLUMNS=VMT. 00001200
ESATS RTS1(77) 00000140

KILOGRAMS OF POLLUTANT WITHIN POLLUTION DISTRICT (FOR FUNC=1-2 ONLY)

DISTRICT	(1)=CARBON MONOXIDE	(2)=OXIDES OF NITROGEN	(3)=HYDROCARBONS
80 _81	0	1,110	1,110
86	2	5,880	5,880
87	11	34,528	34,528
88	20	62,370	62,370
89	14	43,631	43,631
90	2	6,754	6,754
91	2	6,636	6,636
92 —*	13	~~39,065~~	39,065
100 —99	6	17,117	17,117
101	2	5,524	5,524
102 —106, 116	7	20,717	20,717
TOTAL	629	1,974,767	1,974,767

* SAPOLLUT (VERS=07/20/73) COMPLETED WITH RETURN CODE 00

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This List of Districts leaves out some DEY Model Grids in AQMA - e.g. 7, 9, 10, 24 37, 99, (LRAPA's UPRD Summary)
..., and adds Grid not in AQMA - e.g. 27, 39, 44, 56, 75, 77, 78, 80, 86, 90, 91, 92, 100
(not in LRAPA UPRD Summary)

Attachment I

[redacted] ANALYSIS FOR ESATS. TSP AND VMT. 3% HDT 00000570
CO COLUMN=TSP; NO AND HC COLUMNS=VMT. 00000580
ESATS FTS14 00000140

KILOGRAMS OF POLLUTANT WITHIN POLLUTION DISTRICT (FOR FUNC=1-2 ONLY)

Uncorrected 1983 TSP (kg/day)

DISTRICT	(1)=CARBON MONOXIDE	(2)=OXIDES OF NITROGEN	(3)=HYDROCARBONS
6	0	68	68
17	1	4,969	4,969
18	1	2,870	2,870
19	1	4,404	4,404
20	8	28,068	28,068
21	1	1,682	1,682
22	11	36,691	36,691
23	11	34,786	34,786
27	1	1,748	1,748
31	5	17,037	17,037
32	1	2,434	2,434
33	9	30,035	30,035
34	23	76,278	76,278
35	6	18,541	18,541
36	24	79,799	79,799
39	1	3,737	3,737
40	3	10,881	10,881
44	3	10,163	10,163
45	8	26,603	26,603
46	16	53,788	53,788
47	45	150,376	150,376
48	56	185,306	185,306
49	17	55,849	55,849
50	32	105,774	105,774
51	19	62,828	62,828
52	10	34,912	34,912
53	9	30,642	30,642
54	7	23,361	23,361
55	5	17,206	17,206
56	6	20,573	20,573
58	2	5,855	5,855
59	4	14,332	14,332
60	18	61,381	61,381
61	22	72,444	72,444
62	31	103,605	103,605
63	31	101,582	101,582
64	38	126,242	126,242
65	19	62,583	62,583
66	15	48,935	48,935
67	7	24,743	24,743
72	3	9,998	9,998
73	18	58,509	58,509
74	13	41,980	41,980
75	18	60,055	60,055
76	12	39,402	39,402
77	13	42,657	42,657
78	2	8,169	8,169

Attachment I

SAPOLLUT AIR QUALITY ANALYSIS   TSP, VMT   8-78   00000560   SAPOLLUT 08/16/78
[redacted] ANALYSIS FOR ESATS. TSP AND VMT. 3% HDT   00000570
CO COLUMN=TSP; NO AND HC COLUMNS=VMT.   00000580
ESATS FTS14   00000140

KILOGRAMS OF POLLUTANT WITHIN POLLUTION DISTRICT (FOR FUNC=1-2 ONLY)

DISTRICT	(1)=CARBON MONOXIDE	(2)=OXIDES OF NITROGEN	(3)=HYDROCARBONS
80	0	1,229	1,229
86	2	7,231	7,231
87	13	44,478	44,478
88	21	70,362	70,362
89	16	51,788	51,788
90	3	9,815	9,815
91	2	7,696	7,696
92	14	46,831	46,831
100	6	20,839	20,839
101	2	8,241	8,241
102	8	25,383	25,383
TOTAL	693	2,307,774	2,307,774

*** SAPOLLUT (VERS=07/20/73) COMPLETED WITH RETURN CODE 00

Attachment I

SAPOLLUT AIR QUALITY ANALYSIS   TSP, VMT   8-78   00001180   SAPOLLUT 08/23/78 03.48.23 PAGE 27
[redacted] ANALYSIS FOR ESATS. TSP AND VMT. 3% HDT   00001190
CO COLUMN=TSP; NO AND HC COLUMNS=VMT.   00001200
ESATS FTS15   00000140

KILOGRAMS OF POLLUTANT WITHIN POLLUTION DISTRICT (FOR FUNC=1-2 ONLY)

DISTRICT	(1)=CARBON MONOXIDE	(2)=~~OXIDES OF NITROGEN~~ VMT	~~(3)=HYDROCARBONS~~
6	0	~~74~~	74
17	2	5,809	5,809
18	1	3,232	3,232
19	1	4,881	4,881
20	9	31,174	31,174
21	1	1,978	1,978
22	12	38,571	38,571
23	11	38,258	38,258
27	1	1,926	1,926
31	6	19,378	19,378
32	1	2,969	2,969
33	10	34,156	34,156
34	24	81,568	81,568
35	6	19,626	19,626
36	26	87,174	87,174
39	0	1,250	1,250
40	3	10,872	10,872
44	3	10,910	10,910
45	9	29,632	29,632
46	18	59,592	59,592
47	49	162,703	162,703
48	60	199,794	199,794
49	18	59,702	59,702
50	34	114,248	114,248
51	20	66,342	66,342
52	11	38,025	38,025
53	8	27,633	27,633
54	9	31,311	31,311
55	6	19,551	19,551
56	7	22,749	22,749
58	2	8,303	8,303
59	5	15,931	15,931
60	19	64,006	64,006
61	23	75,418	75,418
62	32	108,469	108,469
63	31	101,928	101,928
64	35	117,000	117,000
65	21	68,531	68,531
66	16	53,585	53,585
67	10	32,038	32,038
72	3	11,029	11,029
73	19	63,999	63,999
74	12	40,758	40,758
75	20	68,630	68,630
76	14	48,195	48,195
77	17	55,380	55,380
78	8	28,182	28,182

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Attachment I

ESATS 1987 SAPOLLUT

PPPPPPP GGGGGG M M SSSSSS AA PPPPPPP 000000 L L U U

SAPOLLUT AIR QUALITY ANALYSIS TSP, VMT 8-78 00001180 SAPOLLUT 08/23/78 03.4
1987 ANALYSIS FOR ESATS. TSP AND VMT. 3% HDT 00001190
CO COLUMN=TSP; NO AND HC COLUMNS=VMT. 00001200
ESATS FTS15 00000140

KILOGRAMS OF POLLUTANT WITHIN POLLUTION DISTRICT (FOR FUNC=1-2 ONLY)

DISTRICT	(1)=CARBON MONOXIDE	(2)=OXIDES OF NITROGEN	(3)=HYDROCARBONS
80	0	1,458✓	1,458
86	2	8,154✓	8,154
87	14	47,836✓	47,836
88	22	74,829✓	74,829
89	19	63,474✓	63,474
90	4	11,753✓	11,753
91	3	8,602✓	8,602
92	16	52,044	52,044
100	7	23,325✓	23,325
101	3	9,040✓	9,040
102	8	28,309✓	28,309
103	1	1,918	1,918
TOTAL	752	2,517,212	2,517,212

SAPOLLUT (VERS=07/20/73) COMPLETED WITH RETURN CODE 00

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Attachment I

ATTACHMENT I

Location: ORE99, PACIFIC HIGHWAY WEST, NO. 1W - FAP3, 0.02 mile northwest of 11th Avenue in Eugene

Recorder: FRANKLIN BOULEVARD, 20-003
Installed: October, 1955

HISTORICAL TRAFFIC DATA

Year	Average Daily Traffic	Percent of Average Daily Traffic: Maximum Day	Highest Hourly Volume: Max.	10th	20th	30th	50th
1964	22,526	136	10.4	10.0	9.7	9.6	9.3
1965	22,826	140	11.2	10.0	9.8	9.4	9.0
1966	22,341	132	10.6	9.5	9.3	9.1	8.9
1967	21,195	132	11.2	10.0	9.8	9.6	9.3
1968	21,406	142	11.4	10.5	10.2	9.9	9.7
1969	20,748	140	12.4	10.2	9.8	9.7	9.4
1970	23,111	148	14.2	10.5	10.3	10.1	10.0
1971	24,449	131	13.1	10.4	10.2	10.0	9.8
1972	23,288	147	11.8	10.9	10.6	10.3	10.1
1973	22,965	159	12.8	11.2	10.7	10.5	10.2

1973 TRAFFIC DATA

Month	Average Weekday Volume	Percent of ADT	Average Daily Volume	Percent of ADT
January	24,239	106	22,554	98
February	25,836	112	24,173	105
March	25,318	110	23,664	103
April	24,530	107	23,087	101
May	26,463	115	25,121	109
June	27,589	120	26,052	113
July	22,394	98	20,792	91
August	24,453	107	22,771	99
September	24,471	107	23,090	101
October	24,128	105	22,657	99
November	23,211	101	21,769	95
December	21,559	94	19,850	86
1973 ADT	24,516		22,965	

Classification Breakdown	Percent of ADT
Oregon passenger cars	68.8
Out-of-State passenger cars	4.3
Panel and Pickups	20.4
Light vehicles w/trailer	0.1
Total Light Vehicles	93.6
Campers and light Trucks	2.3
Trucks, 2-axle	1.7
Trucks, 3-axle	1.0
Trucks, 4-axle	0.1
Trucks, 5-axle	1.1
Trucks, 6-axle	—
Buses	0.2
Total Heavy Vehicles	6.4

$$\frac{24,516-22,965}{24,516}(100) = 6.33\%$$

Location: I-105, EUGENE-SPRINGFIELD HIGHWAY, NO. 227 - FAP5 Loop, 0.70 mile west of I-5 in Eugene

Recorder: WILLAKENZIE, 20-008
Installed: November, 1960

HISTORICAL TRAFFIC DATA

Year	Average Daily Traffic	Percent of Average Daily Traffic: Maximum Day	Highest Hourly Volume: Max.	10th	20th	30th	50th
1964	13,320	135	12.0	11.1	10.9	10.7	10.5
1965	15,481	137	12.8	11.6	11.0	10.8	10.5
1966	18,805	132	12.2	10.9	10.7	10.5	10.3
1967	19,581	134	12.1	11.0	10.5	10.3	10.1
1968	20,518	134	12.8	11.2	11.0	10.6	10.5
1969	23,763	138	12.5	11.1	10.8	10.7	10.5
1970	25,932	136	11.8	10.6	10.3	10.1	9.9
1971	27,091	128	10.8	10.4	10.2	10.1	9.9
1972	27,926	129	11.7	10.8	10.4	10.2	10.0
1973	31,492	127	11.5	10.5	10.3	10.2	10.1

1973 TRAFFIC DATA

Month	Average Weekday Volume	Percent of ADT	Average Daily Volume	Percent of ADT
January	28,754	91	27,043	86
February	30,225	96	28,656	91
March	32,625	104	30,437	97
April	32,101	112	32,919	105
May	32,653	104	31,243	99
June	35,617	113	32,916	105
July	35,129	112	32,711	104
August	36,955	117	34,325	109
September	35,439	113	33,356	106
October	34,825	111	32,376	103
November	34,565	110	32,437	103
December	31,229	101	29,584	94
1973 ADT	33,398		31,492	

Classification Breakdown	Percent of ADT
Oregon passenger cars	65.6
Out-of-State passenger cars	3.0
Panel and Pickups	21.2
Light vehicles w/trailer	0.3
Total Light Vehicles	90.1
Campers and light Trucks	2.3
Trucks, 2-axle	2.0
Trucks, 3-axle	2.0
Trucks, 4-axle	0.1
Trucks, 5-axle	2.3
Trucks, 6-axle	—
Buses	0.2
Total Heavy Vehicles	[illegible]

$$\frac{33,398-31,492}{33,398}(100) = 5.71\%$$

WILLAKENZIE 20-008

Location: [illegible]
[illegible]

Recorder: [illegible] 20008
Installed: [illegible]

HISTORICAL TRAFFIC DATA

Year	Average Daily Traffic	Percent of Average Daily Traffic: Maximum Day	Highest Hourly Volume: Max.	10th	20th	30th	50th
1969	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1970	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1971	27,031	128	10.3	10.4	10.2	10.1	9.9
1972	27,928	129	11.7	10.8	10.4	10.2	10.0
1973	31,492	127	11.5	10.5	10.3	10.2	10.1
1974	29,956	132	11.9	11.4	11.1	10.7	10.4
1975	32,140	130	12.3	11.1	10.9	10.7	10.5
1976	35,135	129	11.9	10.9	10.7	10.6	10.3
1977	38,704	127	10.9	10.5	10.4	10.2	10.0
1978	39,821	122	10.2	10.0	9.8	9.5	9.4

1978 TRAFFIC DATA

Month	Average Weekday Volume	Average Weekday Percent of ADT	Average Daily Volume	Average Daily Percent of ADT
January	38,921	98	35,947	90
February	41,602	105	38,593	97
March	42,797	108	39,303	99
April	43,400	109	40,400	102
May	43,600	110	40,600	102
June	45,200	114	41,800	105
July	44,579	112	40,997	103
August	45,440	114	42,200	106
September	43,746	110	40,347	101
October	42,000	106	40,000	100
November	41,500	104	39,000	98
December	42,096	106	38,662	97
1978 ADT	42,907		39,821	

Classification Breakdown	Percent of ADT
Oregon passenger cars	64.2
Out-of-State passenger cars	2.2
Panel and Pickups	24.6
Light vehicles w/trailer	0.4
Total Light Vehicles	91.4
Campers and light Trucks	1.8
Trucks, 2-axle	2.1
Trucks, 3-axle	1.7
Trucks, 4-axle	0.1
Trucks, 5-axle	2.7
Trucks, 6-axle	—
Buses	0.2
Total Heavy Vehicles	8.6

$\frac{42907-39{,}821}{42{,}907}(100) = 7.19\%$

Location: ORE99, PACIFIC HIGHWAY WEST, NO. 1W - FAP58, 0.02 mile northwest of 11th Avenue in Eugene

Recorder: FRANKLIN BOULEVARD, 20-003
Installed: October, 1955

HISTORICAL TRAFFIC DATA

Year	Average Daily Traffic	Percent of Average Daily Traffic: Maximum Day	Highest Hourly Volume: Max.	10th	20th	30th	50th
1969	20,748	140	12.4	10.2	9.8	9.7	9.4
1970	23,111	148	14.2	10.5	10.3	10.1	10.0
1971	24,449	131	13.1	10.4	10.2	10.0	9.8
1972	23,288	147	11.8	10.9	10.6	10.3	10.1
1973	22,965	159	12.8	11.2	10.7	10.5	10.2
1974	21,772	132	11.1	10.4	10.2	10.0	9.8
1975	22,407	137	11.7	10.4	10.0	9.9	9.7
1976	23,997	141	13.4	10.7	10.2	10.1	9.9
1977	24,451	126	10.2	9.9	9.7	9.6	9.4
1978	24,958	137	10.7	10.0	9.8	9.5	9.4

1978 TRAFFIC DATA

Month	Average Weekday Volume	Average Weekday Percent of ADT	Average Daily Volume	Average Daily Percent of ADT
January	25,677	103	23,905	96
February	26,217	105	24,607	99
March	26,789	107	24,771	99
April	27,469	110	25,546	102
May	27,368	110	25,777	103
June	28,559	114	27,163	109
July	26,161	105	24,272	97
August	27,176	109	25,254	101
September	26,730	107	24,913	100
October	27,619	111	25,955	104
November	26,301	105	24,573	99
December	24,512	98	22,761	91
1978 ADT	26,714		24,958	

Classification Breakdown	Percent of ADT
Oregon passenger cars	70.7
Out-of-State passenger cars	2.1
Panel and Pickups	22.5
Light vehicles w/trailer	0.2
Total Light Vehicles	95.5
Campers and light Trucks	1.3
Trucks, 2-axle	1.9
Trucks, 3-axle	0.5
Trucks, 4-axle	0.1
Trucks, 5-axle	0.4
Trucks, 6-axle	—
Buses	0.3
Total Heavy Vehicles	4.5

Annual Average $\frac{26{,}714-24{,}958}{26{,}714}(100) = 6.57\%$

~~Table II~~ Motor Vehicle Exhaust TSP/Grid for 1977, 1978, 1983, 1985, 1987

Attachment II

MODEL GRIDS		1977 (SA Pollut) Uncorrected (kg/day)	1977 (SA Pollut) Corrected (tons/yr)	1983 (SA Pollut) Uncorrected (kg/day)	1983 (SA Pollut) Corrected (tons/yr)	1977-83 ΔTSP/Yr. (tons/yr)	1978 Projected (tons/yr)	1987 (SA Pollut) Uncorrected (kg/day)	1987 (SA Pollut) Corrected (tons/yr)	1983-87 ΔTSP/Yr. (tons/yr)	1985 Proje (tons/yr)
		$\xrightarrow{.358}$		$\xrightarrow{.201}$				$\xrightarrow{.137}$			
~~1,1~~	~~1~~										
~~1,2~~	~~15~~										
1,3	29										
1,4	43										
1,5	57										
1,6	71										
1,7	85										
1,8	99	1.36	.49	1.65	0.33	-0.0207	.46	1.85	.25	-.020	.29
~~1,9~~											
~~2,1~~											
~~2,2~~											
2,3	30	.14	.05	.16	.03	-.0033	.05	.17	.02	-.0025	.025
2,4	44	3	1.074	3	.603	-.0785	.9955	3	.411	-.0480	.507
2,5	58	2	.716	2	.402	-.0523	.6637	2	.274	-.0320	.338
2,6	72	2	.716	3	.603	-.0188	.6972	3	.411	-.0480	.50
2,7	86	2	.716	2	.402	-.0523	.6637	2	.274	-.0320	.338
2,8	100	6	2.148	6	1.206	-.1570	1.9910	7	.959	-.0618	1.0824
~~2,9~~											
~~3,1~~		NOT IN AQMA									
3,2	17	1.23	.44	1.66	.33	-.0183	.42	1.94	.27	-.015	.30
3,3	31	4	1.43[illegible]	5	1.005	-.0712	1.3608	6	.822	-.0458	.91[illegible]
3,4	45	5	1.790	8	1.608	-.0303	1.7597	9	1.233	-.0938	1.4204
3,5	59	6	2.148	4	.804	-.2240	1.924	5	.685	-.0298	.7444
3,6	73	16	5.728	18	3.618	-.3517	5.3763	19	2.603	-.2538	3.1104
3,7	87	11	3.938	13	2.613	-.2208	3.7172	14	1.918	-.1738	2.2654
3,8	101	2	.716	2	.402	-.0523	.6637	3	.411	.0023	.4066
3,9	115										
~~4,1~~		(7) in AQMA									
~~4,2~~	~~18~~	0.77	.28	0.96	.19	-.015	.27	1.08	.15	-.010	.17
4,3	32	1	.358	1	.201	-.0262	.3318	1	.137	-.0160	.169
4,4	46	15	5.370	16	3.216	-.3590	5.0110	18	2.466	-.1875	2.8410
4,5	60	16	5.728	18	3.618	-.3517	5.3763	19	2.603	-.2538	3.1104
4,6	74	10	3.580	13	2.613	-.1612	3.4188	12	1.644	-.2423	2.1[illegible]4
4,7	88	20	7.160	21	4.221	-.4898	6.6702	22	3.014	-.3018	3.6174
4,8	102	7	2.506	8	1.608	-.1497	2.3563	8	1.096	-.1280	1.3520
4,9	116	1.69	.605	1.89	.38	-.0375	.57	2.11	.29	-.0225	.34

Motor Vehicle Exhaust TSP/Grid for 1977, 1978, 1983, 1985, 1987

Attachment II

MODEL GRIDS		1977 (SA Pollut) Uncorrected (kg./day)	1977 (SA Pollut) Corrected (tons/yr)	1983 (SA Pollut) Uncorrected (kg/day)	1983 (SA Pollut) Corrected (tons/yr)	1977-83 ΔTSP/Yr (tons/yr)	1978 Projected (tons/yr)	1987 (SA Pollut) Uncorrected (kg/day)	1987 (SA Pollut) Corrected (tons/yr)	1983-87 ΔTSP/Yr. (tons/yr)	1985 Projected (tons/yr)
		.358 →		.201 →				.137 →			
5,1	5	0.06	.021	.08	.016	-.00683	.06	.09	.012	-.001	.014
5,2	19	1	.358	1	.201	-.026	.332	1	.137	-.016	.169
5,3	33	8	2.864	9	1.809	-.176	2.688	10	1.370	-.110	1.589
5,4	47	41	14.678	45	9.045	-.939	13.739	49	6.713	-.583	7.879
5,5	61	22	7.876	22	4.422	-.576	7.300	23	3.151	-.318	3.786
5,6	75	18	6.444	18	3.618	-.471	5.973	20	2.740	-.220	3.178
5,7	89	14	5.012	16	3.216	-.299	4.713	19	2.603	-.153	2.910
5,8	103	need						1	.137		
5,9	117										
6,1	6	.84	0.30	1.00	.201	-.0165	.284	1.12	0.153	-.012	.177
6,2	20	7	2.506	8	1.608	-.150	2.356	9	1.233	-.094	1.420
6,3	34	22	7.876	23	4.623	-.542	7.334	24	3.288	-.334	3.955
6,4	48	49	17.542	56	11.256	-1.048	16.494	60	8.220	-.759	9.738
6,5	62	28	10.024	31	6.231	-.632	9.392	32	4.384	-.462	5.307
6,6	76	11	3.938	12	2.412	-.254	3.684	14	1.918	-.124	2.164
6,[illegible]	90	2	.716	3	.603	-.019	.697	4	.548	-.014	.575
6,8	104										
~~6,9~~											
7,1	7	.04	.014	.05	.010	-.00067	.013	.06	.008	-.0005	.009
7,2	21	.42	.15	.56	.113	-.0062	.14	0.66	.090	-.00575	.10
7,3	35	6	2.148	6	1.206	-.157	1.991	6	.822	-.096	1.014
7,4	49	15	5.370	17	3.417	-.326	5.044	18	2.466	-.238	2.941
7,5	63	28	10.024	31	6.231	-.632	9.392	31	4.247	-.496	5.239
7,6	77	11	3.938	13	2.613	-.221	3.717	17	2.329	-.071	2.471
7,7	91	2	.716	2	.402	-.052	.664	3	.411	-.002	.406
7,8	105										
~~7,9~~											
8,1	8										
8,2	22	12	4.296	11	2.211	-.348	3.948	12	1.644	-.142	1.927
8,3	36	21	7.518	24	4.824	-.449	7.069	26	3.562	-.316	4.192
8,4	50	29	10.382	32	6.432	-.658	9.724	34	4.658	-.444	5.544
8,5	64	28	10.0	33	6.6	-0.57	9.4	36	1.000	-.117	1.234
8,6	78	14	5.0	17	3.4	-0.27	4.7	19	1.987	-.232	2.451
8,[illegible]	92	7	2.5	8	1.6	-0.15	2.3	9	3.754	-.438	4.631
8,8	106	1.42	.51	1.65	0.33	-0.30	0.48	1.84	0.252	-.0195	0.29
~~8,9~~											

Motor Vehicle Exhaust TSP/Grid for 1977, 1978, 1983, 1985, 1987

③

ATTACHMENT II

MODEL GRIDS		1977 (SA Pollut) Uncorrected (kg./day)	1977 (SA Pollut) Corrected (tons/yr)	1983 (SA Pollut) Uncorrected (kg/day)	1983 (SA Pollut) Corrected (tons/yr)	1977-83 ΔTSP/Yr. (tons/yr)	1978 Projected (tons/yr)	1987 (SA Pollut) Uncorrected (kg/day)	1987 (SA Pollut) Corrected (tons/yr)	1983-87 ΔTSP/Yr. (tons/yr)	1985 Projected (tons/yr)
		$\xrightarrow{.358}$		$\xrightarrow{.201}$				$\xrightarrow{.137}$			
9,1	9	12.42	4.45	14.63	2.94	-.252	4.20	16.09	2.20	-.185	2.57
9,2	23	10	3.580	11	2.211	-.228	3.352	11	1.507	-.176	1.8[illegible]9
9,3	37	0.41	.15	0.46	.09	-.010	0.14	0.49	.067	-.00575	.079
9,4	51	18	6.444	19	3.819	-.438	6.006	20	2.740	-.270	3.279
9,5	65	17	6.086	19	3.819	-.378	5.708	21	2.877	-.236	3.347
9,6	79										
9,7	93										
~~9,8~~											
~~9,9~~											
10,1	10										
10,2	24										
10,3	38	0.45	0.16	0.51	0.10	-.010	0.15	0.56	.077	-.00575	0.089
10,4	52	10	3.580	10	2.010	-.262	3.320	11	1.507	-.126	1.758
10,5	66	13	4.654	15	3.015	-.273	4.381	16	2.192	-.206	2.603
10,6	80	.37	.13	.41	.08	-.00833	.12	.49	.07	-.0025	.0[illegible]5
~~10,7~~											
~~10,8~~											
~~10,9~~											
~~11,1~~											
~~11,2~~											
11,3	39	1.1	.38	1.25	.25	-.0217	.36	.42	.06	-.0475	.16
11,4	53	8	2.864	9	1.809	-.176	2.688	8	1.096	-.178	1.453
11,5	67	7	2.506	7	1.407	-.183	2.323	10	1.370	-.009	1.389
11,6	81	0.10	.036	0.12	.024	-.002	.034	0.15	.021	-.00075	.023
~~11,7~~											
~~11,8~~											
~~11,9~~											
~~12,1~~											
~~12,2~~											
12,3	40	3	1.074	3	.603	-.079	.995	3	.411	-.048	.507
12,4	54	6	2.148	7	1.407	-.124	2.024	9	1.233	-.044	1.319
12,5	68	1.66	0.594	2.04	0.41	0.03067	.563	2.74	.375	-.00875	0.393
~~12,6~~											
~~12,7~~											
~~12,8~~											
~~12,9~~											

ATTACHMENT II

MODEL GRIDS		1977 (SA Pollut) Uncorrected (kg./day)	Corrected (tons/yr)	1983 (SA Pollut) Uncorrected (kg/day)	Corrected (tons/yr)	1977-83 ΔTSP/Yr (tons/yr)	1978 Projected (tons/yr)	1987 (SA Pollut) Uncorrected (kg/day)	Corrected (tons/yr)	1983-87 ΔTSP/Yr. (tons/yr)	1985 Projected (tons/yr)
		.358 →		.201 →				.137 →			
~~13,1~~											
~~13,2~~	~~27~~	.50	.18	.58	.12	-.010	.17	.64	.088	-.0080	.10
13,3	41										
13,4	55	4	1.432	5	1.005	-.071	1.361	6	.822	-.046	.913
13,5	69	.61	.22	.75	.151	-.0115	.21	.85	.12	-.0078	.136
~~13,6~~											
~~13,7~~											
~~13,8~~											
~~13,9~~											
~~14,1~~											
~~14,2~~											
14,3	42										
14,4	56	6	2.148	6	1.206	-.157	1.991	7	.959	-.062	1.082
14,5	70										
~~14,6~~											
~~14,7~~											
~~14,8~~											
~~14,9~~											
TOTALS		651.59	233.226	722.41	145.129	-14.962	218.471	785.35	105.57	-9.51105	124.426

~~Table II~~ Average Daily VMT/Grid From SA Pollut - 1977, 1978, 1983, 1985, 1987

ATTACHMENT III

MODEL GRIDS		1977 SA Pollut (VMT/day)	1983 SA Pollut (VMT/day)	1987 SA Pollut (VMT/day)	1977-83 ΔVMT/yr (VMT/day)	1983-87 ΔVMT/yr (VMT/day)	1978 (VMT/day)	1985 (VMT/day)	1976 VMT/yr SA Pollut $\times 10^6$	1976 VMT/yr OSU/SJO $\times 10^6$	Δ 1976 VMT/[illegible] (± [illegible] Change in OSU-VMT
~~1,1~~	~~1~~										
~~1,2~~	~~15~~										
1,3	29										
1,4	43										
1,5	57										
1,6	71										
1,7	85										
1,8	99	4075	4961	5553	147.7	148.0	4223	5257	1.433		—
~~1,9~~											
~~2,1~~											
~~2,2~~											
2,3	30	427	487	522	10	8.75	437	5045	.152		—
2,4	44	8,904	10,163	10,910	210	188	9,114	10,539	3.17	6.09	-48%
2,5	58	4,785	5,855	8,303	408	612	5,193	7079	1.598	4.65	-66%
2,6	72	7,436	9,998	11,029	427	257.75	7863	10,513.5	2.558	3.15	-19%
2,7	86	5,880	7,231	8,154	225.16	230.75	6105.16	7692.5	2.064	2.88	-28%
2,8	100	17,117	20,839	23,325	620	622	17,737	22,083	6.02	5.42	+11%
~~2,9~~											
~~3,1~~											
3,2	17	3703	4,969	5,809	211	210	3914	5389	1.275	—	—
3,3	31	13,731	17,037	19,378	551	585.25	14,282	18207.5	4.811	4.03	+19%
3,4	45	14,655	26,603	29,632	19,913	757.25	16,646.3	28,117.5	4.622	7.94	-42%
3,5	59	17,579	14,332	15,931	-541	399.75	17,038	15,131	6.61	3.98	+66%
3,6	73	50,840	58,509	63,999	1278	1372.5	52,118	61,254	18.090	17.81	+2%
3,7	87	34,528	44,478	47,836	1658.33	839.5	36,186.33	46,157	11.997	19.75	-39%
3,8	101	5524	8,241	9,040	452.83	199.75	5976.83	8640.5	1.851	3.42	-46%
3,9	115										
~~4,1~~											
~~4,2~~	~~18~~	2,307	2870	3232	94	91	2401	3052	.808	—	—
4,3	32	1,679	2434	2969	125.83	133.75	1804.83	2701.5	.567	.40	+42%
4,4	46	46,321	53,788	59,592	1244.5	1451.	47,565.5	56,690	16.453	21.10	-22%
4,5	60	50,226	61,381	64,006	1859.16	656.25	52,085.16	62,693.5	17.654	23.08	-24%
4,6	74	30,114	41,980	40,758	1977.67	-305.5	32,091.67	41,369	10.270	10.81	-5
4,7	88	62,370	70,362	74,829	1332.	1116.75	63,702	72,595.5	22,279	36.32	-39%
4,8	102	20,717	25,383	28,309	777.66	731.5	21,494.66	26,846	7.278	4.66	+56%
4.9	116	5080	5666	6319	97.7	163.25	5177.7	5992.5	1.82	—	—

— Average Daily VMT/Grid From SA Pollut - 1977, 1978, 1983, 1985, 1987

Attachment III

MODEL GRIDS		1977 SA Pollut	1983 SA Pollut	1987 SA Pollut	1977-83 ΔVMT/yr	1983-87 ΔVMT/yr	1978	1985	1976 VMT/yr SA Pollut $\times 10^6$ ✓	1976 VMT/yr OSU/SJO $\times 10^6$	Δ 1976 VMT/yr (± %) Change i OSU-VM
		✓	✓	✓	✓	✓	✓	✓			
5,1	5	175	253	280	13	11.25	188	276	0.059	✓	
5,2	19	3643	4404	4881	126.83	119.25	3770	4642.5	1.283	2.58	- 50%
5,3	33	26,512	30,035	34,156	587.16	1030.25	27,099.16	32,095.5	9.463	12.63	-25%
5,4	47	130,877	150,376	162,703	3249.83	3081.75	134,126.83	137,040.5	46.584	60.39	-23%
5,5	61	70,380	72,444	75,418	344	743.5	70,724	73,931	25.563	31.87	-20%
5,6	75	56,086	60,055	68,630	661.5	2143.75	56,747.5	64,342.5	20.230	17.04	+19%
5,7	89	43,631	51,788	63,474	1359.5	2921.5	44,990.5	57,631.	15.429	20.63	- 25%
5,8	103										
5,9	117										
6,1	6	2510	3012	3345	84	83.25	2594	3178.5	.885	—	—
6,2	20	23,387	28,068	31,174	780.16	776.5	24,167.16	29,621	8.25	10.69	-23%
6,3	34	69,366	76,278	81,568	1152	1322.5	70,518	78,923	24.90	31.99	-22%
6,4	48	157,181	185,306	199,794	4687	3622.	161,868	192,550	55.66	63.18	-12%
6,5	62	88,763	103,605	108,469	2474	1216	91,237	106,037	31.50	32.46	-3%
6,6	76	33,877	39,402	48,195	920.83	2198.25	34,797.83	43,798.5	12.03	14.50	-17%
6,	90	6754	9815	11,753	510.16	484.5	7,264.16	10,784	2.28	1.56	-46%
6,8	104										
~~6,9~~											
7,1	7	109	147	173	6.33	6.5	115.33	160	.037	—	—
7,2	21	1,245	1682	1978	72.83	74	1317.83	1830.	.428	.97	-56%
7,3	35	17,436	18,541	19,626	184.16	271.25	17,620.16	19,083.5	6.30	6.64	-5%
7,4	49	48,876	55,849	59,702	1162.16	963.25	50,038.16	57,775.5	17.42	22.32	-22%
7,5	63	88,625	101,582	101,928	2159.5	86.5	90,784.5	101,755	31.56	29.69	+ 6%
7,6	77	35,394	42,657	55,380	1210.5	3180.75	36,604.5	49,018.5	2.358	18.84	-88%
7,7	91	6636	7,696	8,602	176.66	226.5	6812.66	8149.	2.36	3.33	-29%
7,8	105			—							
~~7,9~~											
8,1	8										
8,2	22	38,140	36,691	38,571	241.5	470.	38,381.5	37,631	2.28	10.12	-77%
8,3	36	63,372	79,799	87,174	2737.83	1843.75	66,109.83	83,486.5	13.832	19.74	-30%
8,4	50	91,303	105,774	114,248	2411.83	2118.5	93,714.83	110,011	32.446	28.69	+13%
8,5	64	86,110	102,815	112,068	2784	2313.25	88,894	107,441.5	30.413	.44	+68%
8,6	78	43,726	52,209	56,908	1414	1174.75	45,140	54,558.5	15.444	18.56	-17%
8,	92	21,890	26,137	28,489	708	588.	22,598	27,313	7.73	9.28	-17%
8,8	106	4260	4940	5524	113.3	146	4373.3	5167	1.514	—	—
~~8,9~~											
		1,260,264	1,451,360	1,584,211	32,332.57	33,217.25	1,292,596.7	1,498,231	418.238	465.14	

Average Daily VMT/Grid From SA Pollut - 1977, 1978, 1983, 1985, 1987

Attachment III

MODEL GRIDS		1977 SA Pollut	1983 SA Pollut	1987 SA Pollut	1977-83 ΔVMT/yr	1983-87 ΔVMT/yr	1978	1985	1976 VMT/yr SA Pollut x 10^6	1976 VMT/yr OSU/SJO x 10^6	Δ 1976 VMT/yr (± Change OSU-VMT)
		✓	✓	✓	✓	✓	✓	✓	✓	✓	
9,1	9	37,249	43,877	48,256	1105	1095	38,354	46,066	13.2	—	
9,2	23	29,531	34,786	38,256	875.83	868	30,407	36,522	10.46	10.12	
9,3	37	1233	1386	1464	+25.5	+19.5	1259	1425	0.44	—	
9,4	51	55,886	62,828	66,342	1157	878.5	57,043	64,585	19.98	22.31	-10%
9,5	65	53,060	62,583	68,531	1587	1487	54,647	65,557	18.79	25.53	-26%
9,6	79	–	–	–							
9,7	93	–	–	–							
~~9,8~~											
~~9,9~~											
10,1	10	–	–	–							
10,2	24	–	–	–							
10,3	38	1357	1535	1672	+30	+34	1387	1603	0.48	—	—
10,4	52	30,858	34,912	38,025	675.66	778.25	31,533.66	36,468.5	11.017	13.17	-16%
10,5	66	41,707	48,935	53,585	1204.66	1162.5	42,911.66	51,260	14.783	15.98	-7%
10,6	80	1,110	1,229	1,458	29.75	57.25	1139.75	1343.5	.394	.58	-32%
~~10,7~~											
~~10,8~~											
~~10,9~~											
~~11,1~~											
~~11,2~~											
11,3	39	3175	3737	1250	+93.7	-622	3269	2493	1,125	—	—
11,4	53	25,749	30,642	27,633	815.5	-752.25	26,564.5	29,137.5	9.10	10.63	-14%
11,5	67	20,938	24,743	32,038	634.16	1823.75	21,572.16	28,390.5	7.411	39.16	-81%
11,6	81	302	357	462	9.2	26.3	311	410	.107	—	—
~~11,7~~											
~~11,8~~											
~~11,9~~											
~~12,1~~											
~~12,2~~											
12,3	40	9,288	10,881	10,872	265.5	-2.25	9553.5	10,876.5	3.30	2.43	+36%
12,4	54	18,947	23,361	31,311	735.66	1987.5	19,682.66	27,336	6.65	10.64	-37%
12,5	68	4971	6129	8215	193	521.5	5164	7172	1.74	—	—
~~12,6~~											
~~12,7~~		335,361	391,921	429,372	9437.12	9360.55	344,798.89	410,645.5	1242.552	150.55	
~~12,8~~											
~~12,9~~											

— Average Daily VMT/Grid From SA Pollut - 1977, 1978, 1983, 1985, 1987

Attachment III

MODEL GRIDS		1977 SA Pollut	1983 SA Pollut	1987 SA Pollut	1977-83 ΔVMT/yr	1983-87 ΔVMT/yr	1978	1985	1976 VMT/yr SA Pollut	1976 VMT/yr OSU/SJO	Δ 1976 VMT/yr (± %) Change i OSU-VM
~~13,1~~											
~~13,2~~	~~27~~	1487	1748	1926	43.5	43.75	1531	1836	.527	—	—
13,3	41										
13,4	55	13,970	17,206	19,551	539.33	586.25	14,509.33	18,378.5	4.902	3.22	+52
13,5	69	1832	2256	2563	70.7	76.75	1903	2409.5	0.643	—	—
~~13,6~~											
~~13,7~~											
~~13,8~~											
~~13,9~~											
~~14,1~~											
~~14,2~~											
14,3	42										
14,4	56	17,260	20,573	22,749	552.16	544	17,812.16	21,661	6.098	2.48	+146%
14,	70										
~~14,6~~											
~~14,7~~		34,549	41,783	46,789	1205.69	1250.75	35,755.49	44,285	12.17	5.7	
~~14,8~~											
~~14,9~~											
TOTAL		2,038,172	2,382,631	2,599,807	74,580.92	52,675.3	2,096,307	2,476,207	1816.64	799.88	

Attachment IV

BLE I. Es[illegible]s of VMT/day and TSP/day For AQMA Grids Not Addressed by SAPOLLUT

AQMA GRID		Adjacent GRID		Adjust. Factor (%) ②	Traffic Levels (VMT/day)			Exhaust TSP (Kg/day)		
X,Y		X,Y	No.		1977	1983	1987	1977	1983	1987
1,8	99	2,8	100	+11%	4075	4961	5553	1.36	1.65	1.85
2,3	30		44	-48%	427	487	522	0.14	0.16	0.17
3,2	17				3703	4969	5809	1.23	1.66	1.94
4,2	18				2307	2870	3232	0.77	0.96	1.08
4,9	116		102	+52% ~~+56%~~	5080	5666	6319	1.69	1.89	2.11
5,1	5		19	-60% ~~-50%~~	175	253	280	.06	.08	.09
6,1	6		20	-23%	2510	3012	3345	.84	1.00	1.12
7,1	7		21	-56% ~~-50%~~	109	147	173	.04	.05	.06
8,8	106				4260	4940	5524	1.42	1.65	1.84
9,1	9		23	+3%	37,249	43,877	48,256	12.42	14.63	16.09
9,3	37		51	-10%	1233	1386	1464	.41	.46	.49
10,3	38		52	-16%	1357	1535	1672	.45	.51	.56
11,6	81		67	-81%	302	357	462	.10	.12	.15
12,5	68		54	-37%	4971	6129	8215	1.66	2.04	2.74
13,5	69		55	+52%	1832	2256	2563	.61	.75	.85

① Example Calculation: GRID (1,8):

(a) 3671 VMT/day + 11% of 3671 = 4075 VMT/day
(Table II)

(b) $\frac{4075 \text{ VMT/day}}{3000 \text{ VMT/day}} = \frac{x}{1.0}$ $x = 1.36$ Kg/day TSP

Assumes 1.0 kg TSP corresponds to 3000 VMT/day, from scanning SAPOLLUT output data.

② From Attachment I, last column

Attachment IV

TABLE II. VMT/GRID for Grids Not Addressed by SAPOLLUT MODEL

AQMA (X,Y)	GRID No.	VMT / Year (1976) [1]	VMT / Day (1976) [2]
1,8	99	1,340,000	3671
2,3	30	300,000	822
3,2	17	—	3703 (3)
4,2	18	—	2307 (3)
4,9	116	1,220,000	3342
5,1	5	160,000	438
6,1	6	1,190,000	3260
7,1	7	90,000	247
8,8	106	—	4260 (3)
9,1	9	13,200,000	36,164
9,3	37	500,000	1370
10,3	38	590,000	1616
11,6	81	580,000	1589
12,5	68	2,880,000	7890
13,5	69	440,000	1205

Notes: (1) From "Eugene-Springfield Air Quality Maintenance Area – Data Base Development", published by Seton, Johnson + Odell, Inc., 317, S.W. Alder St., Portland, Oregon, Feb. 15, 1978, Page 108, Appendix 8.1.b.

(2) Column 1 ÷ 365

(3) From

Attachment V

Correction of VMT/GRID Allocation For GRIDS 92, 78 and 64

AQMA GRID (X,Y)	No.	Uncorrected[1] 1977 SAPOLLUT TSP (Kg/day)	Uncorrected[1] 1977 SAPOLLUT VMT (VMT/day)	Seton, Johnson, Odell[2] VMT (VMT/Yr x10⁶)	Seton, Johnson, Odell[2] %		Corrected 1977 SAPOLLUT VMT (VMT/Day)	Corrected 1977 SAPOLLUT TSP (Kg/day)
(8,7)	92	13	39,065	9.28	.1442	× 151,841 =	21,890	7
(8,6)	78	2	6,043	18.56	.288	× 151,841 =	43,726	14
(8,5)	64	34	106,733	36.50	.567	× 151,841 =	86,110	28
		49	151,841		1.0		151,841	49

AQMA GRID (X,Y)	No	Uncorrected[1] 1983 SAPOLLUT TSP	Uncorrected[1] 1983 SAPOLLUT VMT	Corrected 1977 SAPOLLUT TSP	Corrected 1977 SAPOLLUT VMT		Corrected 1983 SAPOLLUT TSP	Corrected 1983 SAPOLLUT VMT
8,7	92	14	46,831	7	21,890	×1.194 →	8.4	26,137
8,6	78	2	8,169	14	43,726		16.7	52,209
8,5	64	38	126,242	28	86,110		33.4	102,815
		54	181,242	49	151,841		58.5	181,161

$$\frac{181,242}{151,841} = 1.194$$

AQMA GRID (X,Y)	No	Uncorrected[1] 1987 SAPOLLUT TSP	Uncorrected[1] 1987 SAPOLLUT VMT	Corrected 1983 SAPOLLUT TSP	Corrected 1983 SAPOLLUT VMT		Corrected 1987 SAPOLLUT TSP	Corrected 1987 SAPOLLUT VMT
8,7	92	16	52,044	8	26,137	×1.09 →	9	28,489
8,6	78	8	28,182	17	52,209		19	56,908
8,5	64	35	117,000	33	102,815		36	112,068
		59	197,226		181,161			197,465

$$\frac{197,226}{181,161} = 1.09$$

① From Attachment I
② From Reference I, p 108

Attachment VI

Attachment

STATE OF OREGON INTEROFFICE MEMO

DEPT. 229-6087 TELEPHONE

TO: File – Lead SIP

DATE: Oct. 29, 1979

FROM: Bob Guy

SUBJECT: Documentation of SAPollut Emission Factors for Tailpipe TSP.

The SAPollut regional transportation model uses the following emission factors for total exhaust particulate ("tailpipe TSP") emissions rates, in grams TSP/vehicle-mile; for light duty gasoline powered autos and trucks (LDV), heavy duty gas-powered vehicles (HDG), and heavy duty diesel vehicles.

Table I. SAPollut "Tailpipe TSP" Emission Factors

WTG Eyeball Ave." given to Dave Kunselman(?)

Year	LDV Tailpipe TSP 92% (g/veh-mile) @ 20 mph	HDG Tailpipe TSP 2% (g/veh-mile) @ 20 mph	HDD Tailpipe TSP 6% (g/veh-mile) @ 20 mph
1977	0.25	0.91	1.3
1982 85	0.12	0.91	1.3
1987 90	0.07	0.91	1.3

– The LDV Tailpipe TSP was assumed to drop because of the phasedown of lead content of leaded gasoline mandated by EPA, and the expected increase in the fraction of all vehicles using non-leaded gasoline (i.e. catalyst equipped, later model cars). HDG and HDD vehicles are not affected by these factors.

– For purposes of lead SIP, only LDV and HDG need be considered, because EPA considers lead emissions from diesel vehicles to be "insignificant compared to gasoline-powered vehicles" (EPA-450/2-78-038, p 4 of section 4.3)

– SA Pollut provides Tailpipe TSP estimates separately for LDV and HDG, for 1977, 1982 and 1987, and further broken down by several roadway type categories (freeway, arterials) and geographic areas (Central City, Suburban, and CBD).

The Decrease in the LDV Tailpipe TSP emission factor will generate the primary amount of reduced lead emissions projected for the Portland metro area, because of the predominance of the LDV source (~90% of total traffic). The derivation of this emission factor, by DEQ staff, occurred in late 1978, and probably was accomplished as follows:...

Assume: (1) Tailpipe TSP emission factors in g/veh-mile for pre 1973 LDVs from AP-42 (Table D.1-8) as follows:

LDV Fuel	Tailpipe TSP Emission Factor (g TSP / vehicle-mile)
Leaded Gasoline	0.34
Non-Leaded Gas	0.05

Assume (2) Mix of LDV using non-leaded and leaded gas is defined as illustrated in Table 5, p 148 of EPA-450/2-78-(Attachment I), which in turn is based upon the "Fraction of Annual (LDV) Travel" from Table D.1-2 of AP-42, Supplement 5 (Attachment 2). However, use of actual Oregon vehicle population data would alter the fraction of annual travel by each model year LDV from the national average data shown in Attachment 2.

Thus the example calculation below, which uses national average data, provi

Attachment VI

slightly different ~~den~~ emission factors than were actually used in SA Pollut. The difference is assumed to reflect the fact that DEQ staff used actual Oregon data on vehicle age/population to calculate the actual SA Pollut Tailpipe TSP Emission Factors used (Table I).

Example Calculation (using national average data from Attachments 1 & 2)

	This Calc.	SA Pollut Uses	Difference
1977: 0.34(.615) + 0.05(.385) =	0.228	0.25	-8.8%
1982: 0.34(.15) + 0.05(.85) =	0.0935	0.12	-22.1%
1987: 0.34(.028) + 0.05(.972) =	0.058	0.07	-17.4%

The above suggests that SAPollut's Tailpipe TSP emissions projections (not including tire wear) could be 9% high for 1977 run, 22% high for 1982 run, and 17% high for 1987 run

An attempt to recalculate, using Oregon age/use data (Attachment) gr

	Calc	SA Pollut	Diff
~~1977: 0.34(.763) + .05(.237) =~~	~~0.271~~	~~0.25~~	~~+8.4%~~
1982: 0.34(.411) + .05(.599) =	0.1397	0.12	+16.4%
1987: 0.34(.149) + .05(.851) =	0.0507	0.07	-27.6%

??

Table 5

Lead Content of Gasoline

LDV

Year	LEADED GASOLINE % Pre-75 Vehicles	Max. Possible Lead (grams/gal)	Probable Lead (grams/gal)	UNLEADED GASOLINE % Post-74 Vehicles	Lead (grams/gal)	Pooled Ave.*** Lead Content (grams/gal)	Probable Pooled Ave. Lead Content (grams/gal)	LD[illegible] Exh[illegible] TSP Fu[illegible] (g/veh[illegible]
	A	B*	C	D	E	F	G**	
1974	100.0	-	2.0	0.0	.05	-	2.0	0.3
1975	88.8	1.91	1.9	11.2	.05	1.7	1.7	0.3[illegible]
1976	74.5	1.86	1.9	25.5	.05	1.4	1.4	0.2
1977	61.5	1.59	1.6	38.5	.05	1.0	1.0	0.2
1978	49.4	1.57	1.6	50.6	.05	0.8 0.9*	0.8	
1979	39.6	1.19	1.2	61.4	.05	0.5 0.6	0.5	
1980	29.2	1.59	1.6	70.8	.05	0.5	0.5	0.1[illegible]
1981	21.3	2.16	2.0	78.7	.05	0.5	0.5	0.11
1982	15.0	3.05	2.0	85.0	.05	0.5	0.34	0.0[illegible]
1983	10.3	4.42	2.0	89.7	.05	0.5	0.25	
1984	7.1		2.0	92.9	.05	0.5	0.19	.0[illegible]
1985	5.2		2.0	94.8	.05	0.5	0.15	.06[illegible]
1986	3.9		2.0	96.1	.05	0.5	0.13	.061
1987	2.8		2.0	97.2	.05	0.5	0.11	0.05
1988	2.1		2.0	97.9	.05	0.5	0.09	
1989	1.7		2.0	98.3	.05	0.5	0.08	
1990	0		2.0	100.0	.05	0.5	0.05	

*Column B = $\frac{F-(D \times E)}{A}$

**Column G = (A x C) + (D x E)

***Required by EPA Regulations

* As a result of small refiners exemption and proposed postponement of large refiners' [illegible] 1979 deadline to ? } Fed. Regis. 44(153) Aug 7, 1979.

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A-405

(p.149)

Attachment VII

Table D.1-21. PARTICULATE, SULFURIC ACID, AND TOTAL SULFUR OXIDES EMISSION FACTORS FOR LIGHT-DUTY, GASOLINE-POWERED VEHICLES

Pollutant	Emission factors		
	Non-catalyst (Leaded fuel)	Non-catalyst (Unleaded fuel)	Catalyst (Unleaded fuel)
Particulate			
Exhaust[a]			
g/mi	0.34	0.05	0.05
g/km	0.21	0.03	0.03
Tire wear			
g/mi	0.20	0.20	0.20
g/km	0.12	0.12	0.12
Sulfuric acid			
g/mi	0.001	0.001	0.02-0.06[b]
g/km	0.001	0.001	0.01-0.04
Total sulfur oxides			
g/mi	0.13	0.13	0.13
g/km	0.08	0.08	0.08

[a] Excluding particulate sulfate or sulfuric acid aerosol.
[b] Sulfuric acid emission varies markedly with driving mode and fuel sulfur levels.

Table D.1-22. SAMPLE CALCULATION OF FRACTION OF ANNUAL LIGHT-DUTY VEHICLE TRAVEL BY MODEL YEAR[a]

Age, years	Fraction of total vehicles in use nationwide (a)[b]	Average annual miles driven (b)[c]	a x b	Fraction of annual travel (m)[d]	
1	0.081	15,900	1,238	0.112	100% 1974
2	0.110	15,000	[illegible]	0.143	88.8 1975
3	0.107	14,000	[illegible]	0.130	74.5 1976
4	0.106	13,100	[illegible]	0.121	etc
5	0.102	12,200	[illegible]	0.108	
6	0.096	11,300	1,085	0.094	
7	0.088	10,300	906	0.079	
8	0.077	9,400	724	0.063	
9	0.064	8,500	544	0.047	
10	0.049	7,600	372	0.032	
11	0.033	6,700	221	0.019	
12	0.023	6,700	154	0.013	
≥13	0.064	6,700	429	0.039	

[a] References 1 through 6.
[b] These data are for July 1. Data from References 2-6 were averaged to produce a value for m that is better suited for projections.
[c] Mileage values are the results of at least squares analysis of data in Reference 1.
[d] $m = ab/\Sigma ab$.

Appendix D "Projected Emission Factors For Highway Vehicles" (12/75)
From AP-42 "Compilation of Air Pollutant Emission Factors"

JULY, 1978 POPULATION DISTRIBUTION

n	CY	Clack.	Mult.	Wash.	Σ	
1	78	9329	24840	11235	45404	.0619
2	77	14749	35319	16102	66170	.0902
3	76	14413	32612	15076	62101	[illegible]
4	75	10666	22535	10135	43336	0.059
5	74	12908	28041	12433	53382	[illegible]
6	73	14787	30579	13640	59006	[illegible]
7	72	14261	30184	13031	57476	[illegible]
8	71	11197	24243	9764	45204	0.062
9	70	10232	22876	8637	41745	[illegible]
10	69	11067	25370	9430	45867	0.065
11	68	9739	21387	7740	38866	[illegible]
12	67	8388	18843	6742	33973	[illegible]
13	66	7815	17438	6208	31461	[illegible]
14	65	7142	15719	5292	28153	[illegible]
15	64	5489	11575	4027	21091	[illegible]
16	63	4080	8563	2723	15366	[illegible]
17	62	2900	6500	2600	12000 *	[illegible]
18	61	2000	4300	1700	8000 *	
19	60	1500	3200	1300	6000 *	
20	Pre-60	4600	10000	4162	18762 *	.0255

Σ 733,373

* 1900-62 POPULATION IS 44762

10/29/79

Attachment VI

July 1978 Oregon Data

Age Years (n)	Model Year	Oregon Figures for Vehicle Population: Fraction of Total Vehicles in use (a)	$\sum^{n} a$	National Average Annual Miles Driven (b)	a×b	ab/Σab	
1	1978	.0619	(.0619)	15,900	(984)	(.0947)	90.4
2	77	.0902	.1521	15,000	1353	.1303	67.1
3	76	.085	.2371	14,000	1190	.1145	55.1
4	75	.059	.2961	13,100	773	.0744	
5	74	.073	.3691	12,200	891	.0857	100
6	73	.080	.4491	11,300	904	.0870	
7	72	.078	.5271	10,300	803	.0773	
8	71	.062	.5891	9,400	583	.0561	
9	70	.057	.6461	8,500	485	.0467	
10	69	.063	.7091	7,600	479	.0461	
11	68	.053	.7621	6,700	355	.0342	
12	67	.046	.8081	6,700	308	.0296	
(≥13)				(6,700)	(1283)	(.1235)	
13	66	.043	.8511	6,700	288	.0277	
14	65	.038	.8891				
15	64	.029	.9181				
16	63	.021	.9391				
17	62	.016	.9551				
18	61	.011	.9661				
19	60	.008	.9741				
≥20	Pre-1960	.0255	.9996				

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STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY — INTEROFFICE MEMO

TO: Eugene - Sprinfield AQMA File — DATE: June 26, 1980

FROM: Bob Gay RF Gay

SUBJECT: Paved Road Dust TSP Emissions

SUMMARY

This memo describes the rationale and procedures used to estimate TSP emissions from paved road dust (PRD), for each 2 km grid in the Eugene - Springfield AQMA dispersion model. Changes from previous PRD estimates by Seton, Johnson & Odell (SJO)[1] are explained, including 1) a Trackout Surcharge, based on industrial land use; 2) Street Cleaning Credits, and 3) entrainment (rainfall dust suppression) assumptions. The basic SJO equation for estimating PRD emissions was used, but with traffic (VMT) levels from more recent (SAPOLLUT) regional transportation model runs.

Adjustment of PRD emission factors using chemical mass balance data is described in a separate memo[2]. Under final model calibration assumptions, AQMA PRD emissions totaled 2485 Tons/yr in 1978, and 3090 Tons/yr in 1987. These totals assumed a PRD emission rate of 2.81 g/VMT, compared to SJO's 4.016 g/VMT. However, the 2.81 g/VMT does not include Trackout surcharges which accounted for 32% of AQMA total PRD TSP. The Trackout assumption causes the "effective" PRD emissions rate to vary by grid, with distribution of industrial land use. Including Trackout, the AQMA average PRD emissions rate used is 4.13 g/VMT.

DISCUSSION

SJO used OSU estimates of VMT/Grid for 1976 and a 1985 regional transportation model (SAPOLLUT) run to extrapolate VMT/Grid for 1980, 1990 and 1995, assuming linear growth. These VMT/Grid estimates were then used in the following general equation, to estimate PRD TSP/Grid:

Paved Road Traffic Levels		Paved Road Dust Emission Rate (Other Factors)		Other Factors		Paved Road Dust TSP Emissions per Grid	
(VMT/Grid)	X	(g TSP/VMT)	x		=	(Tons/year)	(1)

This analysis reestimates PRD TSP/Grid using more recent SAPOLLUT model runs for Eugene - Springfield, dated August 17, 19 and 23, 1978, which simulate 1977, 1983 and 1987, respectively. SAPOLLUT is a regional transportation model, containing local planners' best estimates of population and employment trends, and changes in the areawide street network. By inserting vehicle pollutant emission factors, and vehicle mix, SAPOLLUT can also generate estimates of pollutant emissions per grid.

CORRECTION FOR HEAVY DUTY TRUCKS

A separate memo[3], which describes estimation of motor vehicle exhaust TSP emissions, documents the use of SAPOLLUT data to provide "average daily VMT/Grid, including contributions from local roads " (as well as VMT from arterials and freeways). These VMT/Grid values are used here with one additional correction for heavy duty truck impacts.

One of ODOT's assumptions in SAPOLLUT was that the average areawide traffic mix consisted of 97% light duty cars and trucks and 3% heavy duty trucks. Assuming the heavy trucks are 18-wheel vehicles they would cause an "effective" 10.5% increase in VMT/Grid with respect to paved road dust emissions.

$$.97X + .03X\ (18/4) = 1.105X \qquad (2)$$

where X = VMT/Grid

To account for this, VMT/Grid from SAPOLLUT could be multiplied by 1.105, to afford the "effective" VMT/Grid, for purposes of estimating PRD emissions. Alternately, as was done in this analysis, the correction factor (1.105) can be lumped with others used in calculating PRD emissions.

SJO had assumed heavy duty vehicles accounted for 10% of total freeway VMT and 5% of other VMT. In discussions with ODOT, this assumption seemed high. It would have been difficult to adjust SAPOLLUT data to reflect the SJO assumption.

PAVED ROAD DUST EMISSION FACTOR

EPA has published a summary of paved road dust emission factors[4]. A more recent summary by R. N. Pitt[5] reports a range for literature estimates of particulate emissions from roadways of 0.2 to 45.0 grams TSP/vehicle-mile, with most typical values in the 2-5 g/VMT range. Seton, Johnson & Odell[1] used 4.016 g/VMT. In this analysis, Seton, Johnson & Odell's approach to calculating a PRD emission factor was used, as illustrated in Equations 2 and 3.

Paved Road Dust Emission Factor	=	Aerodynamic Particle Size Factor	x	Road Dust Emissions Rate	x	Rainfall (Entrainment) Factor	x	Heavy Duty Truck VMT Correction Factor	(2)
(g/VMT)		(%,as decimal)		(g TSP/VMT)		(%, as decimal)		(%, as decimal)	
2.11	=	.9	x	2.81	x	.755	x	1.105	(3)

where,

.9 = 90% (by weight) of paved road TSP emissions are less than 30 microns in size, and thus considered aerodynamically entrainable for significant distances from the roadway.

2.81 = paved road emissions rate (grams/VMT) under final model calibration assumptions for the Base Year (1978).

.755 = 75.5% entrainment of paved road dust, which assumes entrainment occurs during any hour in which no trace of rainfall occurs -- i.e., that 75.5% of the hours in 1978 had no rain whatsoever.

1.105 = Heavy duty truck correction factor.

Thus, the Base Year (1978)
PRD emission factor (2.11 g/VMT)
is based on an assumed 2.81 g/VMT PRD emission rate, 1978 rainfall, and entrainment based on hours ≤ a trace of rainfall. Model calibration analyses had indicated that 2.81 g/VMT PRD emissions rate corresponded best to chemical mass balance (CMB) estimates of total dust levels.

The 2.11 g/VMT would be comparable to SJO's 1976 PRD emission factor, of 2.52 g/VMT, based on a 4.016 g/VMT PRD emission rat, 1976 rainfall, and SJO's entrainment assumption based on days $>$0.1 inches of rainfall -except for one thing. The 2.11 g/VMT does not include the "Trackout surcharge" added to PRD emissions, as discussed below. Since Trackout accounts for 32% of the total 1978 estimated PRD emissions, the effective AQMA wide average PRD emission rate is 2.81/.68 = 4.13 g/VMT, very close to SJO's 4.016 g/VMT. For individual grids, the effective PRD emission rate varies from 2.81 g/VMT (no Trackout surcharge) to over four times as much, depending on the amount of industrial land use in the grid.

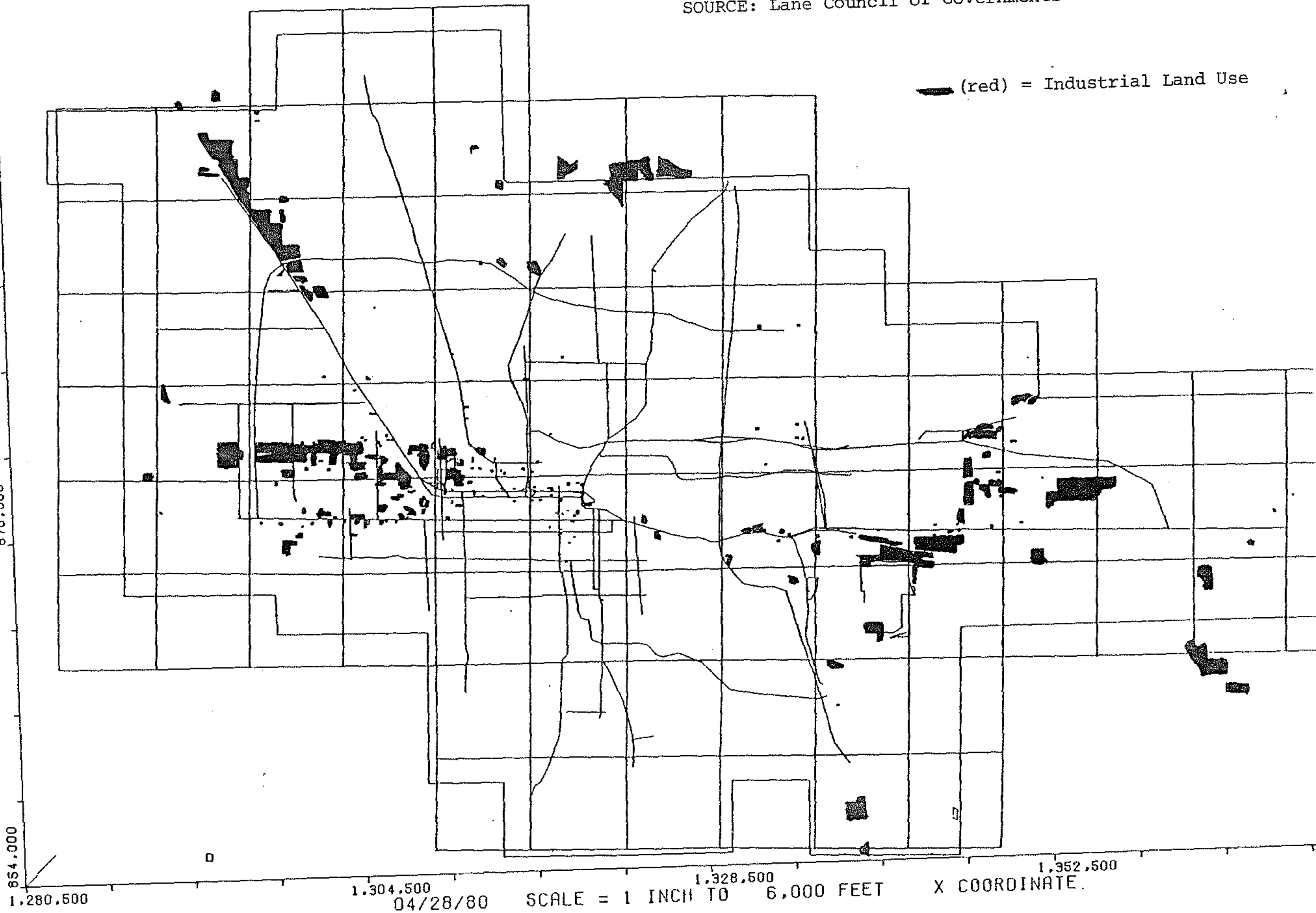
TRACKOUT SURCHARGE

The Trackout surcharge assumes that industrial land uses may contribute to higher than average dust loadings on paved roads, because of mud and dust tracked out from unpaved work areas and parking lots, or windblown from bare ground. Figure I shows the location of actual industrial land use in the AQMA. This map was prepared by Lane Council of Governments (LCOG), at DEQ's request for this analysis. Using a much larger map, the percent of land area in each grid attributable to industrial land use was estimated.

A study by Puget Sound Air Pollution Control Agency (PSAPCA)[6] had measured road dust emission factors for several representative land uses. The study found substantially higher road dust emission factors for industrial areas than for commercial areas, like the Central Business District. Based on advice of DEQ staff[8], road dust emissions from roads in industrialized areas were assumed to be 19 times as great as from other roads. The

FIGURE I. Actual Industrial Land Use

SOURCE: Lane Council of Governments



percentage of land area in each grid attributable to industrial land use, multiplied by 19, afforded a Trackout Factor. Table I summarizes the Trackout Factors calculated for the 41 grids affected -- i.e. those with significant industrial land use. The Trackout Factor, multiplied by the estimated PRD emissions per grid, gives the Trackout surcharge, or additional PRD emissions assigned to that grid. As Table I shows, this Trackout assumption increased total PRD emissions in some grids by as much as four fold.

The Trackout surcharge was first applied early in the model calibration process. It seemed to improve model performance, and was retained thereafter. There is no direct evidence that this Trackout source exists as postulated, in part because available CMB data cannot distinguish between dust from different sources. Further work is needed to confirm the source's magnitude and importance.

Table I. Trackout Factors

GRID (X.Y)	No.	Percentage of Land Industrialized (as decimal)	x	Industrialized Area Road Dust Emissions Multipier	=	Trackout Factor
2,4	44	.002		19		1.038
2,5	58	.055		19		2.045
2,7	86	.38		19		1.722
2,8	100	.15		19		3.85
3,3	31	.002		19		1.038
3,4	45	.12		19		3.28
3,5	59	.10		19		2.9
3,6	73	.025		19		1.475
3,7	87	.155		19		3.945
4,4	46	.045		19		1.855
4,5	60	.115		19		3.185
4,6	74	.004		19		1.076
5,4	47	.025		19		1.475
5,5	61	.050		19		1.95
5,6	75	.013		19		1.247
5,7	89	.010		19		1.19
6,1	6	.004		19		1.076
6,3	34	.002		19		1.038
6,4	48	.020		19		1.38
6,5	62	.004		19		1.076
6,6	76	.002		19		1.038
6,7	90	.020		19		1.38
7,4	49	.002		19		1.038
7,5	63	.010		19		1.19
7,7	91	.035		19		1.665
8,3	36	.013		19		1.247
8,4	50	.020		19		1.38
8,5	64	.003		19		1.037
8,6	78	.003		19		1.057
9,3	37	.006		19		1.114
9,4	51	.070		19		2.33
10,3	38	.005		19		1.095
10,4	52	.150		19		3.85
10,5	66	.050		19		1.95
11,4	53	.020		19		1.38
11,5	67	.012		19		1.228
12,3	40	.008		19		1.152
12,4	54	.038		19		1.722
12,5	68	.001		19		1.019
13,4	55	.175		19		4.325

DUST ENTRAINMENT--Suppression By Rainfall

SJO assumed that dust entrainment from paved roads would be suppressed all day (24 hrs) if > 0.1 inch of rainfall fell during the day. 1978 had 140 days with > 0.1 inch of rain, so the % entrainment, according to SJO, would be 365-140/365 = 61.6 %. PRD emissions estimates (Tons/yr) would be multiplied by 0.616 to account for rainfall suppression of PRD reentrainment, using the SJO assumption.

In this analysis, a different entrainment assumption was used because it helped fit model results to CMB estimates of total dust levels, and because it seemed more reasonable. It was assumed that a trace or more of rainfall in an hour would suppress all PRD reentrainment during that hour. For 1978, 6963 hours had no rainfall, out of a total of 8760 hours. corresponding to 79.4 % entrainment. If only the (61) TSP sample days are considered (HIVOL sample every 6th day), 359 out of 1464 hours had no rain, corresponding to 75.5% entrainment.

Table II summarizes entrainment factors calculated for various time periods, and different rainfall assumptions. Attachment II contains data used to prepare Table II.

Note that Table II contains a long term (10 yr) average entrainment factor of 78.5% based on hours ≥ trace of rainfall--or, 4% more than the Base Year (1978) factor of 75.5% entrainment. Accordingly, a 1.04 factor was used to convent Base Year PRD emissions from "actual" to representative of "long term average" (LTA) rainfall. LTA emissions bases were used to calculate projected exceedances of TSP standards for future years.

Table II. Road Dust Entrainment Factors For Various Time Periods and Rainfall Assumptions.

Time Period	Rainfall Assumption Basis		
	Hours _ Trace	Hours Trace	Days 0.01 inches
All 365 1978 Days	79.4	90.6	61.6
(61) 1978 TSP Sample Days	75.5	86.7	55.7
(66) 1978 CMB Sample Days (June - Nov 15)	93.3	97.3	81.8
All 365 1978 Days	----	----	----
(62) 1977 TSP Sample Days	80.8	89.4	----
All 365 Days 1967-76 Ave	78.5	89.1	----

Source of rainfall data: National Weather Service -"Local Climatological Data" (Attachment II)

Street Cleaning Credits

Another adjustment to PRD emissions estimates assigned Street Cleaning Credits to six grids where a significant portion of the streets were cleaned twice a week or more in 1978. Street Cleaning Credits are described in detail in a separate memo[7]

Such streets were assumed to have a PRD emission rate only 1/3 that of streets which were not cleaned this frequently. Table III shows these street cleaning credits expressed as a decimal which, when multiplied by estimated PRD emissions, adjusts PRD TSP/Grid to account for these Street Cleaning Credits.

Table III. Street Cleaning Credits

Grid (X,Y)	No.	Street Cleaning Credit (decimal Multiplier)
Eugene		
5,4	47	.44
5,5	61	.633
6,3	34	.976
6,4	48	.573
Springfield		
9,4	51	.653
10,4	52	.86

See memo on Street Cleaning Credits for derivation of these multipliers

CALCULATION OF PRD EMISSIONS

PRD emissions, by grid, were calculated as follows, for the Base Year (1978).

1978 PRD Traffic Levels		PRD Emission Rate		1978 Rainfall (Entrainment) Factor		Heavy Truck Factor		Particle Size Factor		1978 Trackout Factor	
(VMT/Day)	X	(g/VMT)	X		X		X		X		X

1978 Street Cleaning Factor		Conversion Factors		1978 PRD Emissions	
	X	(ton-days)/(g/year)	=	(Tons/Year)	(3)

1978 Base Year PRD emissions multiplied by 1.04 gave 1978 "Long term average (LTA)" emissions, or Base Year emissions normalized to long term average rainfall. 1987 PRD emissions were estimated, using LTA rainfall assumptions, by multiplying 1978 LTA PRD emissions by the growth in VMT estimated by SAPOLLUT, for each grid. Attachment I summarizes the PRD emissions, by grid, as calculated using final model calibration assumptions--i.e., 2.81 g/VMT PRD emissions rate (2) 78.5% entrainment (LTA); (3) Trackout Surcharge, and (4) Street Cleaning Credits.

PRD

References

(1) "Eugene / Springfield Air Quality Maintenance Area - Data Base Development", by Seton, Johnson & Odell, Feb.15, 1978.

(2) "Summary of TSP Modeling Results - Preliminary Draft", memo from Robert Gay to Don Arkell, May 28, 1980.

(3) "Motor Vehicle Exhaust TSP Emissions", June 20, 1980, memo to Eugene - Springfield AQMA file, by Robert Gay, Oregon Department of Environmental Quality, Portland, Oregon.

(4) "Compilation of Air Pollutant Emission Factors", AP-42, published by the U. S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, 27711, Section 11.2.5, Dec., 1977.

(5) "Demonstration of Nonpoint Pollution Abatement Through Improved Street Cleaning Practices", EPA-600/1-79-161, August,1979 by Robert Pitt, of Woodward - Clyde Consultants, San Francisco, CA.

(6) "Particulate Emissions From Paved Roads in Seattle and Tacoma Nonattainment Areas", July 1, 1979, by the Puget Sound Air Pollution Control Agency (PSAPCA), 410 West Harrison St., Seattle, WA, 98119.

(7) "Reduction of Paved Road Dust Emissions By Street Cleaning Credits", June 27, 1980 memo to Eugene - Springfield AQMA file, by Robert Gay, Oregon DEQ, Portland.

Attachments

I. Paved Road Dust emissions, By Grid (1978, 1987), showing Trackout surcharge and Street Cleaning Credit

II. Climatological Data, Entrainment Factor Calculations

Document Name: A I 178. A (permanent storage no.)

TABLE I Paved Road Dust

Attachment I ①

MODEL GRIDS		1978 SA Pollut			1978 Paved Road Dust	TRACKOUT SURCHARGE	STREET CLEANING CREDITS	1978 "4.TH" PRD	1987 VMT / 1978 VMT =	1987 "4.TH" PRD
		(VMT/day)			(T/yr)			(T/yr)		(T/yr)
		.0008498				By Grid	By Grid	1.04		
1,1	1									
1,2	15				2					
1,3	29									
1,4	43									
1,5	57									
1,6	71									
1,7	85									
1,8	99	4223			3.59	→	→	3.7	5553/4223	4.9
1,9										
2,1										
2,2										
2,3	30	432			.37	→	→	.39	572/432	.46
2,4	44	9114			7.75	1.078 → 8.64	→	8.36	10910/9114	10.0
2,5	58	5193			4.41	2.045 → 9.02	→	9.39	8303/5193	15.0
2,6	72	7563			6.68	→	→	6.95	11034/7563	9.75
2,7	86	6105			5.19	1.722 → 8.93	→	9.29	8154/6105	12.41
2,8	100	17,737			15.07	3.85 → 58.03	→	60.35	23329/17,737	79.36
2,9										
3,1										
3,2		3914			3.33	→	→	3.46	5869/3914	5.13
3,3	31	14,282			12.14	1.038 → 12.60	→	13.1	19,378/14,282	17.77
3,4	45	16,646			14.15	3.28 → 46.4	→	48.25	29,632/16,646	85.80
3,5	59	17,038			14.48	2.9 → 41.99	→	43.67	15,931/17,038	40.8
3,6	73	52,118			44.29	1.475 → 65.33	→	67.94	63,999/52,118	83.43
3,7	87	36,186			30.75	3.945 → 121.31	→	126.16	47,836/36,186	166.78
3,8	101	5977			5.08	→	→	5.28	9,040/5977	7.99
3,9	115	—								
4,1										
4,2		2401			2.04	→	→	2.12	3232/2401	2.86
4,3	32	1805			1.53	→	→	1.59	2969/1805	2.62
4,4	46	47,566	76.53	62.6	40.42	.855 → 74.98	~~104.4~~	77.98	59,592/47,566	97.70
4,5	60	52,085			44.26	3.185 → 140.97	→	146.6	64,006/52,085	180.15
4,6	74	32,092			27.27	1.076 → 29.34	→	30.52	40,758/32,092	38.76
4,7	88	63,702			54.13	→	→	56.30	74,829/63,702	66.13
4,8	102	21,495			18.27	→	→	19.0	28,309/21,495	25.02
4,9	116	5178			4.4	→	→	4.58	6319/5178	5.5
								75~~9~~34		98~~0~~39

2.319/VMT × .755 × .9 × 1.105 × 365/906,000 = .0008498 $\frac{\text{ton-days}}{\text{gram-yr}}$

$\frac{.788\ (\%\ \text{Entrainment})}{.755\ (\%\ \text{Entrainment})}$ = 1.04

37~~3~~.41 73~~0~~.17 73~~0~~.17

MODEL GRIDS		1978 VMT (SAPollut)	PRD E.F. & Conversion Factors→PRD	Rainfall Adj→Base Yr PRD	VMT Adj vs. Base Yr	TRACKOUT	STREET CLEANING	1978 LTA PRD T/yr	1987 VMT / 1978 VMT	= 1987 LTA PRD
		(VMT/day)	(Tons/yr) .0008498	(T/yr)	(T/yr)	T/yr	(T/yr) 1.04			
5,1	5	188			.16	→	→	.17	280/188	.25
5,2	19	3770			3.2	→	→	3.33	4881/3770	4.31
5,3	33	27,099			23.03	→	→	23.95	34,156/27099	30.19
5,4	47	134,127			113.98	1.475 → 168.12	.44 → 73.97 →	76.93	162,703/134,127	93.32
5,5	61	70,724			60.1	1.95 → 117.2	.633 → 74.18 →	77.15	75,418/70,724	82.27
5,6	75	56,748			48.22	1.247 → 60.14	→	62.54	68,630/56,748	75.63
5,7	89	44,991			38.23	1.19 → 45.5	→	47.32	63,474/44,991	66.76
5,8	103	—							—	
5,9	117	—							—	
6,1	6	2594			2.2	1.076 → 2.37	→	2.47	3345/2594	3.19
6,2	20	24,167			20.54	→	→	21.36	31,179/24,167	27.55
6,3	34	70,518			59.93	1.078 → 64.7	.976 → 63.17 →	65.69	81,568/70,518	75.98
6,4	48	161,868			137.56	1.38 → 189.8	.573 → 108.77 →	113.12	199,794/161,868	139.62
6,5	62	91,237			77.53	1.076 → 83.43	→	86.77	108,469/91,237	103.16
6,6	76	34,798			29.57	1.038 → 30.70	→	31.92	48,195/34,798	44.2
6,7	90	7,264			6.17	1.38 → 8.52	→	8.86	11,753/7,264	14.3
6,8	104	—								
6,	—									
7,1	7	115			.098	→	→	.10	173/115	.15
7,2	21	1318			1.12	→	→	1.16	1978/1318	1.75
7,3	35	17,620			14.97	→	→	15.57	19,626/17,620	17.34
7,4	49	50,038			42.52	1.038 → 44.14	→	45.90	59,702/50,038	54.77
7,5	63	90,785			77.15	1.19 → 91.81	→	95.48	101,928/90,785	107.2
7,6	77	36,605			31.11	→	→	32.35	55,380/36,605	48.9
7,7	91	6813			5.79	1.665 → 9.64	→	10.0	8602/6813	12.7
7,8	105	—								
7,9										
8,1	8	—								
8,2	22	38,382			32.62	→	→	33.92	38,571/38,382	34.1
8,3	36	66,110			56.18	1.247 → 70.06	→	72.86	87,174/66,110	96.1
8,4	50	93,715			79.64	1.38 109.90	→	114.3	114,248/93,715	139.3
8,5	64	88,894			75.54	1.057 → 78.84	→	83.04	112,068/88,894	104.7
8,6	78	45,140			38.36	1.057 → 40.55	→	42.17	54,908/45,140	53.16
8,7	92	22,598			19.20	→	→	19.97	28,484/22,598	25.2
8,8	106	4373			3.72	→	→	3.86	5524/4373	4.88
8,9					1098.44	1365.19	1145.46	1192.24		1460.98

MODEL GRIDS		1978 VMT (SA Pollut)	PRD EF & Conversion Factors	Rainfall Adj→BASE YR PRD	VMT Adj vs Base Yr	TRACKOUT	STREET CLEANING	1978 LTA		1987 LTA
		(VMT/Day)	(T/yr)	(T/yr)	(T/yr)	(T/yr)	(T/yr)			
9,1	9	38,354	0.000 8498		32.59			1.04 → 33.90	48,256/38,354	42.0[illegible]
9,2	23	30,407			25.84			26.87	38,258/30407	33.8
9,3	37	1259			1.07	1.114 → 1.19		1.24	1464/1259	1.44
9,4	51	57,043			48.48	2.33 → 112.95	.653 → 73.75	76.70	66342/57043	89.21
9,5	65	54,647			46.44			48.30	68531/54647	60.6
9,6	79	—								
9,7	93	—								
~~9,8~~										
~~9,9~~										
10,1	10	—								
10,2	24	—								
10,3	38	1387			1.18	1.095 → 1.29		1.34	1672/1387	1.62
10,4	52	31,534			26.80	3.85 → 103.17	.86 → 88.23	92.28	33025/31534	111.3
10,5	66	42912			36.47	1.95 → 71.11		73.95	53585/42912	92.3
10,6	80	1140			.97			1.01	1958/1140	1.29
~~10,6~~		—								
~~10,7~~										
~~10,8~~										
~~10,9~~										
~~11,1~~										
~~11,2~~										
11,3	39	3269			2.78			2.89	1250/3269	1.1
11,4	53	26,565			22.57	1.38 → 31.15		32.4	27633/26565	33.7
11,5	67	21,572			18.33	1.228 → 22.51		23.41	32038/21572	34.8
11,6	81	311			.26			.27	462/311	0.4
~~11,7~~										
~~11,8~~										
~~11,9~~										
~~12,1~~										
~~12,2~~										
12,3	40	9554			8.12	1.152 → 9.35		9.73	10872/9554	11.1
12,4	54	19683			16.73	1.722 → 28.80		29.96	31311/19683	42.65
12,5	68	5164			4.39	1.019 → 4.47		4.65	8215/5164	7.4
~~12,6~~										
~~12,7~~										
~~12,8~~										
~~12,9~~										
					293.82	494.87		458.9		57[illegible]

GRIDS X,Y	No	1978 VMT (SA Pollut) (VMT/Day)	PRD E.F. & Conversion Factors→PRD (Tons/yr)	RAINFALL Adj.→Base Yr PRD (T/yr)	VMT Adj vs. Base Yr (T/yr)	Trackout (T/yr)	Street Cleaning (T/yr)	1978 LTA (T/yr)		1987 LTA (T/yr)
			0.0008498				1.04			
~~13,1~~	~~2~~									
13,2	27	1531			1.30			1.35	1926/1531	1.7
13,3	41	—						—		—
13,4	55	14,509			12.33	4.325 → 53.33		55.46	19559/14509	74.7
13,5	69	1903			1.62			1.68	2563/1903	2.3
~~13,6~~										
~~13,7~~										
~~13,8~~										
~~13,9~~										
~~14,1~~										
~~14,2~~										
14,3	42	—								
14,4	56	17812			15.14			15.74	22749/17812	20.1
14,5	70				Column 4	Col #5	Col 7	Col 8		Col 10
~~14,6~~					1978 PRD T/yr	78 PRD w/Trackout	1978 PRD w/ Trackout w/St. Cleaning	1978 "LTA" w/Trackout w/St. Cleaning		1987 "LTA" PRD w/Trackout w/St. Cleaning
~~14,7~~										
~~14,8~~										
14,9										
			Totals		2088.3	2661.6	2388.3	2484.7		3112.3
					323.41	71.39		74.23		

Attachment II

Local Climatological Data

MONTHLY SUMMARY

JANUARY 1978

EUGENE, OREGON

EUGENE, OREGON
NATIONAL WEATHER SERVICE OFC
MAHLON SWEET FIELD

LATITUDE 44° 07' N   LONGITUDE 123° 13' W   ELEVATION (GROUND) 359 FT.   STANDARD TIME USED: PACIFIC   WBAN #24221

Date (1)	Temp. °F Maximum (2)	Minimum (3)	Average (4)	Departure from normal (5)	Average dew point (6)	Degree days base 65° Heating (season begins with July 1) (7A)	Cooling (season begins with Jan 1) (7B)	Weather types on dates of occurrence (8)	Snow, ice pellets or ice on ground at 04AM In. (9)	Precipitation Water equivalent In. (10)	Snow, ice pellets In. (11)	Avg. station pressure In. Elev. 373 feet m.s.l. (12)	Wind Resultant dir. (13)	Resultant speed M.P.H. (14)	Average speed M.P.H. (15)	Fastest mile Speed M.P.H. (16)	Fastest mile Direction (17)	Sunshine Minutes (18)	Percent of possible (19)	Sky cover tenths Sunrise to sunset (20)	Midnight to midnight (21)	Date (22)
1	37	25*	31	-8	21	34	0		0	0	0	29.80	36	10.6	10.9	15	36			9	7	1
2	31	26	29*	-10	23	36	0	1 6	T	.26	T	29.57	01	9.4	10.2	15	01			10	10	2
3	50	29	40	1	37	25	0	1 6	T	.38	0	29.40	20	2.9	4.0	14	18			10	10	3
4	52	38	45	6	41	20	0	1 8	0	T	0	29.11	18	4.8	7.6	25	18			10	9	4
5	49	44	47	8	42	18	0	1	0	3.08	0	29.07	17	18.6	18.8	32	18			10	10	5
6	49	41	45	6	42	20	0	1	0	.14	0	29.60	17	3.5	6.0	12	15			10	10	6
7	46	39	43	4	41	22	0	1	0	.12	0	29.63	21	2.0	4.9	9	17			10	9	7
8	53	43	48	9	44	17	0	2	0	.23	0	29.52	02	2.7	3.6	12	01			10	10	8
9	46	42	44	5	43	21	0	2	0	.13	0	29.34	36	5.5	5.8	9	36			10	10	9
10	51	37	44	5	43	21	0	1	0	T	0	29.42	35	1.6	3.2	7	04			10	9	10
11	48	39	44	5	42	21	0	1	0	.45	0	29.51	16	6.1	6.5	13	16			10	10	11
12	49	35	42	3	43	23	0	2 8	0	.06	0	29.76	18	.4	4.3	9	17			10	8	12
13	46	41	44	5	41	21	0	1	0	.48	0	29.48	02	8.8	9.1	14	01			10	10	13
14	46	40	43	4	41	22	0	1	0	.17	0	29.05	35	5.8	7.6	14	28			10	10	14
15	51	37	44	5	42	21	0	2	0	.28	0	28.93	12	2.8	5.5	25	17			9	9	15
16	54	43	49	10	44	16	0	1	0	.78	0	28.95	17	4.1	7.5	14	18			9	10	16
17	51	44	48	9	44	17	0	1	0	.69	0	29.42	17	9.4	10.2	14	16			10	10	17
18	45	37	41	2	41	24	0	2	0	.53	0	29.38	34	2.2	5.3	9	36			10	10	18
19	52	42	47	8	44	18	0	2	0	.16	0	29.43	18	4.9	6.2	18	18			10	10	19
20	55*	46	51*	12	46	14	0		0	T	0	29.68	16	7.5	7.9	13	17			10	10	20
21	52	41	47	8	43	18	0		0	.48	0	29.67	19	10.6	11.2	16	22			8	9	21
22	47	31	39	0	37	26	0	2	0	.24	0	29.93	21	5.6	6.2	9	21			8	7	22
23	37	31	34	-6	32	31	0	2	0	0	0	30.06	02	1.8	5.8	10	01			10	10	23
24	40	33	37	-3	33	28	0	1	0	0	0	30.00	03	2.9	3.9	8	02			10	10	24
25	44	34	39	-1	38	26	0	2	0	.11	0	29.86	17	5.1	6.0	12	16			10	10	25
26	44	38	41	1	40	24	0	2	0	0	0	29.85	35	5.5	6.2	12	01			10	10	26
27	53	38	46	6	39	19	0	2 8	0	T	0	29.84	01	4.6	4.9	12	36			8	9	27
28	51	39	45	5	43	20	0	2	0	.14	0	29.79	35	1.8	3.7	9	16			10	10	28
29	45	38	42	1	39	23	0	1	0	T	0	29.80	36	8.4	8.9	13	35			10	10	29
30	48	37	43	2	37	22	0	1 8	0	.06	0	29.59	02	3.3	5.3	9	03			10	10	30
31	51	35	43	2	40	22	0	1 8	0	.05	0	29.56	17	7.9	8.6	10	18			10	9	31
	SUM 1473	SUM 1153				TOTAL 690	TOTAL 0			TOTAL 9.05	TOTAL T	FOR THE MONTH: 29.55	14	.8	7.0	32	18	TOTAL	% FOR MONTH	SUM 301	SUM 285	
	AVG. 47.5	AVG. 37.5	AVG. 42.5	DEP. 3.1	AVG. 39	DEP. -104	DEP. 0			DEP. 1.51						DATE: 05		POSSIBLE		AVG. 9.7	AVG. 9.2	

NUMBER OF DAYS			
Precipitation ≥ .01 inch	22	Snow, ice pellets ≥ 1.0 inch	0
Thunderstorms	0	Heavy fog	12
Clear	0	Partly cloudy	0
Cloudy	31		

NUMBER OF DAYS: Maximum temp. ≥ 90°	Maximum temp. ≤ 32°	Minimum temp. ≤ 32°	Minimum temp. ≤ 0°
0	1	5	0

SEASON TO DATE	Heating	Cooling
TOTAL	2653	0
DEP.	-29	0

GREATEST IN 24 HOURS AND DATES: Precipitation	Date	Snow, ice pellets	Date	GREATEST DEPTH ON GROUND OF SNOW, ICE PELLETS OR ICE AND DATE	Date
3.08	5	T	2	T	3+

* EXTREME FOR THE MONTH - LAST OCCURRENCE IF MORE THAN ONE.
T TRACE AMOUNT
+ ALSO ON AN EARLIER DATE, OR DATES.
HEAVY FOG: - VISIBILITY 1/4 MILE OR LESS.
FIGURES FOR WIND DIRECTIONS ARE TENS OF DEGREES CLOCKWISE FROM TRUE NORTH. 00 = CALM.
DATA IN COLS. 6 AND 12-15 ARE BASED ON 7 OR MORE OBSERVATIONS PER DAY AT 3-HOUR INTERVALS.
FASTEST MILE WIND SPEEDS ARE FASTEST OBSERVED ONE-MINUTE VALUES WHEN DIRECTIONS ARE IN TENS OF DEGREES. THE / WITH THE DIRECTION INDICATES PEAK GUST SPEED.
ANY ERRORS DETECTED WILL BE CORRECTED AND CHANGES IN SUMMARY DATA WILL BE ANNOTATED IN THE ANNUAL SUMMARY.

SUMMARY BY HOURS

Hour (local time)	Averages: Sky cover (tenths)	Station pressure In.	Temperature Air °F	Wet bulb °F	Dew pt. °F	Relative humidity %	Wind speed M.P.H.	Resultant wind Direction	Speed M.P.H.
01	10	29.55	42	41	39	91	6.2	19	1.2
04	9	29.56	41	40	38	92	6.4	16	1.3
07	9	29.55	40	39	37	91	6.8	16	1.6
10	10	29.58	42	40	39	88	6.9	11	1.0
13	10	29.55	45	43	41	85	7.8	13	.9
16	10	29.53	46	44	41	85	7.8	06	.3
19	10	29.53	43	42	40	90	6.8	03	1.3
22	10	29.54	43	41	40	90	7.1	14	1.5

HOURLY PRECIPITATION (WATER EQUIVALENT IN INCHES)

Date	A.M. 1	2	3	4	5	6	7	8	9	10	11	12	P.M. 1	2	3	4	5	6	7	8	9	10	11	12	Date
1																									1
2		T	T	T	T				T	T	.05	.09	.06	T	.01	T	T	.01	.02	T	.01	.07	T	.01	2
3	T		T	.03	.02	.04	.09	T	.02	.03	.02	.01	.01	T		T		.07	.04	T					3
4												T											T	T	4
5	T	.13	T	T	.03	.20	.16	.04	.10	.24	.29	.50	.39	.18	.12	.06	.10	.12	.05	.30	.03	.03		T	5
6	T	.03	.02	.05		.02	T	.01	T	.01	T	T	T	T											6
7					T	T			T	T	.04	.04	.02	.02	T				T	T					7
8	T	T	.02	.05	.02	.03	.07	.01	.01	.01			T	.01										T	8
9	.04	.02	.04	.02	T	.01			T	T	T						T	T	T	T	T	T	T	T	9
10	T																								10
11												T	.04	.01	.04	.05	.02	.01	.01	.08	.08	.07	T		11
12																				T	T	T	.04	.02	12
13	T	.02	T				T	T	.02	.18	.10	.12	.02				T	.01	.01						13
14	T	.02	T	T	T	T						T	.07	T	.01	.01	.01	T	T			.02	.02	.01	14
15	.04	.02	.01						T	.01										T	.16	.03	.01	T	15
16	.02	.13	.04	.01		T			.01	T	.01	.02	T					T	.04	.09	.04	.12	.17	.08	16
17	T	.01	.02	.01	T	.14	.10	.12	.26	.03	T	T	T	T	T	T									17
18								T	.03	.05	.05	.08	.05	.08	.10	.03	.03	.01	T			.01			18
19		T	T			T	T	.01	.01		.03	.07	.04				T	T							19
20					T	T	T							T	T	T				T	T	T		T	20
21	T				.18	.05	T	T	.02	.01		T	T		.03	.06	.05	.02	.04	T		T	T	.02	21
22	.02		.01					.03	T					.01	.17										22
23																									23
24																									24
25									T		.01	.05	.02	.02	T	T	T	.01	T		T	T			25
26																									26
27																						T	T	T	27
28				.11	.01	T	T	T	T	.01	T	.01	T	T											28
29								T	T	T	T														29
30																						.05	.01		30
31			T	T			T	.01	.01		.02			T	T	.01					T	T			31

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noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA SERVICE

Daniel B. Mitchell
DIRECTOR, NATIONAL CLIMATIC CENTER

USCOMM--NOAA--ASHEVILLE   01/23/78   275

Table I 1978 365-Day Summary of Rainfall, Heating Degree Days and Regime Classifications

DATE	REGIME	HEATING DEGREE DAYS	RAINFALL RECORD # hrs, or 3-hr periods ≥ Various rainfall levels (in.)					
			Hrs ≥ Trace	Hrs ≥ .01	Hrs ≥ .05	3Hrs ≥ Trace	3hrs ≥ .01	3hrs ≥ .05
Jan.								
1		34	0	0	0	0	0	0
2		36	20	9	4	8	5	3
3		25	17	11	2	7	6	2
4		20	3	0	0	2	0	0
5		18	23	19	15	8	8	7
6		20	13	6	1	5	4	1
7		22	11	4	0	5	2	0
8		17	13	9	2	6	5	2
9		21	17	5	0	7	2	0
10		21	1	0	0	1	0	0
11		21	12	10	4	5	4	3
12		23	5	2	0	2	1	0
13		21	13	8	3	6	6	1
14		22	17	8	1	7	4	1
15		21	10	7	1	5	4	1
16		16	17	13	5	8	6	3
17		17	16	8	4	6	4	2
18		24	13	11	6	6	5	2
19		18	11	5	1	6	3	1
20		14	10	0	0	6	0	0
21		18	18	10	4	8	7	2
22		26	6	5	1	3	3	1
23		31	0	0	0	0	0	0
24		28	0	0	0	0	0	0
25		26	12	5	1	6	3	1
26		24	0	0	0	0	0	0
27		19	3	0	0	1	0	0
28		20	11	4	1	4	2	1
29		23	4	0	0	2	0	0
30		22	2	2	1	2	1	1
31		22	11	4	0	8	3	0
			309					

etc. for all 12 months of 1978

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

SUSPENDED PARTICULATE AND BUBBLER BOX SAMPLING SCHEDULE

1978

January		February		March	
Monday	2	Wednesday	1	Friday	3
Sunday	8	Tuesday	7	Thursday	9
Saturday	14	Monday	13	Wednesday	15
Friday	20	Sunday	19	Tuesday	21
Thursday	26	Saturday	25	Monday	27

April		May		June	
Sunday	2	Tuesday	2	Thursday	1
Saturday	8	Monday	8	Wednesday	7
Friday	14	Sunday	14	Tuesday	13
Thursday	20	Saturday	20	Monday	19
Wednesday	26	Friday	26	Sunday	25

July		August		September	
Saturday	1	Sunday	6	Tuesday	5
Friday	7	Saturday	12	Monday	11
Thursday	13	Friday	18	Sunday	17
Wednesday	19	Thursday	24	Saturday	23
Tuesday	25	Wednesday	30	Friday	29
Monday	31				

October		November		December	
Thursday	5	Saturday	4	Monday	4
Wednesday	11	Friday	10	Sunday	10
Tuesday	17	Thursday	16	Saturday	16
Monday	23	Wednesday	22	Friday	22
Sunday	29	Tuesday	28	Thursday	28

Samples are to be taken from midnight to midnight. Samples should be mailed in as soon as possible after they are taken. Every effort should be made to adhere to the schedule; however, if this is not possible a make up date should be taken as soon as possible.

[illegible] Rainfall and Heating Degree Day Summary for
Eugene-Springfield TSP Sampling Days

DATE	REGIME	HEATING DEGREE DAYS	RAINFALL RECORD # hrs, or 3-hr periods ≥ Various rainfall levels (in.) Hrs ≥ Trace	Hrs ≥ Trace	Hrs ≥ .01	Hrs ≥ .05	3Hrs ≥ Trace Days ≥ .01	3hrs ≥ .01	3hrs ≥ .05 (MR (66) On ≥ .01 [illegible])
Jan 2		36	20	9	9	4	~~8~~ ✓	~~8~~ 5	≥ 8
8		17	13	9	9	2	~~6~~ ✓	5	2
14		22	17	8	8	1	✓	4	6/13
20		14	10	0	0	0	0	0	7/1
26		24	0	0	0	0	0	0	7/26
Feb 1		19	19	16	16	10	✓	6	8/12
7		18	16	9	9	5	✓	6	8/24
13		26	1	0	0	0	0	0	8/25
19		20	0	0	0	0	0	0	9/5
25		16	9	0	0	0	0	0	9/11 9/20
Mar 3		21	9	3	3	0	✓	2	10/20
9		20	0	0	0	0	0	0	10/29
15		23	0	0	0	0	0	0	11/4
21		12	0	0	0	0	0	0	
27		11	0	0	0	0	0	0	
Apr 2		20	19	13	13	6	✓	6	
8		19	0	0	0	0	0	0	
14		20	23	17	17	6	✓	7	
20		20	10	3	3	0	✓	2	
26		11	9	6	6	2	✓	2	
May 2		12	0	0	0	0	0	0	
8		9	0	0	0	0	0	0	
14		13	17	15	15	3	✓	6	
20		0	0	0	0	0	0	0	
26		12	12	7	7	0	✓	3	
June 1		1	0	0	0	0	0	0	
7		1	0	0	0	0	0	0	
13		8	4	1	1	0	✓	1	
19		5	0	0	0	0	0	0	
25		7	2	0	0	0	0	0	
Subtotal		457	210	116	116	39		55	

12 days ≥ .01

66
-12
54

Entrainment Days

$\frac{54}{66}(100) = 82\%$ Entrainment

Source: "Local Climatological Data - Monthly Summaries for Eugene, Oregon, 1978, from National Weather Service (Airport site).

DATE	REGIME	Heating Degree Days	Hrs ≥ Trace	Hrs ≥T	Hrs ≥ .01	Hrs. ≥ .05	Days ≥ .01	3hrs ≥ .01
July 1	✓	4	8	6	6	1	✓	4
7		0	0	0	0	0	0	0
13		0	0	0	0	0	0	0
19		0	0	0	0	0	0	0
25		0	0	0	0	0	0	0
31		0	0	0	0	0	0	0
Aug 6		0	0	0	0	0	0	0
12		3	13	2	2	2	✓	2
18		3	0	0	0	0	0	0
24		5	14	9	9	5	✓	4
30		0	0	0	0	0	0	0
Sept 5		8	21	8	8	1	✓	5
11		5	3	3	3	2	✓	2
17		12	12	6	6	1	✓	3
23		0	0	0	0	0	0	0
29		6	0	0	0	0	0	0
Oct. 5		7	0	0	0	0	0	0
11		11	0	0	0	0	0	0
17		7	0	0	0	0	0	0
23		15	0	0	0	0	0	0
29		22	4	3	3	1	✓	2
Nov. 4		18	5	3	3	2	✓	1
10		31	0	0	0	0	0	0
16		15	15	4	4	0	✓	2
22		33	0	0	0	0	0	0
28		15	15	14	14	5	✓	6
Dec. 4		21	15	11	11	5	✓	5
10		18	13	7	7	4	✓	3
16		30	4	2	2	0	✓	1
22		20	7	1	1	0	✓	1
28		36	0	0	0	0	0	0
Subtotal		345	149	79	79	29	27 rain days 61 total days	41
Total		802	359	195	195	68	34 Extreme Days	96
Annual Corr Facts		0.9471	0.755	.867	0.867	0.954	55.74% Ext	

Heating Degree Days (1978) = 5067 ÷ 365 = 13.88219 ; 802 ÷ 61 = 13.14754 ; 13.14754/13.88219 = 0.9471

Rainfall Dust Suppression Factors ① Hrs ≥ Trace = 359 ÷ (61 × 24) = 0.245. Corr = 1.00 − .245 = .75

② Hrs ≥ .01 = 195 ÷ 1464 = 0.1332. Corr = .867

③ Hrs ≥ .05 = 68 ÷ 1464 = .0464. Corr = .954

④ Days ≥ Trace = 30. 30/61 = .492. Corr = .51

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY — INTEROFFICE MEMO

TO: Joe Lassiter

DATE: August 28, 1980

FROM: Bob Gay RLGay

SUBJECT: Modeling Results for Revised Cyclone and Paving Strategies

Summary of Findings

This memo summarizes the changes in estimated 1987 TSP standard exceedances (SIP Design Values), and estimated 1987 benefits from the two "hardest" control strategies - baghouse control of all dry handling cyclones, and paving of the "worst 10 miles" of unpaved roads - brought about by the following two changes to the emissions data base:

1. Substitute a new list of 53 cyclones (340 tons/yr) for the original 5 cyclones (116 tons/year)

2. Assume no increase in VMT on unpaved roads between the Base Year (1978) and Design Year 1987 - i.e., assume "no growth" in unpaved road dust emissions.

These changes affect both the estimated 1987 exceedances, and the estimated TSP reductions (ug/m^3) achievable with each strategy. The distribution of strategy benefits to individual grids is also changed by 2 factors: (1) different distribution, as well as magnitude, of cyclone emissions, and; (2) different distribution of paving benefits, due to a more representative modeling approach to this strategy.

Overall, the two data base changes appear to improve TSP control more in Springfield grids than in Eugene grids. This is because more cyclones are located in Springfield, and because the improved distribution of paving benefits helps Springfield grids at the expense of Eugene grids. There are exceptions to this general trend. Grid by grid evaluation of the major changes is contained in Table V, based on data in Tables IV A and IV B, and other Tables.

Overall, the modeling suggests these two "hard" straegies would make a quite respectable Phase I effort, and allow "softer" strategies, like weatherization, to be prime Phase II SIP targets.

Summary of Tables

The attached tables, containing the modeling data and calculations used in this evaluation, include:

Tables IA - IC: Revised estimates of 1987 exceedances, or TSP SIP Design Values.
Table II: Revised estimate of cyclone control effectiveness.
Table III: Revised estimate of paving strategy effectiveness.
Tables IV A & IV B: Summary of changes in previous model estimates of the following four parameters:

1. 1987 exceedances; or; TSP SIP (Phase I) Design Values
2. Cyclone Strategy Benefits, by key grid.
3. Paving Stragey Benefits, by key grid.
4. Residual 1987 exceedances, after applying both strategies; or, Phase II Design Values.

Table V: Grid by grid explanation of the positive or negativew changes in residual 1987 exceedances (Phase II Design Values), caused by the two data base changes.

Summary of Results

A. Phase I Design Values

1. Estimated 1987 exceedances of the annual average TSP standard decreased by 0.6 - 0.9 ug/m^3 at the Springfield Library and DMV sites, and decreased by 0.8 ug/m^3 at Grid (12.4) and Grid (6.3). (Table IV A, Colume 1)

2. Estimated 1987 exceedances of the 24 hr. average TSP standard ("worst worst case", based on Feb. 18, 1977 meteorology) decreased @ all sitres - except Grid (8,4). Exceedances were eliminated at Library, DMV and Grid (3,4).

B. New Cyclone and Paving Strategy Effectiveness Estimates

1. Predictably, controlling cyclones affords larger reductions in TSP levels than previously modeled, because three times more tons per year are being removed. (See Tables IV A & B, Column 2)

   Distribution of cyclone emissions resulted in a redistribution of cyclone strategy benefits. Grid (11,4) exhibited a reduction in strategy benefits - from 33 ug/m^3 to 27 ug/m^3 while all other changes were increases in strategy benefits, benefitting Springfield grids most.

2. Also predictably, paving strategy reductions in TSP levels are generally lower, because 33% less UPRD emissions are assumed for 1987 - using the 1978-87 "no growth" in UPRD assumption.

A more representative modeling approach caused significant redistribution of paving benefits - such that some Springfield grids actually experience increased paving benefits. Other Springfield sites and all Eugene sites experience the expected decrease in paving benefits. The original modeling approach had not allocated paving benefits strictly to those grids in which actual paving had occurred, or was scheduled to occur. Instead, the case of 100% elimination of all UPRD had been modeled, and then the paving of the 10 worst miles (which accounted for 63% of all UPRD tons/yr) was "scaled" from this, by using a 63% scale factor.

Tables IV A & B (Column 3) show how the redistribution of paving benefits changed the estimated effectiveness (ug/m^3 TSP reduced) of applying this strategy in key grids.

C. Phase II Design Values

Tables IV A and B (Column 4) estimate the combined effect of the cyclone control and paving strategies in reducing the revised estimated 1987 exceedances ("Phase I Design Values"), leaving residual exceedances (Phase II Design Values") to be addressed by Phase II efforts. All Phase II Design Values were lowered (i.e., improved) except Commerce (24 hr. up 47%) and Library (Annual up 6%) and Westmorland (24 hr. up 2%). If other viably "hard" strategies are to be included in Phase I, the Phase II Design Values could be even lower. Moreover, these Phase I reductions look quite respectable by themselves.

Table V ... printed with memo by mistake

D. Summary of the Overall Effects of the Two Data Base Changes

Table V summarizes the "positive" (+) and "negative" (-) changes as compared to the previous modeling results, resulting from the two data base changes.

Table V. Positive (+) and Negative (-) Changes in the Model - Estimated Effectiveness of Applying Cyclone and Paving Strategies to Reduce 1987 TSP Standard Exceedances.

I. Annual Average TSP Reductions

+	Grid (12,4)	Exceedance now fully eliminated, due to a 13% reduction in the estimated exceedance, and increased strategy benefits, mostly from cyclones.
+	Grid (11,4)	Extra 25% reduction in exceedance, due mostly to increased paving benefits, but also to cyclones.

-	Library	6% higher residual exceedance (Phase II Design Value), due to decrease in paving benefits.
-	Grid (6,3)	No longer fully eliminate this exceedance, due to elimination of all paving benefits, and continued lack of cyclone strategy benefits.

II. <u>24 hr. Ave. TSP Reductions - "Worst Worst Case"</u>

+	PNW Bell	Now fully eliminated this (14% lower) exceedance, due mostly to doubling of cyclone control benefits.
+	Grid (3,4)	Previously estimated 1987 exceedance of 16 ug/m^3 is totally eliminated, primarily by the UPRD no no growth assumption, which precluded the large (123 T/yr) UPRD emissions in this grid from growing by 78%, with VMT. And since the paving strategy eliminates 100% of the UPRD in this grid by 1987, a healthy growth cushion is created.
+	Grid (11,4)	Reduced 1987 exceedance is eliminated by a larger margin, despite reduced cyclone strategy benefits, because of enhanced paving benefits. Result: larger growth cushion.
+	Grid (12,4)	Still no exceedance. Increased cyclone control benefits greatly enhance growth cushion (by 21 ug/m^3).
+	Grid (8,5)	Combination of reduced 1987 exceedance, and improved cyclone and paving benefits, creates larger growth cushion, after elimination of the exceedance.
+	DMV	No 1987 exceedance predicted now. Improved cyclone and paving benefits increase growth cushion.
+	Shops	Decreased 1987 exceedance, is further reduced by increased cyclone benefits.
+	Library	No 1987 exceedance now, slight reduction in paving benefits, is more than offset by improved cyclone control benefits. Result: a better growth cushion (16 ug/m^3).
-	Commerce	11% decrease in exceedance and small improvement in cyclone control benefits is offset by a 76% reduction in paving benefits. Net result: a 47% larger residual exceedance (Phase II Design Value (6.42 instead of 4.36 ug/m^3).

-	Westmoreland	1987 exceedance is reduced by 12% and cyclone control benefits are slightly increased, but both are offset by reduced paving benefits. Result is a 12% larger Phase II Design Value.
-	Grid (8,4)	Increased exceedance, plus 80% less paving benefits, increases Phase II Design Value by 60% (11.3 to 18 ug/m^3 residual exceedance).
-	Grid (7,4)	Decreased exceedance by 25% (2 ug/m^3), but also decrease paving benefits by 91%. Result: previously totally eliminated exceedance is now not fully eliminated.
-	Grid (5,4)	A 3 ug/m^3 reduction in this high 1987 exceedance is more than offset by 7 ug/m^3 less paving benefits.
-	Grid (4,5)	This remains the highest exceedance (next to Shops). Although the 1987 exceedance was reduced by 4 ug/m^3, paving benefits were reduced by 5 ug/m^3.

(1) Descriptions refer to Table IV A and IV B data.

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TABLE IA. ANNUAL AVG. TSP - ESTIMATED 1987 COMPLIANCE STATUS

	1978 - 79 Average (1) Annual Avg. TSP (ug/m^3) Arithmetic (Hi Vol)	Geometric (Hi Vol)	1978 - 87 Growth (2) (Arithmetic) (Model)	X Model Correction Factor (3)	= Corrected Growth	X Arithmetic to Geometric Correction Factor (4)	= Growth Corrected to Geometric Mean TSP	1987 Design Value (5) Estimated Annual Geometric Mean TSP	1987 Exceedance of 60 ug/m^3 Standard
	A	B	C	D	E	F	G	H	I
1. Commerce	62.1	51.85	7.15	.962	6.88	.835	5.74	57.59	0
2. Westmoreland	61.05	49.25	4.46	1.0	4.46	.807	3.60	52.85	0
3. So. Eugene	39.75	30.70	2.54	.807	2.05	.772	1.58	32.28	0
4. Oakway	54.4	47.1	4.67	.933	4.36	.865	3.77	50.87	0
5. Library	68.95	59.2	4.93	1.0	4.93	.859	4.23	63.43	3.4
6. Thurston	58.5	48.05	5.28	.80	4.22	.817	3.45	51.50	0
7. DMV	63.95	56.25	4.31	.957	4.12	.880	3.63	59.88	0
8. PNW Bell	79.80	67.4	4.77	1.0	4.77	.845	4.03	71.43	11.4
9 City Shops	88.35	74.35	4.05	1.0	4.05	.842	3.41	77.76	17.8
				('78 Model	+ Background	+ Growth)	X .83 =	1987 Geometric Mean	1987 Exceedance
10. Grid 11,4				43	40	3		71.38	11.4
11. Grid 3, 4				17	40	6		52.29	0
12. Grid 4,5				27	40	4		58.93	0
13. Grid 5,4				21	40	7		56.44	0
14. Grid 6, 3				25	40	8		60.59	0.6
15. Grid 8, 5				24	40	6		58.10	0
16. Grid 8, 4				25	40	5		58.10	0
17. Grid 7, 4				24	40	4		56.44	0
18. Grid 12, 4				34	40	5		65.57	5.6
19. Grid 5, 5				22	40	5		55.61	0

1. Average of 1978 and 1979 HIVOL data.
2. See over, Column C
3. See over, Column G
4. Column B/Column A for HIVOL sites. For grids without HIVOLS, used average for sites 1-8 (0.83).
5. Estimated 1987 annual geometric mean, using long term average (LTA) emissions base and LTA meteorology. For grids without HIVOLS, the 1987 geometric mean was estimated as follows: Base year (1978) model predicted ug/m^3 (using 1977-78 365 day average regime frequencies), plus background of 40 ug/m^3, plus 1978 to 1987 growth (see over, Column C). This total was multiplied by the average Column F Correction Factor for sites 1-8 (0.83) to give geometric mean TSP.

	LTA Model Prediction (1) 1987	− 1978	= Growth		Site Specific Correction Factor 1978 (2) HiVol	÷ 1978 (3) Model	= Correction (4) Factor	Fraction of Local Impacts Predicted by Model
	A	B	C	D	E	F	G	H
1. Commerce	34.27	27.12	7.15		64.4	66.89	.962	104%
2. Westmoreland	18.36	13.90	4.46		6[illegible].0	54.39	1.18	85%
3. So. Eugene	10.91	8.37	2.54		39.2	48.59	.807	124%
4. Oakway	23.20	18.53	4.67		53.7	57.58	.933	107%
5. Library	29.87	24.94	4.93		69.5	64.63	1.075	93%
6. Thurston	35.32	30.04	5.28		55.7	69.50	.80	125%
7. DMV	29.94	25.63	4.31		62.2	64.99	.957	104%
8. PNW Bell	32.42	27.65	4.77		80.0	67.13	1.19	84%
9. City Shops	29.20	25.15	4.05		85.5	64.73	1.32	76%
10. Grid 11, 4	46	43	3					
11. Grid, 3, 4	23	17	6					
12. Grid 4, 5	31	27	4		For Grids without HIVOLS, no model correction factor was estimated.			
13. Grid 5, 4	28	21	7					
14. Grid 6, 3	33	25	8					
15. Grid 8, 5	30	24	6					
16. Grid 8, 4	30	25	5					
17. Grid 7, 4	28	24	4					
18. Grid 12, 4	39	34	5					
19. Grid, 5, 5	27	22	5					

1. 1987 (DEQEBVN) and 1978 (DEQ EB8T)"all sources" model runs used long term average (LTA) emissions rates and meteorology (1977-78 365 day average regime frequencies).
2. Base year (1978) HIVOL data.
3. Background (40 ug/m^3) + 1978 "all sources" model run (DEQGEB8T using 1978 TSP Sample Days regime frequencies.
4. Column E/Column F. Factor can correct model estimates for over/under prediction--vs. a line of slope = 1.0 with intercept at estimated background (40 ug/m^3). In practice, DEQ only corrects for model overprediction.
5. 1.0/Column G.

TABLE 1B "AVERAGE" WORST CASE, 24-HR AVE. TSP - ESTIMATED 1987 COMPLIANCE STATUS

	A Second Highest 1978-79 Ave. (HIVOL) (1)	B 1978-1987 Growth (Model) (2)	x	C Site Specific Correction Factor (4) for Model Prediction	=	D 1978-1987 Growth Corrected	E 1987 Design Value (4) Estimated 1987 24-hr. avg. TSP	F 1987 Exceedance of 150 ug/m3 Standard
1. Commerce	142	13.71		1.0		13.71	155.7	5.7
2. Westmoreland	154	8.75		1.0		8.75	162.8	12.8
3. So. Eugene	96	2.72		1.0		2.72	98.7	0
4. Oakway	136	8.59		1.0		8.59	144.6	0
5. Library	145	7.25		1.0		7.25	152.3	2.3
6. Thurston	130	10.30		1.0		10.30	140.3	0
7. DMV	147	5.87		1.0		5.87	158.9	8.9
8. PNW Bell	(168)	5.33		1.0		5.33	(173.3)	(23.3)
9. City Shops	214	3.77		1.0		3.77	217.8	67.8
		1978 Model +		Background +		Growth =	1987 24 hr TSP	1987 Exceedance
10. Grid 11, 4		57		56		8	121	0
11. Grid 3, 4		36		56		12	104	0
12. Grid 4, 5		51		56		8	115	0
13. Grid 5, 4		44		56		14	114	0
14. Grid 6, 3		45		56		14	115	0
15. Grid 8, 5		44		56		11	111	0
16. Grid 8, 4		46		56		9	111	0
17. Grid 7, 4		42		56		8	106	0
18. Grid 12, 4		40		56		8	104	0
19. Grid 5, 5		40		56		9	105	0

1. Average of second highest HIVOL values for 1978 and 1979.
2. See over, Column C
3. See over, Column G
4. Estimated 1987 second highest 24-hr. TSP concentration, using long term average (LTA) emissions base, and "average worst case" (Regime 7) meteorology. For grids without HIVOLS, estimated 1987, 2nd highest TSP as follows: Base year (1978) model predicted ug/m^3 (Regime 7), plus background (56 ug/m^3) plus 1978 to 1987 growth (see over, Column C).

	LTA Model Prediction[1]				Site Specific Correction Factor			
	1987 -	1978 =	Growth		1978[2] HiVol ÷	1978[3] Model =	Correction[4] Factor	Fraction of Local Impacts[5] Predicted by Model
	A	B	C	D	E	F	G	H
1. Commerce	64.25	50.54	13.71		141	106.54	1.32	76%
2. Westmoreland	35.62	26.87	8.75		158	82.87	1.91	52%
3. So. Eugene	13.24	10.52	2.72		89	66.52	1.34	75%
4. Oakway	39.64	31.05	8.59		119	87.05	1.37	73%
5. Library	52.97	45.72	7.25		142	101.72	1.40	71%
6. Thurston	43.83	33.53	10.30		121	89.53	1.35	74%
7. DMV	57.74	51.87	5.87		136	107.87	1.26	79%
8. PNW Bell	61.76	56.43	5.33		(164)	112.43	1.49	67%
9. City Shops	57.44	53.67	3.77		234	109.67	2.13	47%
10. Grid 11, 4	65	57	8					
11. Grid 3, 4	48	36	12					
12. Grid 4, 5	59	51	8		For Grids without HIVOLS, no model correction factor was estimated.			
13. Grid 5, 4	58	44	14					
14. Grid 6, 3	59	45	14					
15. Grid 8, 5	55	44	11					
16. Grid 8, 4	55	46	9					
17. Grid 7, 4	50	42	8					
18. Grid 12, 4	48	40	8					
19. Grid, 5, 5	49	40	9					

1. 1987 (DEQEBVN) and 1978 (DEQEB8T)"all sources" model runs used long term average (LTA) emission rates and "average worst case" (Regime 7) meteorology.
2. Second highest 24-hr. TSP HIVOL measurement in 1978.
3. Background (56 ug/m^3)+ 1978 "all sources" model (DEQEB8T predicted 24-hr. average TSP using Regime 7. -i.e., Column B+56 ug/m^3
4. Column E/Column F. Factor can correct model estimates for over/under-prediction - vs. a line of slope = 1.0 with intercept at estimated background (56 ug/m^3). In practice, DEQ corrects only for model overprediction.
5. 1.0/Column G.

TABLE I C "WORST" WORST CASE, 24-HR AVE. TSP - ESTIMATED 1987 COMPLIANCE STATUS

	A Second Highest 1978-79 Ave. (HIVOL) (1)	B 1978-1987 Growth (Model) (2) X	C Site Specific Correction Factor (4) for Model Prediction =	D 1978-1987 Growth Corrected	E 1987 Design Value (4) Estimated 1987 24-hr. avg. TSP	F 1987 Exceedance of 150 ug/m3 Standard
1. Commerce	142	17.4	.968	16.84	158.8	8.8
2. Westmoreland	154	12.5	1.0	12.5	166.5	16.5
3. So. Eugene	96	2.4	1.0	2.4	98.4	0
4. Oakway	136	9.7	.95	9.2	145.2	0
5. Library	145	5.9	.816	4.8	149.8	0
6. Thurston	130	10.5	1.0	10.5	140.5	0
7. DMV	147	2.2	.778	1.7	148.7	0
8. PNW Bell	(168)	4.8	.814	3.9	171.9	21.9
9. City Shops	214	3.2	1.0	3.2	217.2	67.2
		1978 Model +	Background +	Growth =	1987 24 hr TSP	1987 Exceedance
10. Grid 11, 4		103	63	11	177	27.0
11. Grid 3, 4		61	63	20	144	0
12. Grid 4, 5		114	63	12	189	39.0
13. Grid 5, 4		88	63	21	172	22.0
14. Grid 6, 3		55	63	22	140	0
15. Grid 8, 5		79	63	9	151	1
16. Grid 8, 4		101	63	6	170	20.0
17. Grid 7, 4		86	63	7	156	6.0
18. Grid 12, 4		72	63	10	145	0
19. Grid 5, 5		68	63	12	143	0

1. Average of second highest HIVOL values for 1978 and 1979
2. See over, Column C
3. See over, Column G
4. Estimated 1987 second highest 24-hr. average TSP level, using long term average (LTA) emissions base, and "worst worst case" meteorology (February 18, 1977). For grids without HIVOLS, estimated 1987 second highest TSP as follows: Base year (1978) model predicted (using February 18, 1977 meteorology), plus background (63 ug/m3), plus 1978 to 1987 growth in TSP (see over, Column C).

	LTA Model Prediction[1] 1987	- 1978	= Growth		Site Specific Correction Factor 1978[2] HiVol	÷ 1978[3] Model	= Correction[4] Factor	Fraction of Local Impacts Predicted by Model
	A	B	C	D	E	F	G	H
1. Commerce	99.99	82.59	17.40		141	145.6	.968	103%
2. Westmoreland	64.16	51.64	12.52		158	114.6	1.38	72%
3. So. Eugene	22.62	20.23	2.39		89	83.2	1.07	.93%
4. Oakway	71.86	62.15	9.71		111	125.2	0.95	105%
5. Library	116.93	111.04	5.89		142	174.0	0.816	123%
6. Thurston	58.45	47.98	10.47		121	111.0	1.09	92%
7. DHV	113.80	111.65	2.15		136	174.7	0.778	129%
8. PNW Bell	143.32	138.51	4.81		(164)	201.5	0.814	123%
9. City Shops	131.43	128.23	3.20		234	191.2	1.22	82%
10. Grid 11, 4	114	103	11		For Grids without HIVOLS, no model correction factor was estimated.			
11. Grid, 3, 4	81	61	20					
12. Grid 4, 5	126	114	12					
13. Grid 5, 4	109	88	21					
14. Grid 6, 3	77	55	22					
15. Grid 8, 5	88	79	9					
16. Grid 8, 4	107	101	6					
17. Grid 7, 4	93	86	7					
18. Grid 12, 4	82	72	10					
19. Grid, 5, 5	80	68	12					

1. 1987 (DEQE EVO) and 1978 (DEQEE85) "all sources" model runs used long term average (LTA) emissions rates and "worst worst case" meteorology (February 18, 1977).
2. Second highest 24-hr. TSP HIVOL measurements in 1978.
3. Background (63 ug/m^3) + 1978 "all sources" model (DEQEE85) predicted 24-hr. average TSP using February 18, 1977 meteorology.
4. Column E/Column F. Factor can correct model estimates for over/under prediction - vs. a line of slope = 1.0 with intercept at estimated TSP background (63 ug/m^3). In practice, DEQ only corrects for model overprediction.
5. 1.0/Column G.

TABLE II

Revised Estimate of Cyclone Strategy Effectiveness

	Annual Average 1987 Exceedances of 60 ug/m^3 Standard	Annual Average All Point Sources (1987)	-	Cyclone Strategy B (10% Opacity)	=	Annual Average[1] Δ ug/m^3 Arithmetic Mean	Geometric Mean	All Point Sources (1987)	-	Cyclone Strategy B	=	"Average Worst Case" 24-hr. Avg[2] Δ ug/m^3	2/18/77 All Point Sources (1987)	-	2/18/77 Cyclone Strategy B	=	"Worst Worst Case" 24-hr. Avg[3] ug/m^3	Worst Case" 1987 150 ug/m^3 24-hour Average Standard
1. Commerce		1.70	-	1.66	=	.04	.03	2.35	-	2.30	=	.05	12.00	-	10.82	=	1.18	8.8
2. Westmoreland		0.98	-	0.92	=	.06	.05	2.07	-	1.91	=	.16	9.85	-	9.23	=	0.62	16.5
3. South Eugene		0.95	-	0.92	=	.03	.02	2.29	-	2.27	=	.02	4.75	-	4.55	=	0.2	0
4. Oakway Mall		2.05	-	1.98	=	.07	.06	2.38	-	2.32	=	.06	10.68	-	8.66	=	2.02	0
5. Library	3.4	3.27	-	3.18	=	.09	.08	5.18	-	4.58	=	.60	44.75	-	34.91	=	9.84	0
6. Thurston		11.60	-	10.19	=	1.41	1.2	7.47	-	6.08	=	1.39	18.38	-	7.80	=	10.58	0
7. DMV	0	2.45	-	2.25	=	.20	.18	4.65	-	3.71	=	0.94	43.57	-	30.31	=	13.26	0
8. PNW Bell	11.4	3.36	-	3.12	=	.24	.20	7.26	-	5.84	=	1.42	62.95	-	46.01	=	16.94	21.9
9. City Shops	17.8	2.95	-	2.66	=	.29	.24	7.40	-	5.83	=	1.57	57.46	-	40.92	=	16.54	
10. Grid 11, 4	11.4	16	-	14	=	2	1.7	14	-	10	=	4	43	-	16	=	27	27.0
11. Grid 3,4		1	-	1	=	0	0	3	-	2	=	1	3	-	4	=	-1	0
12. Grid 4,5		3	-	3	=	0	0	6	-	5	=	1	27	-	24	=	3	39.0
13. Grid 5,4		1	-	1	=	0	0	2	-	2	=	0	14	-	13	=	1	22.0
14. Grid 6,3	0.6	1	-	1	=	0	0	4	-	4	=	0	3	-	2	=	1	0
15. Grid 8,5		1	-	1	=	0	0	1	-	1	=	0	16	-	12	=	4	1.0
16. Grid 8,4		2	-	2	=	0	0	3	-	3	=	0	29	-	22	=	7	20.0
17. Grid 7,4		6	-	6	=	0	0	9	-	9	=	0	27	-	23	=	4	6.0
18. Grid 12,4	5.6	15	-	13	=	2	1.7	12	-	10	=	2	35	-	14	=	21	
19. Grid 5,5		2	-	2	=	0	0	3	-	2	=	1	10	-	6	=	4	0
20. Grid 3,6		0	-	0	=	0	0	0	-	0	=	0	8	-	6	=	2	
21. Grid 9,5		2	-	2	=	0	0	2	-	2	=	0	27	-	20	=	7	

1. DEQEB73 (8-12-80), "EUG87PT2KVDOK" (1977-78 365 day average) minus DEQEB73 "EUGCYC2STRB87" = Arithmetic mean values x (site specific correction factor) = Geometric mean, annual average TSP in ug/m. Revises prior Table IV A in RL Gay memo to Don Arkell dated May 28, 1980.
2. DEQEB73, "EUG87PT2KVDOK" (regime 7), minus DEQEB73, "EUGCYC2STRB87 (regime 7) = 24-hour average TSP..."average worst case" estimate. Revises prior Table IV B.
3. DEQEG72 (8-11-80), "EUG87PT2KVDOK" (Feb. 18, 1977 meteorology), minus DEQEG72, "EUGCYC2STRB87 (Feb. 18, 1977) = 24-hour average TSP..."worst worst case" estimate. Revises prior Table IV C.

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TABLE III

Revised Estimate of Paving (Worst 10 Miles) Strategy Effectiveness

	Revised 1987 Exceedances Annual Avg. of 60 ug/m3 Standard	All Point Sources (1987)	-	Paving Worst 10 Miles	=	Strategy Effectiveness Annual Average[1] Arithmetic Mean		Geometric Mean	All Area Sources (1987)	-	Paving Worst 10 Miles By 1987	=	"Average Worst Case" 24-hr. Avg.[2] ug/m3	All Area Sources (1987)	-	Paving Worst 10 Miles By 1987	=	"Worst Worst Case" 24-hr. Avg.[3] ug/m3	Exc. Worst Worst Case" 24-hour Average TSP
1. Commerce	0	32.92	-	32.35	=	.57	=	.48	62.68	-	61.31	=	1.37	84.86	-	83.67	=	1.19	8.8
2. Westmoreland	0	17.63	-	15.75	=	1.88	=	1.52	34.13	-	31.33	=	2.80	53.22	-	50.00	=	3.22	16.5
3. South Eugene	0	9.98	-	9.39	=	.59	=	.46	11.17	-	10.58	=	0.59	17.62	-	15.91	=	1.71	0
4. Oakway Mall	0	21.29	-	21.11	=	.18	=	.16	37.98	-	37.53	=	0.45	61.20	-	57.56	=	3.64	0
5. Library	3.4	25.94	-	24.77	=	1.17	=	1.01	47.37	-	44.86	=	2.51	69.17	-	62.98	=	6.19	0
6. Thurston	0	23.07	-	18.47	=	4.60	=	3.76	36.62	-	29.77	=	6.85	41.55	-	34.95	=	6.60	0
7. DMV	0	28.25	-	24.35	=	3.90	=	3.43	53.56	-	45.34	=	8.22	71.08	-	59.11	=	11.97	0
8. PNW Bell	11.4	29.44	-	25.97	=	3.47	=	2.93	53.78	-	46.04	=	7.74	78.02	-	66.23	=	11.79	21.9
9. City Shops	17.3	27.17	-	23.39	=	3.78	=	3.18	49.44	-	41.07	=	8.37	72.09	-	60.18	=	11.91	67.2
10. Grid 3,4	0	22	-	13	=	9	=	7.47	46	-	27	=	19	77	-	49	=	28	0
11. Grid 4,5	0	27	-	25	=	2	=	1.67	53	-	49	=	4	97	-	90	=	7	39
12. Grid 5,4	0	28	-	26	=	2	=	1.67	57	-	55	=	2	91	-	87	=	4	22
13. Grid 11,4	11.4	28	-	18	=	10	=	8.3	50	-	31	=	19	68	-	44	=	24	27
14. Grid 8,4	0	27	-	26	=	1	=	0.83	52	-	50	=	2	71	-	70	=	1	0
15. Grid 6,3	0.6	32	-	32	=	0	=	0	54	-	54	=	0	73	-	71	=	2	1
16. Grid 8,5	0	29	-	24	=	5	=	4.15	55	-	45	=	10	71	-	57	=	14	6
17. Grid 7,4	0	21	-	21	=	0	=	0	39	-	38	=	1	66	-	65	=	1	0
18. Grid 9,5	0	20	-	18	=	2	=	1.67	40	-	37	=	3	55	-	48	=	7	0
19. Grid 5,5	0	24	-	23	=	1	=	0.83	47	-	44	=	3	71	-	67	=	4	0
20. Grid 3,6	0	16	-	13	=	3	=	2.49	32	-	27	=	5	63	-	54	=	9	0
21. Grid 12,4	5.6	23	-	16	=	7	=	5.81	36	-	26	=	10	43	-	34	=	9	0

1. DEQEBM2, "EUG87LTATSP2AR"(Cycle 2; 1977-78 365 day average), minus DEQEBM2 "EUG87LTAUPRD2AR2" (Cycle 3)= arithmetic mean TSP x (site specific correction factor) = Geometric mean, annual average TSP. Revises prior Table III A.
2. DEQEBM2, "EUG87LTATSP2AR" (Cycle 2; Regime 7) minus DEQEBM2, "EUG87LTAUPRD2AR2 (Cycle 3; Regime 7) = 24-hour "average worst case" TSP, in ug/m^3. Revises prior Table III B.
3. DEQEBM3, "EUG87L7ATSP2AR" (Cycle 2; Feb. 18, 1977 met.), minus DEQEVO, "EUG87LTAUPRD2AR2 (Cycle 3; Feb. 18, 1977 met) = 24-hour average "worst worst case" TSP. Revises prior Table III C.

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Table IV A

Summary of Revised Versus Original Modeling Results - Annual Average TSP

	Phase I Design Value Estimated Exceedances Original	$+\Delta$ ug/m^3	= Revised	Cyclone Controls Estimated Strategy Gains Original	$+\Delta$ ug/m^3	= Revised	Paving Worst 10 Miles Estimated Strategy Gains Original	$+\Delta$ ug/m^3	= Revised	Phase II Design Value Revised Exceedances	− Cyclone Strategy	− Paving Strategy	= Residual Exceedances
1. Commerce	0		0	0	+ .03	= .03	1.8	− 1.32	= .48	0			0
2. Westmoreland	0		0	.02	+ .03	= .05	2.0	− .48	= 1.52	0			0
3. South Eugene	0		0	.01	+ .01	= .02	1.2	− .74	= .46	0			0
4. Oakway Mall	0		0	.01	+ .05	= .06	1.0	− .84	= .16	0			0
5. Library	4.0	−0.6	= 3.4	.03	+ .05	= .08	1.8	− .79	= 1.01	3.4	− .08	− 1.01	= 2.31
6. Thurston	0		0	.38	+ .82	= 1.2	3.6	+ .16	= 3.76	0			0
7. DMV	0.9	−0.9	= 0	.05	+ .13	= .18	3.3	+ .13	= 3.43	0	− .18	− 3.43	= 0
8. PNW Bell	12.4	−1.0	= 11.4	.05	+ .15	= .20	3.1	− .17	= 2.93	11.4	− .20	− 2.93	= 8.27
9. City Shops	18.8	−1.0	= 17.8	.04	+ .20	= .24	3.3	− .12	= 3.18	17.8	− .24	− 3.18	= 14.38
10. Grid 11,4	11.4	NC	11.4	.83	+ .87	= 1.7	6.3	+ 2.0	= 8.3	11.4	− 1.7	− 8.3	= 1.40
11. Grid 3,4	0		0	0		0	8.9	− 1.43	= 7.47	0			0
12. Grid 4,5	0		0	0		0	3.2	− 1.53	= 1.67	0			0
13. Grid 5,4	0		0	0		0	2.7	− 1.03	= 1.67	0			0
14. Grid 6,3	1.4	−0.8	= 0.6	0		0	2.1	− 2.1	= 0	0.6	− 0	− 0	= 0.6
15. Grid 8,5	0		0	0		0	3.7	+ .45	= 4.15	0			0
16. Grid 8,4	0		0	0		0	2.1	− 1.27	= 0.83	0			0
17. Grid 7,4	0		0	0		0	3.7	− 3.7	= 0	0			0
18. Grid 12,4	6.4	−0.8	= 5.6	0	+ 1.7	= 1.7	5.7	+ .11	= 5.81	5.6	− 1.7	− 5.81	= 0
19. Grid 5,5	0		0			0	2.1	− 1.27	= 0.83	0			0
20. Grid 9,5	0		0			0			1.67	0			0
21. Grid 3,6	0		0			0			2.49	0			0

Table IV B

Summary of Revised Versus Original Modeling Results - 24 Hour TSP "Worst Worst Case"

	Phase I Design Value Estimated Exceedances Original	$+\Delta$ ug/m^3	= Revised	Cyclone Controls Estimated Strategy Gains Original	$+\Delta$ ug/m^3	= Revised	Paving Worst 10 Miles Estimated Strategy Gains Original	$+\Delta$ ug/m^3	= Revised	Phase II Design Value Revised Exceedances	− Cyclone Strategy	− Paving Strategy	= Residual Exceedances
1. Commerce	9.9	−1.1	= 8.00	.44	+ .74	= 1.18	5.1	− 3.9	= 1.2	8.8	− 1.18	− 1.2	= 6.42
2. Westmoreland	18.3	−1.8	= 16.5	.19	+ .43	= .62	5.7	− 2.5	= 3.2	16.5	− .62	− 3.2	= 12.68
3. South Eugene	0		0	.06	+ .14	= .20	2.9	− 1.2	= 1.7	0			0
4. Oakway Mall	0		0	1.16	+ 0.86	= 2.02	4.9	− 1.3	= 3.6	0			0
5. Library	1.8	−1.8	= 0	6.21	+ 3.63	= 9.84	6.6	− 0.4	= 6.2	0	− 9.84	− 6.2	= 0
6. Thurston	0		0	0.74	+ 9.84	= 10.58	4.2	+ 2.4	= 6.6	0			0
7. DMV	1.4	−1.4	= 0	7.22	+ 6.04	= 13.26	10.4	+ 1.6	= 12.0	0	− 13.26	− 12.0	= 0
8. PNW Bell	25.4	−3.5	= 21.9	8.74	+ 8.2	= 16.94	11.2	+ .6	= 11.8	21.9	− 16.94	− 11.8	= 0
9. City Shops	71.1	−3.9	= 67.2	7.81	+ 8.73	= 16.54	11.0	+ .9	= 11.8	17.8	− 16.54	− 11.9	= 38.76
10. Grid 11,4	36	− 9	= 27	33	− 6	= 27	18.3	+ 5.7	= 24	27	− 27	− 24	= 0
11. Grid 3,4	16	−22	= 0	0			31.5	− 3.5	= 28	0			0
12. Grid 4,5	43	− 4	= 39	3			12	− 5	= 7	39	− 3	− 7	= 29
13. Grid 5,4	25	− 3	= 22	1			10.7	− 6.7	= 4	22	− 1	− 4	= 17
14. Grid 6,3	0		0	0	+ 1	= 1	5.7	− 3.7	= 2	0			0
15. Grid 8,5	3	− 2	= 1	2	+ 2	= 4	9.5	+ 4.5	= 14	1	− 4	− 14	= 0
16. Grid 8,4	17	+ 3	= 20	0	+ 1	= 1	5.7	− 4.7	= 1	20	− 1	− 1	= 18
17. Grid 7,4	8	− 2	= 6	2	+ 2	= 4	11.3	− 10.3	= 1	6	− 4	− 1	= 1
18. Grid 12,4	0		0	0	+ 21	= 21			=	0			0
19. Grid 5,5	0		0	0	+ 4	= 4	6.9	− 2.9	= 4	0			0
20. Grid 9,5	0		0	5	+ 2	= 7	6.[illegible]	+ 0.7	= 7	0			0

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STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY — INTEROFFICE MEMO

TO: Don Arkell — DATE: August 29, 1980

FROM: Bob Gay

SUBJECT: Estimated "Background" TSP Levels used in Modeling Effort

Summary of Contents and Conclusions

This memo summarized how estimates of "background" (caused by emission sources outside the AQMA) total suspended particulate (TSP) and background soil dust were arrived at, for use in the modeling effort which supported the TSP SIP preparation. In the SIP analysis, background TSP was added to model predicted TSP (caused by sources inside the AQMA) to estimate total TSP levels as they might be measured at a monitoring site.

1. The TSP background values resulting from this analysis are:

   40 ug/m^3 — Annual average total particulate

   56 ug/m^3 — "Average Worst Case" 24-hour average particulate - to be used with model predicted TSP, using Regime 7 metheorology in the AQMA GRID Model.

   63 ug/m^3 — "Worst Worst Case" 24-hour average particulate - to be used with model predicted TSP, using February 18, 1977 meteorology in the AQMA GRID Model.

2. A total soil dust annual average background level of 15.0 ug/m^3 was also estimated for a May-November data set consisting of 66 sampling days for which chemical mass balance (CMB) data was available.

3. Attachment I contains Base Year (1978) HiVol data, summarized by meteorological regime and by monitoring site, from which the TSP background estimates are derived.

4. Attachment II contains discussions of alternative approaches to estimating background TSP levels, which were not used, but which may have more promise in the long run, because they consider important factors such as particle size.

Purpose of Estimating "Background" Particulate Levels

The AQMA GRID model estimates only the "local" contribution to total suspended particulate (TSP) levels, caused by those emissions sources located within the AQMA which are included in the emissions data base used by the model. The considerable "background" contribution, from all sources outside the AQMA, must also be estimated and added to model-predicted "local" contributions, in order to simulate the overall total particulate levels comparable to (HiVol) monitoring measurements.

Model calibration using chemical mass balance (CMB) also requires estimates of "background" contributions for any source categories specifically estimated by CMB data - e.g., soil dust, auto exhaust, etc. Calibration of the AQMA GRID model relied upon soil dust CMB data almost exclusively, so an estimate of "background" soils dust contributions was needed. Such background soils contributions were subtracted from the total soil dust levels found by CMB analysis @ AQMA monitoring sites, to estimate how much soil dust (ug/m^3) was contributed by local sources - like paved road dust, unpaved road dust or agricultural tilling. Then these dust emissions data bases were adjusted to obtain the best correlation between CMB and model estimates of local dust levels.

Total Particulate Background Estimates

Both annual average and 24-hour average (TSP) background level estimates were needed. Two 24-hour cases were eventually formulated: (1) a "worst worst" case, based on meteorology from the best characterized TSP standard violation day (February 18, 1977), and (2) an "average worst" case, based on the combined frequencies of two GRID model meteorological regimes (Regimes 7 and 9) which produced the highest 24-hour average TSP levels among the model's 13 wind regimes. The latter represented "worst" case conditions averaged over a collection of days, some of which had fairly low TSP levels.

To estimate TSP background, the approach used was to average TSP levels from three monitoring sites located on the perimeter of the AQMA. These were considered to be most representative of the influx of TSP from sources outside the AQMA. The three sites were: Coburg, Eugene Airport (Mahlon-Sweet) and Creswell. Base Year (1978) monitoring data was used, from the regular TSP sampling schedule (HiVol each 6th day). This data is summarized, by monitoring site and meteorological regime, in Attachment 1.

I. The resulting background TSP estimates were:

40 ug/m^3	Annual average TSP levels
56 ug/m^3	24-hour "Average Worst Case" (Regime 7 and 9) TSP levels
63 ug/m^3	24-hour "Worst Worst Case" (February 18, 1977) TSP levels

Table I summarizes the HiVol data for the three sites (from Attachment I). The calculated value of 37.6 ug/m^3 annual average TSP (average of the three sites) was not used. Instead a higher value of 40.0 ug/m^3 was used. This can be justified in several ways. First, missing data at all three sites occurred on some days with relatively high TSP levels (e.g., 11/22, 10/17, 7/19, 7/13, 9/23, 12/16), which would tend to make the overall average TSP levels too low. Second, a background value closer to the Coburg value (40.7 ug/m^3) is justifiable, since this site may be the "truest background site" of the three, because of its geographic location in the path of the most frequent northerly and northwesterly winds.

For the "average worst case" 24-hour average TSP background estimate, the actual value calculated in Table I (56 ug/m^3) was used. This three-site average was not adjusted for several reasons. First, the missing data from the seven (7) Regime 7 and Regime 9 days was from days with relatively <u>lower</u> TSP than the other days in this subset (7/13, 9/23). Second, while adjustment upward could be justified to bring the average closer to Coburg's average (64.7 ug/m^3), this would have raised the "average worst use" background TSP level to the "worst worst case" TSP level of 63 ug/m^3 (February 18, 1977), shown in Table II. The latter had worse overall TSP air quality than any of the seven Regime 7 and 9 days.

<u>Total Dust Background Estimates</u>

Only annual average background dust estimates were needed. The model was calibrated on a data set of 66 CMB sample days, during May-November 1978. The CMB results obtained by averaging the data for all 66 sampling days is summarized in Table III. Column 4 shows that the total dust levels at Eugene (Commerce) and Springfield (Library) sites were 24.45 ug/m^3 and 37.63 ug/m^3 respectively.

The contribution to these observed total dust levels from sources outside the AQMA was estimated to be approximately 15.0 ug/m^3. This was the level observed at a truly remote background station (Carus), and is consistent with the lower values observed at other outlying monitoring sites (e.g., Creswell at 14.25 ug/m^3, and Corvallis, at 14.08 ug/m^3).

The 66 CMB days were a "pseudo-annual average" data set, because they covered only May-November, 1978. However, the basic assumptions used to adjust the emissions data base for soil dust sources to represent this May-November time period - e.g., the road dust reentrainment factor based on rainfall and the road dust emission factors - were the same ones subsequently used with the separate data set of (61) 1978 TSP Sample Days, to effect final model calibration. On a twelve month basis, both the total dust and background dust levels observed could be expected to be lower than shown in Table III, because the May-November period should have less rainfall than the year round average. No 12 month CMB data set existed when this work was done.

Other Approaches to Estimate Background TSP

Several other approaches were considered for estimating background TSP and background soil dust levels. They were prompted by the assumption that it might be more reasonable to assume that only a fraction of the TSP or total dust observed at background sites could, in effect, drift all the way into the AQMA. The larger particle size particulate should settle out before traveling far from its source. This should result in lower background TSP and background soils estimates at sites inside the AQMA. This should be especially true for soils, which have a higher percentage of "coarse" particles ($>$15-20 microns in diameter) than "fine" particles ($<$15-20 microns).

Attachment II contains two memos which summarize data and analyses used to consider alternative background estimates. Some of these approaches have great promise, but were not used in the TSP SIP work because of (1) lack of time to develop an acceptable, consistent approach, and; (2) lack of key data, including CMB data, for certain key sites on key days. These alternative approaches should be reevaluated, as more time and additional CMB date becomes available.

TABLE I

Background TSP Levels

(61) 1978 TSP Sampling Days

Regime	Coburg		Airport		Creswell	
No.	No. of Days	HiVol (Ave.)	No. of Days	HiVol (Ave.)	No. of Days	HiVol (Ave.)
1	14	47.36	16	53.44	15	51.0
2	3	57.33	5	33.6	5	31.6
3	10	16.9	11	13.55	9	12.44
4	1	17.0	1	19.0	1	16.0
5	1	13.0	2	21.0	2	17.5
6	4	33.25	4	24.75	4	20.5
7	3	65.0	3	58.67	3	39.33
8	0	--	0	--	0	--
9	3	64.33	4	57.0	3	52.33
10	0	--	2	49.0	1	46.0
11	6	52.33	7	47.43	7	38.71
12	0	--	0	--	0	--
13	3	27.67	4	16.25	5	23.4
Total:	48	1952	59	2231	55	1877
Average:	--	40.7	--	37.82	--	34.13

- Annual Average of Coburg, Airport, and Creswell $= \frac{40.7+37.82+34.13}{3} = \underline{37.6\ ug/m^3}$

- 24-hour "Average Worst Case" TSP average of Coburg, Airport, and Creswell:

$$\left[\frac{(3x65.0)+(3x64.33)}{6} + \frac{(3x58.67)+(4x57.0)}{7} + \frac{(3x39.33)+(3x52.33)}{6}\right] \div 3 = \underline{56.07\ ug/m^3}$$

TABLE II

Monitored TSP Levels - February 18, 1977

Monitoring Site	HiVol (ug/m^3)
Commerce	180
West Moreland	150
Oakway	92
So. Eugene (Edgewood)	66
Library	159
Thurston	85
DMV	117
PNW Bell	---
City Shops	174
..........(Background Sites)..........	
Coburg	63
Airport	59
Creswell	67

24-hour "Worst Worst Case" TSP Average of Coburg, Airport, and Creswell:

$$\frac{63 + 59 + 67}{3} = \underline{63.0\ ug/m^3}$$

TABLE III

Total Suspended Particulate CMB Site Averages
May to November, - 1978
(micrograms per cubic meter)

ITE	TOTAL MEASURED	MARINE	DUST	AUTO EXHAUST	RESIDUAL OIL	BIOGENIC SOURCES (2)	VEG. (3) BURNING	KRAFT PROCESS	SECONDARY NITRATE	SECONDARY SULFATE	RESIDUAL CARBON	CALC. MASS	%OF MASS ACCOUNTED FOR (1)
arus	28.6	0.40	15.00	0.65	0.30	2.68	8.59	1.40	1.07	1.34		31.4	109
alem	41.0		21.81	2.00	0.50	6.94	7.10	1.90		0.57	3.28	43.5	106
orvallis	28.4	0.29	14.08.	0.77	0.42	4.09	6.90	2.62		0.45	2.55	32.1	113
ebanon	43.2	0.52	24.46	1.00	0.51	8.77	9.84	2.50			3.87	50.9	117
alsey	39.9		25.85	0.75	0.44	1.40	11.53	2.82	1.20			43.9	110
unction City	41.5	0.37	24.59	0.65	0.59	5.51	10.89	1.85	0.06	0.39		44.9	108
oburg	40.3	0.33	25.80	0.81	0.32	8.48	11.72	1.45	0.10	0.70		49.2	122
[redacted]	[redacted]	0.44	[redacted]	[redacted]	0.45	7.79	[redacted]	[redacted]		1.00		61.6	[redacted]
[redacted]	[redacted]		[redacted]	[redacted]	0.49	6.76	[redacted]	[redacted]			3.18	60.1	[redacted]
reswell	30.6		14.25.	0.73	0.27	4.23	8.97	2.28			3.22	34.1	111
etwork Ave.	41.5	0.24	22.79	1.33	0.42	5.65	11.05	2.21	0.24	0.45	1.61	45.9	110 ±
ercent of easured mass		0.5%	54.9%	3.20%	1.0%	13.6%	26.5%	5.3%	0.5%	1.0%	3.8%		

1) Other source contributions less than 0.5 ug/m^3.
2) Estimated biogenic sources coarse impact, table 5.
3) Fine plus coarse impact estimate.

Source. From "Field Burning - A Review of Air Quality in Oregon's Willamette Valley" published by DEQ in January, 1980.

ATTACHMENT I

SUMMARY OF BASE YEAR (1978) HiVOL DATA, BY REGIME
AND BY
MONITORING SITE, FOR ALL (61) TSP SAMPLING DAYS
(HiVOL EACH 6TH DAY)

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 1 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
Jan. 2	38	45	42	41	42	48	44	46	47	30	25	33
Jan. 14	45	52	41	40	40	50	41	43	50	28	20	33
Jan. 26	86	70	46	47	67	60	67	67	59	30	30	33
March 3	80	64	52	40	69	83	62	71	55	31	28	43
May 8	—	113	—	64	110	107	88	132	117	52	76	61
June 1	97	149	66	76	110	121	90	—	110	48	68	69
June 19	76	78	58	64	84	79	70	118	60	64	89	49
July 7	64	60	41	41	54	74	51	76	43	41	37	—
July 19	83	85	63	69	95	72	82	106	90	—	81	50
July 31	99	100	71	85	88	94	80	111	80	75	—	54
August 6	99	70	64	57	66	81	61	76	57	59	68	47
Sept. 5	—	22	—	20	21	27	23	25	22	14	15	12
Sept. 17	20	13	9	—	—	19	26	32	24	—	7	—
Oct. 5	114	124	81	92	—	80	116	142	142	84	105	58
Oct. 17	125	132	89	111	110	119	113	143	113	—	94	110
Nov. 4	65	64	37	51	42	36	40	56	58	19	14	17
Nov. 10	161	135	125	121	117	114	136	188	171	88	98	96
TOTAL	1252	1376	885	1019	1115	1264	1190	1432	1298	663	855	765
Average	83.47	80.94	59.0	63.69	74.33	74.35	70.0	89.5	76.35	47.36	53.44	51.0
Range(Lo-Hi)												
Avg. TSP <15 μ												
Avg. Dust ≤15 μ												
Ann. Mean (Arith)												
(Geom.)												

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 2 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
April 8	72	73	31	49	80	41	61	72	75	28	18	28
April 14	34	43	20	23	36	33	32	41	–	–	7	15
May 2	64	49	22	37	79	41	53	101	77	–	26	22
June 7	61	91	–	55	86	96	77	–	124	65	59	46
October 11	81	101	68	90	100	71	87	125	101	79	58	47
TOTAL	312	357	141	254	381	282	310	339	377	172	168	158
Average	62.4	71.4	35.25	50.8	76.2	56.4	62	84.75	94.25	57.33	33.6	31.6
Range(Lo-Hi)												
Avg. TSP <15 μ												
Avg.Dust ≤15 μ												
Ann.Mean (Arith)												
(Geom.)												

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 3 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
Feb. 1	14	12	7	24	17	–	23	25	28	12	10	13
Feb. 7	16	13	7	27	28	13	35	31	35	14	7	9
Feb. 25	23	27	9	33	52	26	45	56	58	16	11	14
April 20	29	28	9	29	43	22	30	74	54	18	42	15
April 26	33	22	12	22	51	33	33	58	38	14	10	10
May 14	–	21	14	26	14	19	20	24	28	7	10	11
May 26	19	20	7	27	17	16	30	–	52	14	14	12
August 12	20	18	14	19	23	26	31	23	28	20	10	9
August 30	27	26	20	30	42	47	39	67	78	36	16	19
Dec. 4	35	37	17	48	53	27	46	35	43	–	7	–
Dec. 22	32	21	13	41	43	18	59	27	74	18	12	–
TOTAL	248	245	129	326	383	247	391	420	516	169	149	112
Average	24.8	22.27	11.73	29.64	34.82	24.7	35.55	42.0	46.91	16.9	13.55	12.44
Range(Lo-Hi)												
Avg. TSP <15 μ												
Avg. Dust ≤15 μ												
Ann. Mean (Arith)												
(Geom.)												

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 4 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
June 13	25	26	13	25	43	22	35	59	41	17	19	16
TOTAL	25	26	13	25	43	22	35	59	41	17	19	16
Average	25	26	13	25	43	22	35	59	41	17	19	16
Range(Lo-Hi)												
Avg. TSP <15 μ												
Avg. Dust ≤15 μ												
Ann. Mean (Arith)												
(Geom.)												

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 5 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
Oct. 29	27	39	22	-	21	9	22	18	27	13	4	11
Dec. 16	64	74	37	60	68	50	78	-	79	-	38	24
TOTAL	91	113	59	60	89	59	100	18	106	13	42	35
Average	45.5	56.5	29.5	60	44.5	29.5	50	18	53	13	21	17.5
Range(Lo-Hi)												
Avg. TSP <15 μ												
Avg. Dust <15 μ												
Ann. Mean(Arith)												
(Geom.)												

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 6 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
March 9	-	88	39	46	85	50	58	112	64	32	24	30
June 25	23	-	14	26	29	22	26	35	30	17	11	18
August 18	68	43	30	5	-	52	-	67	63	57	47	15
Sept. 11	42	35	19	31	41	26	41	48	41	27	17	19
TOTAL	133	166	102	108	155	150	125	262	198	133	99	82
Average	44.33	55.33	25.5	27.0	51.67	37.5	41.67	65.5	49.5	33.25	24.75	20.5
Range(Lo-Hi)												
Avg. TSP <15 μ												
Avg.Dust ≤15 μ												
Ann.Mean (Arith)												
(Geom.)												

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 7 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
July 1	30	32	18	25	32	41	33	29	27	22	13	15
July 25	129	92	68	97	110	108	100	134	122	91	64	49
Sept. 29	109	126	85	101	110	110	111	195	137	82	99	54
TOTAL	268	250	171	223	252	259	244	358	286	195	176	118
Average	89.33	83.33	57.0	74.33	84.0	86.33	81.33	119.33	95.33	65.0	58.67	39.33
Range(Lo-Hi)												
Avg. TSP <15 μ												
Avg. Dust ≤15 μ												
Ann. Mean (Arith)												
(Geom.)												

Regime 7/9

Commerce	Westmorland	S. Eugene	Oakway	Library	Thurston	DMV	Bell
268	250	171	223	252	259	244	
450	465	260	320	512	353	385	
7⌊718	7⌊715	7⌊431	7⌊543	7⌊764	7⌊612	7⌊629	
102.6	102.6	61.6	77.6	109.1	87.4	89.9	

ave.(2) = 64.67
57.71
2⌊122.38
61.19

ave.(3) = 122.38
45.83
3⌊168.21
56.07

"Regime 7/9"

Regime 7	Coburg	Airport	Creswell
7-1	22	13	15
7-25	91	64	49
9-29	82	99	54
Regime 9			
2-13	38	34	50
3-13	45	57	56
7-13	110	69	—
9-23	—	68	51
7 days	64.67	57.71	45.83

A-456

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 9 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
Feb 13	140	110	68	71	120	63	89	157	90	38	34	50
March 15	139	173	64	76	142	107	101	234	132	45	57	56
July 13	101	105	76	97	130	105	113	140	112	110	69	–
Sept. 23	70	77	52	76	120	78	82	127	97	–	68	51
TOTAL	450	465	260	320	512	353	385	658	431	193	228	157
Average	112.5	116.25	65.0	80.0	128	88.25	96.25	164.5	107.75	64.33	57.0	52.33
Range(Lo-Hi)												
Avg. TSP <15 μ												
Avg. Dust ≤15 μ												
Ann. Mean (Arith)												
(Geom.)												

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 10 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
Nov. 22	140	147	81	119	123	86	126	134	91	-	80	46
Nov. 28	36	23	11	41	40	16	52	63	45	-	18	-
TOTAL	176	170	92	160	163	102	178	197	136	-	98	46
Average	88.0	85.0	46.0	80.0	81.5	51.0	89.0	98.5	68.0	-	49.0	46
Range(Lo-Hi)												
Avg. TSP <15 µ												
Avg. Dust ≤15 µ												
Ann. Mean (Arith)												
(Geom.)												

A-458

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: II Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
Jan. 8	57	61	47	48	44	28	31	53	52	-	30	35
Feb. 19	65	51	35	40	63	44	50	62	63	25	24	27
March 21	141	-	68	99	168	141	152	291	148	78	63	57
March 27	71	63	35	52	116	58	76	104	92	36	33	39
May 20	59	59	31	52	63	60	57	75	75	47	43	30
October 23	128	158	67	109	137	109	121	129	141	102	80	59
Dec. 28	60	59	37	38	67	52	58	89	74	26	59	24
TOTAL	581	451	320	438	658	492	545	803	645	314	332	271
Average	83.0	75.17	45.71	62.57	94.0	70.29	77.86	114.7	92.14	52.33	47.43	38.71
Range(Lo-Hi)												
Avg. TSP ≤15 μ												
Avg. Dust ≤15 μ												
Ann. Mean(...th) (Geom.)												

TABLE (61) 1978 TSP SAMPLE DAYS, BY REGIME, AND BACKGROUND TSP CALCULATIONS

Regime: 13 Date	Commerce	West-Moreland	South Eugene	Oakway Mall	Library	Thurston	DMV	City Shops	28th &C	Coburg	Airport	Creswell
Jan. 20	36	42	-	51	68	22	50	63	81	37	24	26
April 2	17	23	10	20	21	14	18	17	19	10	7	21
August 24	20	19	11	23	32	15	27	51	35	-	14	18
Nov. 16	65	48	27	79	97	43	80	113	97	36	-	34
Dec. 10	25	24	12	40	38	16	53	31	34	-	20	18
TOTAL	163	156	60	213	256	110	228	275	266	83	65	117
Average	32.6	31.2	15.0	42.6	51.2	22.0	45.6	55.0	53.2	27.67	16.25	23.4
Range(Lo-Hi)												
Avg. TSP <15 μ												
Avg.Dust ≤15 μ												
Ann.Mean(Arith)												
(Geom.)												

ATTACHMENT II

OTHER APPROACHES TO ESTIMATING
BACKGROUND PARTICULATE AND BACKGROUND DUST LEVELS
FOR THE EUGENE-SPRINGFIELD AIR QUALITY MAINTENANCE AREA

1. February, 1980 memo entitled "Eugene-Springfield AQMA Background Analysis", from J. E. Core to R. L. Gay

2. March 14, 1980 memo entitled "Eugene-Springfield AQMA TSP Background Analysis", from J. E. Core to R. L. Gay

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMO

TO: R. L. Gay DATE: February, 1980

FROM: JEC

SUBJECT: Eugene-Springfield AQMA Background Analysis.

An analysis of monitoring data was undertaken to identify the background TSP under Regime 1, 3 and annual means to facilitate model calibration.

Regime 1

The following HV data was tabulated for Regime 1 days included in the "CMB" data base for dates listed:

Regime 1 Special Days, ug/m^3

Date	Junction City	Coburg	Airport	Halsey
6/19/78	67 (3.0)*	64 (3.8)	89	65 (8.1)
7/7/78	45 (-)	41 (-)	37	43 (202)
7/11	38 (27.0)	51 (3.1)	35	45 (-)
8/2	96 (15.8)	107 (17.4)	107	86 (22.9)
8/3	90 (32.4)	134 (17.8)	129	99 (31.2)
8/6	53 (10.3)	59 (12.4)	68	73 (11.6)
8/7	110 (11.6)	137 (17.8)	31	169 (15.9)
8/9	69 (18.4)	120 (19.2)	89	120 (20.1)
Average	71 (16.9)	89 (13.0)	73	87 (18.6)

*(SFU fine mass < 2 microns)

The data suggests that the background TSP measured at Coburg may be on the "high side". About 14% of the HV-TSP is in the fine mass compared to 21% at Halsey and 24% at Junction City, suggesting more coarse mass at Coburg. Silicon levels at Junction City, Coberg, and Halsey for these days are shown below.

Regime 1 Soils Estimate, 1978

Date	Junction City Si	Junction City Soil	Junction City %LV	Coburg Si	Coburg Soil	Coburg %LV	Halsey Si	Halsey Soil	Halsey %LV
6/19	5.05	14.4	23.4	4.42	12.6	35.7	15.90	45.3	78.6
7/7	--	--	--	2.29	6.5	26.1	3.27	9.3	29.2
7/11	9.35	26.6	27.9	5.70	16.2	44.5	--	--	--
8/2	13.76	39.2	49.0	11.75	33.4	42.0	5.49	15.6	25.2
8/3	9.76	27.8	32.8	17.26	49.1	49.6	13.18	37.5	47.9
8/6	6.18	17.6	46.7	7.10	20.2	54.6	12.27	34.9	72.8
8/7	14.09	39.9	41.0	22.74	64.6	61.6	44.49	126.7	93.0
8/9	10.27	29.3	57.5	18.6	53.0	57.0	22.1	62.9	75.3
Average		27.8	39.7		31.9	46.3		47.4	59.8

Soil = Si x 3.5
%LV = (Si x 3.5)/Low-vol ug/m^3

Since (a) the background particulate transported into the AQMA is probably less than the total measured on the Hi-Vol, and greater than that mass less than 2 microns in size (SFU, fine fraction) measured at Coburg, (b) the Coburg data represents a "middle ground" estimate of background soils, and; (c) an estimate of the particulate mass < 15 microns can be made given available relationships, the best estimate of background has been estimated by using the following assumptions:

(1) the ug/m^3 of inhalable particulate (IP) $\leq$15 microns in size, derived from Coburg HV data is as follows: ug/m^3 IP = 0.36(89) + 7.9 or 39.9 ug/m^3. The 1978 annual Coburg IP mass (Coburg Arith. mean = 41.5 ug/m^3 is estimated to be 22.8 ug/m^3, as follows: .36 (41.5) + 7.9 = 22.8 ug/m^3.

(2) the percent of soil within the IP fraction estimated from the following:

Average Si in <15 microns TSP = 1.86 x 3.6 = 6.6 ug/m^3 soil
Average mass <15 microns = 28.7 ug/m^3
% soil in 15 microns mass = 6.6/28.7 or 22.9%

Regime 1 background

TSP mass <15 microns = 39.9 ug/m^3
TSP mass <15 microns, soil only = 22.9% of 39.9 ug/m^3 = 9.1 ug/m^3

RLG:b
AB397.B

ABLE III

Total Suspended Particulate CMB Site Averages
May to November, 1978
(micrograms per cubic meter)

SITE	TOTAL MEASURED	MARINE	DUST	AUTO EXHAUST	RESIDUAL OIL	BIOGENIC SOURCES (2)	VEG. (3) BURNING	KRAFT PROCESS	SECONDARY NITRATE	SECONDARY SULFATE	RESIDUAL CARBON	CALC. MASS	% OF MASS ACCOUNTED FOR (1)
Carus	28.6	0.40	15.00	0.65	0.30	2.68	8.59	1.40	1.07	1.34		31.4	109
Salem	41.0		21.81	2.00	0.50	6.94	7.10	1.90		0.57	3.28	43.5	106
Corvallis	28.4	0.29	14.08	0.77	0.42	4.09	6.90	2.62		0.45	2.55	32.1	113
Lebanon	43.2	0.52	24.46	1.00	0.51	8.77	9.84	2.50		0.45	3.87	50.9	117
Halsey	39.9		25.85	0.75	0.44	1.40	11.53	2.82	1.20			43.9	110
Junction City	41.5	0.37	24.59	0.65	0.59	5.51	10.89	1.85	0.06	0.39		44.9	108
Coburg	40.3	0.33	25.80	0.81	0.32	8.48	11.72	1.45	0.10	0.70		49.2	122
Eugene	54.5	0.44	24.45	2.98	0.45	7.79	20.63	2.97		1.00		61.6	112
Springfield	67.3		37.63	2.94	0.49	6.76	14.20	2.34			3.18	68.1	101
Creswell	30.6		14.25	0.73	0.27	4.23	8.97	2.28			3.22	34.1	111
Network Ave.	41.5	0.24	22.79	1.33	0.42	5.65	11.05	2.21	0.24	0.45	1.61	45.9	110 ±
Percent of measured mass		0.5%	54.9%	3.20%	1.0%	13.6%	26.5%	5.3%	0.5%	1.0%	3.8%		

(1) Other source contributions less than 0.5 ug/m^3.
(2) Estimated biogenic sources coarse impact, Table 5.
(3) Fine plus coarse impact estimate.

Source: From "Field Burning - A Review of Air Quality in Oregon's Willamette Valley" published by DEQ in January, 1980.

RLG:b
AB397.A

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY — INTEROFFICE MEMO

TO: R. L. Gay
Eugene-Springfield AQMA Coordinator

DATE: March 14, 1980

FROM: J. E. Core

SUBJECT: Eugene-Springfield AQMA TSP Background Analysis

Early attempts to identify the TSP background north of the AQMA during Regime 1 (north wind flow) summer periods indicated that the background TSP would account for as much as 90 percent of the particulate measured in downtown Eugene. Investigation into possible fugitive dust sources in close proximity to the Coburg monitoring site failed to identify any obvious sources likely to bias the data. Comparisons of simultaneous measurements taken during the 1978 field burning studies at the Eugene airport site, Coburg, Junction City, and Halsey on eight Regime 1 days indicated TSP levels of 73, 89, 71, and 87 respectively. Since Coburg is the only site directly north of the AQMA, it is the logical choice as a Regime 1 background site even though it is somewhat higher than the other sites. Information from LRAPA suggest the airport-Coburg sites are well correlated suggesting that neither one is greatly bias by nearby fugitives.

Given the problem with assuming that all of the HV-TSP background mass is transported into the AQMA from Coburg, efforts were directed toward developing a background value for smaller particle more likely to be transported into the center of the AQMA. Possible approaches included use of the particle mass less than 2 or 15 microns since data from these two size cuts is available for the valley. No single, clear cut point can be easily established on the basis of available information because it is a function~~ing~~ of wind speed, turbulence, particle density, and other factors. Work by Suck, et al.*, in Arizona compares dry deposition rate model results for 20 μ particles to hi-vol mass measurements at 10 meters and obtained (what the investigators believed to be) reasonable results. On this basis, attention was turned to identifying (a) the background mass less than 15-20 μ and (b) the soil component less than 15-20 μ in size.

1. Identification of Background Mass Less Than 15 μ

Two approaches may be used to identify the background mass less than 15-20 μ in size:

Option 1-1: Direct application of SFU fine and total mass measurements at Coburg. For Regime 1 days (6/19, 7/7, 7/11, 8/2, 8/3, 8/16, 8/17, and 8/19, 1978) the average mass less than about 20 μ is 48.8 $\mu g/m^3$.

* S. H. SUCK, et al., "Dust Transport in Maricopa County, Arizona," Atmospheric Environment, Volume 12, pp 2265-2271.

Option 1-2: Derivation of the mass of TSP < 15 u in size thru use of the hi-vol TSP vs. virtual impactor mass relationship from the attached scattergram mass < 15 u = 0.36 (hi-vol mass) + 7.9. The average Coburg mass for the eight Regime 1 days is 89 ug/m^3, therefore the estimated mass < 15 u is 0.36 $\pm$ .02 (89) + 7.9 $\pm$ 1.8 or 36 - 43 ug/m^3. This value should be less than estimate (1-1) since it is for a smaller particle size class and is based on an assumed "average case" TSP-15 u mass relationship. The most appropriate would be to use measured data whenever possible as in option "1-1."

2. Estimates of the Soil Background Less Than 15-20 u

Since no virtual impactor data is available for Coburg and only SFU fine filters were chemically analyzed, soil estimates must be based on established, average case relationships developed from data taken at other monitoring sites for which virtual impactor fine and coarse particle silicon data is available. Since the eight Regime 1 days used for model calibration may not be typical cases, a separate investigation of these days are discussed below. Two approaches are possible:

Option 2-1: (1) Estimate the particulate mass < 15 u in size from the HV TSP mass-15 u mass scattergram relationship noted above. (2) Assume that the average percentage of soil within the mass < 15 u is 31.5 percent (from summary statistics of field burning study data, all sites, see Table 1).

For Regime 1, eight days the estimated mass < 15 u (see above) ranges from 36 to 43 ug/m^3 or averages 39.5 ug/m^3, thereby providing an estimate of (39.5 ug/m^3)(.315), of 12.4 ug/m^3 soil.

Option 2-2: (1) Estimate the percent TSP silicon typically found in the fraction < 15 u by (a) factoring the average Si concentration < 15 u (1.86 ug/m) by 3.6 (assumes 27.7 percent of soil is Si) to arrive at a value of 6.6 ug/m^3 of soil (b) assuming an average mass < 15 u of 28.7 ug/m^3 (see attached Table 1). This provides an estimate of the average percent of soil in the mass $\leq$15 u of (6.6/28.7) 22.9 percent. If the mass < 15 u is known (or estimated by option 1-2 above) a background value can be obtained.

For Regime 1 days, the estimated mass < 15 u is 39.9 ug/m^3 x 22.9 percent or 9.1 ug/m^3.

Preliminary model calibration efforts, directed toward comparing model predicted dust components utilize eight selected, Regime 1 days which, because of the time of year, concurrent agricultural operations and their observed "dusty" nature, may not be typical cases appropriate for background analysis thru the above mechanisms. To explore this potential problem further, an attempt has been made to compare the percent of silicon found in the fraction < 15 u relative to the total silicon measured on the low-vol sampler for different regimes. No data is available for Coburg. Instead, Halsey and Lebanon data was reviewed. The results are sumerized below in Table 2. No data is available from any site during the eight days modeled.

Table 2

Percent of Silicon < 15 u
(Relative to Low-Vol Silicon)
July 1 - November 15, 1978

Regime	N	Average	Range	Dates (1978)
1	3	4.6%	34-55%	8/1, 8/2, 8/9
3	6	23.1%	10-46%	9/1, 8/31, 9/20, 9/21, 9/22, 9/26
5	2	19.5%	16-22%	8/25, 9/2
6	1	40.8%	-	9/28
7	4	28.6%	17-45%	9/24, 9/25, 9/29, 10/25
8	1	17.3%	-	8/29
11	5	42.0%	35-53%	7/22, 8/17, 8/26, 10/10, 10/23

Considering the lack of data, there appears to be an inadequate basis to determine appropriate soil correction factors for Regime 1 (or other regimes).

Summary

Option 1-1

Background Mass 1 = SFU Fi~~r~~ne Mass + SFU Course Mass

Option 1-2

Background Mass 2 = 0.36 (HV Average Mass) + 7.9

Option 2-1

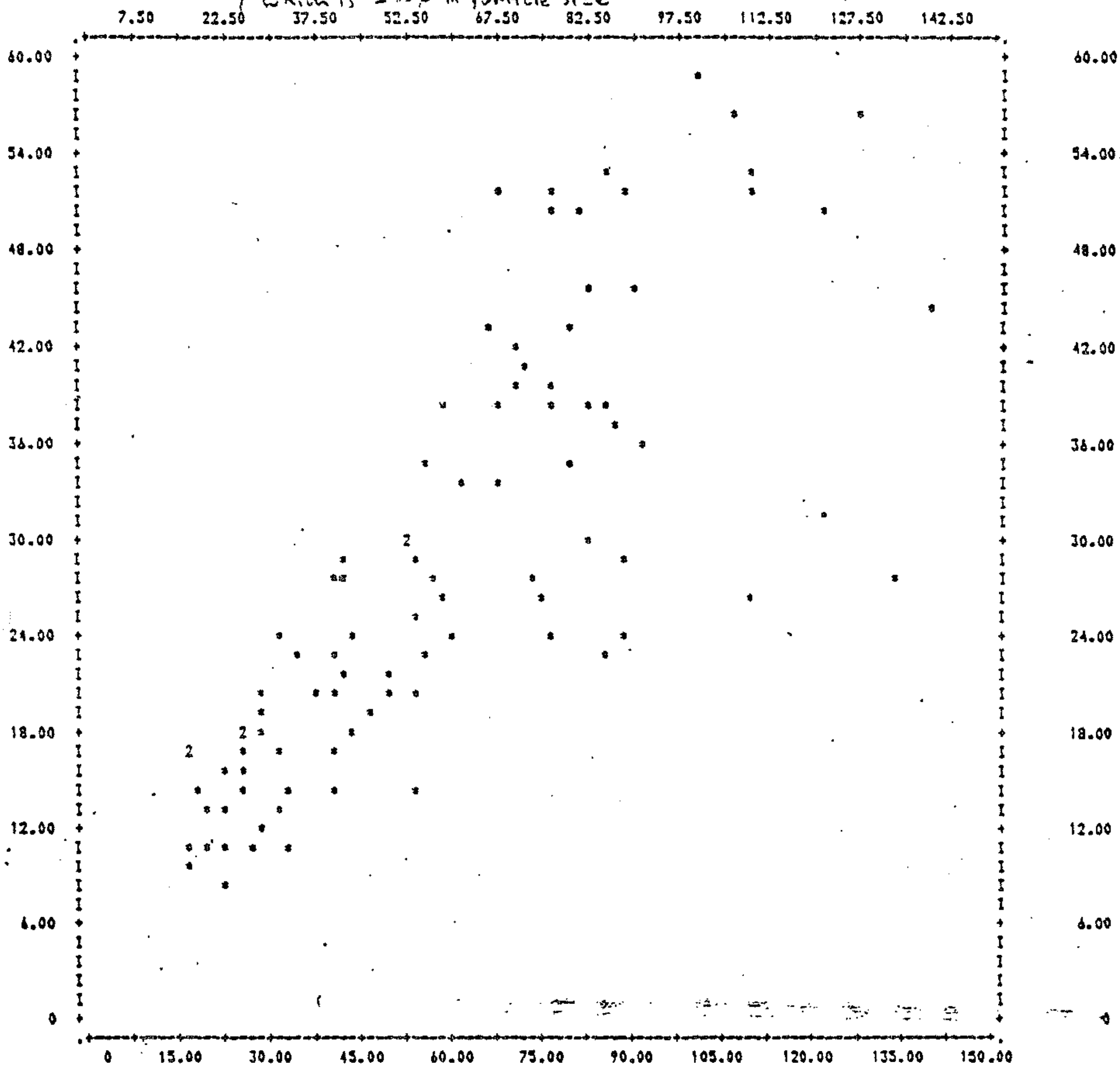
Background Soil = (Background Mass 2) (.315), or
Background Soil = (SFU Fine + SFU Course Mass) (.315)

Option 2-2

Background Soil = (Background Mass 2) (.229)

Figure 11

ILE WVMERG2 (CREATION DATE = 79/02/13.) WILLAMETTE VALLEY SAMPLER STUDY
UBFI EUGENE SPRING LEBANON HALSEY CORVAL
SCATTERGRAM OF (DOWN) VITSP { mass of which is ≤ 15 μ in particle size (ACROSS) HVMASS TSP MASS BY FRM



0STATISTICS..

0 CORRELATION (R)-	.80304	R SQUARED -	.64487	SIGNIFICANCE R -	.00001
0 STD ERR OF EST -	8.08403	INTERCEPT (A) -	7.96341	STD ERROR OF A -	1.85255
0 SIGNIFICANCE A -	.00002	SLOPE (B) -	.36233	STD ERROR OF B -	.02834
0 SIGNIFICANCE B -	.00001				
0 PLOTTED VALUES -	92	EXCLUDED VALUES-	3	MISSING VALUES -	2

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY — INTEROFFICE MEMO

TO: JFK — DATE: January 19, 1980

FROM: JEC

SUBJECT: Soil Contribution to different size fractions.

Following is a summary of the amount and percentage of soil in different size fractions for all five sites included in the analysis (Eugene, Springfield, Lebanon, Halsey, and Corvallis).

1. Average ug/m^3 soil for 5 sites = 25.3ug/m^3
   maximum = 149.9ug/m^3
   minimum = 0.8ug/m^3

2. Average percentage of HV mass from soil = 34.0%
   minimum = 5.2%
   maximum = 88.7%

3. The percentage silicon in different size fractions are:

	Size Fraction	Average	Max.
(a)	20u to uppercut point of tsp LV sampler	68.6%	99.7%
(b)	3.5 to 20u	25.0%	82.8
(c)	<3.5u	6.5%	80.0%

This again shows that only 7 percent - 10 percent of the soil is in the fraction <3.5u and that, on the average, about 30 percent of the fraction <20u is soil. Establishment of a "fine" particle standard at near 15-20u will still be significantly impacted by soil sources.

The attached table 1 shows similar data for other sites in the Valley. The percentage of HV mass estimated as soils (around 1/3) is much less than showing in earlier work, probably because (1) earlier estimates were June - August 15, and these figures are for 68 days, June - November 15, which includes more rainy days and (2) only 11-19 days are included - so the real value in these numbers rests only with the silicon distribution estimates.

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Table 1
Soil Distribution Summary
by size fraction

SITE	(ug/m3) VITSI[1] Mean	Max	(ug/m3) VITSP[2] Mean	Max	(ug/m3) Soil Mean	Max	%FHV mass Soil Mean	Max	(ug/m3) Large SI[3] Mean	Max	% Large SI[4] Mean	Max	%Coarse SI[5] Mean	Max	%Fine SI[6] Mean	Max	% SI Inhalabl
ALL	1.86	5.6	28.7	93.0	25.3	149.9	34.0	88.7	0.68	0.99	68.4	99.7	25.0	82.8	6.5	80.0	31.5%
Eugene	1.91	4.1	28.8	60.2	23.1	68.2	30.0	48.7	0.71	0.83	71.5	83.2	24.6	33.0	3.9	6.7	28.5
Springfield	1.56	3.2	27.7	57.4	28.7	75.4	33.0	71.1	0.72	0.94	71.8	94.6	23.5	35.7	4.6	15.1	28.1
Lebanon	2.2	5.7	32.3	93.0	25.2	83.7	35.9	76.7	0.70	0.99	70.4	99.7	23.7	42.4	5.8	30.5	29.5
Halsey	1.7	5.4	28.7	55.5	33.4	149.9	38.2	88.7	0.79	0.93	79.9	93.9	12.4	50.0	7.6	13.8	20.0
Corvallis	1.8	5.1	26.5	51.3	16.4	62.3	30.7	77.9	0.49	0.73	48.9	73.1	40.8	82.8	10.1	80.0	50.8

NOTES:

1. VITSI = total virtual impactor Coarse + fine silicon (≤ 15u)
2. VITSP = total virtual impactor Coarse + fine mass (≤ 15u)
3. Large SI = Silicon " 15ξ ` tsp Low-vol upper cutoff
4. %Large SI = large silicon % of total silicon
5. %Coarse SI = 3.5 - 15u silicon % of total silicon
6. %fine SI = ` 3.5u silicon % of total silicon

AS0823.C

Appendix 4.6.4.1--2

Report of the Modeling Subcommittee

of

The Eugene-Springfield AQMA CAC

Appendix 4.6.4.1--2

Report of the Modeling Subcommittee

of

the Eugene-Springfield AQMA CAC

The "grid" model used by the DEQ to simulate the air quality of the Eugene-Springfield AQMA is a basic conservation of mass grid cell type model which uses a finite difference solution of the basic diffusion equation.

This model was selected mainly because of its advantages over other models in handling complex wind fields. Many other models are limited to areas with nearly flat terrain and linear winds. These types of assumptions are not valid in this AQMA because of the topographical features which lead to curved wind fields. The grid model was designed to simulate these conditions and more nearly reflect reality. A more complete discussion of the model and the assumptions involved are included in Appendix 4.6.4.1--1.

The model is intended to simulate the air quality of the AQMA in future years to assist in the development of control strategies to attain the ambient air quality standards for TSP. To accomplish this task the model processes meteorological and emission inventory data through the finite difference algorithm and projects TSP levels throughout the AQMA.

Given that the theoretical aspects of the computer model are reasonably representative of the real world (and, according to experts this model is probably better than most in this regard), the overall accuracy of the results is dependent upon the accuracy of the data base being used by the model. It should be recognized that the emissions data being input into the model are not absolute numbers, but are estimates, based on a variety of tests, assumptions, and basic understanding of emission sources. Some of these estimates are reasonably accurate, and others, such as the area sources, represent fairly gross approximations. As a result, the results of the model should not be interpreted as absolute values but as relative values. A further degree of sophistication was used in this modeling effort to improve the model calibration. Chemical Mass Balance (CMB) data was used to calibrate the model and this effort adds confidence to the results. This calibration procedure is discussed in Appendix 4.6.4.1--1.

The Modeling Subcommittee met with the staffs of LRAPA and the DEQ on three occasions from May 28, 1980 through July 1, 1980, to discuss the results of the modeling effort. Through the course of these meetings the Subcommittee developed several comments and recommendations regarding the modeling effort and additional suggestions to improve this tool for further utilization.

The comments of the Subcommittee can be divided into three major categories: model instabilities, meteorological data, and soils.

I. Model Instability

An inherent quality of grid cell models is that they exhibit a small amount of numerical instability. This results from the model's limitation in handling rapid concentration changes. The limitation is greatest under very rapid dispersion conditions (caused by the combination of strong vertical winds and strong diffusion processes) and where emission gradients are greatest between adjacent cells.

The resulting "instability" may manifest itself as differences between the results of a single combined source model run and the sum of individual component source runs. Differences can be as high as 10 percent. This was not considered to be very large. DEQ has taken a number of measures to minimize model instability. These included:

a.) Reducing the model's time step size (Δt), to allow more time for the model to react to changes in concentration. However, time step size cannot be reduced too far because it is also related to model efficiency (cost).

b.) The grid model's algorithm was improved by the addition of flux correctors designed to minimize conditions which could lead to numeric instability. Essentially this is done by smoothing possible "pulses" of concentration between cells.

c.) Model results were analyzed in ways to minimize mathematical errors. As concentration changes were derived from differences between emission changes, the most accurate predicted concentrations are those derived from the largest emission change (more significant figures). Changes in concentration from smaller emission changes were then scaled from the larger change in the emissions of that same source.

DEQ has also contacted users of grid cell models in other states. Although they were aware of instability in their models, they did not consider it to be a major problem. It was the general consensus of the Subcommittee that this problem needed further study, but no recommendation was made.

II. Meteorological Data

There was considerable discussion regarding the meteorological data and the development of the meteorological regime classification scheme (a detailed discussion of how these were derived is found in Appendix 4.6.4.1--1. It was pointed out that the winds on an actual day could vary significantly from simulated meteorology on the regime day. This is due to the fact that the regime day represents an average of several days and cannot be expected to exactly simulate an actual day. The differences, however, may be quite significant. It was the conclusion of the Subcommittee that more work needs to be done on the sensitivity of the model to the meteorological data.

It was also noted by DEQ that only one worst case day was modeled and that the best modeling results were obtained using the meteorology of an actual worst case day. Based on these observations, the general consensus of the Modeling Subcommittee was that more emphasis should be placed on developing worst case day meteorology. It was noted that worst case days can occur at any time during the calendar year and, as a result, perhaps several worst case days need to be modeled. There was some discussion over the number of surface meteorological sites needed, but it was pointed out that the "WEST" model can only accept high confidence data from three surface sites. Data can be used for more than three sites with lower confidence levels. It was concluded that the three existing sites should continue to be operated.

The general lack of upper air data was also noted. The model uses a power law assumption when no data is provided. This is generally considered to be quite inaccurate for this area. The DEQ used Salem rawinsonde data at a low confidence level to reduce the reliability on a power law assumption. However, it is generally agreed that the data from Salem is not representative of this area. As a result, the Subcommittee recommended that an effort be made to obtain upper air data using pibals on worst case days. It was the conclusion of the Subcommittee that the development of worst case day meteorology should receive priority over developing annual regime classes.

III. Soils

This rather broad category covers a multitude of topics which received considerable attention by the Subcommittee.

One concern was that there are a number of removal mechanisms that reduce, or decay concentratrations of airborne soils. A decay factor is not in the model. It was concluded that using a decay factor would more accurately depict what actually occurs.

The growth factor used for unpaved roads was also discussed at length. It was agreed that little, if any, growth in unpaved road emissions will occur because these roads are not arterials and are generally found in older, already developed, neighborhoods that have no room for future growth. It was pointed out that there may be a few unpaved streets with the potential for some growth. However, considerable effort is required to determine which streets fall into this category.

The importance of "soils" as a major source of the local air quality problem was discussed at length. It was noted that CMB analysis was used to calibrate the model for soils (see Appendix 4.6.4.1--1 for details), and that the existing soils emissions inventory was inadequate to account for all of the soils found on the filters. This led to the development of the "industrial trackout surcharge" for paved road dust to help balance the calibration. The validity of this assumption was questioned, which led to a discussion of the origins of the "soils" found on the roads. It was concluded that additional analysis was needed, in particular, a study of trackout sources and improvements to the paved road dust emission inventory.

Additional concerns were expressed regarding model validation in grids which are currently unmonitored, and model calibration which used CMB data at only two sites which may not be representative of the entire AQMA. The general consensus was that the unmonitored grids which the model showed to be in non-attainment should have monitors installed to validate the modeling results. It was also the consensus that those grids depicted by the model as having the highest potential for TSP problems for which CMB data is not available should have CMB analysis performed to calibrate the model, and to assist in the development of additional control strategies.

Summary of Subcommittee recommendations, and where they are addressed in the Plan:

Recommendation: Worst case day surface and upper air meteorology be developed and worst case day CMB analysis be performed.

Plan Reference: Work Plan 3-A in Appendix 4.6.4.3-1.

Recommendation: Model calibration be performed at the Pacific Northwest Bell and Westmoreland sites using CMB analysis.

Plan Reference: Work Plan 3-B in Appendix 4.6.4.3-1

Recommendation: Model validation and calibration be performed in two presently unmonitored grids which the model predicts as having the highest potential for air quality problems.

Plan Reference: Work Plan 3-C in Appendix 4.6.4.3-1.

Recommendation: A study be performed to determine a decay factor for soils.

Plan Reference: Work Plan 3-D in Appendix 4.6.4.3-1.

Recommendation: A study be performed to improve the Emission Inventory for soils and other background sources.

Plan Reference: Work Plan 1, Appendix 4.6.4.3--1

Appendix 4.6.4.3--1

Workplans: Phase II

Appendix 4.6.4.3--1

Workplans: Phase II

Workplan No. 1: Paved Road Dust Strategy Development

This workplan represents the current best estimate of the needed effort. This will be reviewed periodically on at least an annual basis and necessary adjustments will be made. These adjustments will be based primarily upon a re-evaluation of the project need and resource availability.

The objective of this workplan is to develop a strategy for reducing emissions from paved roads. This study will investigate the two basic approaches to controlling emissions. One approach would reduce emissions through the preventive measures of a comprehensive trackout control program. The other approach involves the corrective measure of cleaning the streets.

This strategy will be developed using small scale pilot studies as follows:

Step 1: Select representative trackout sources to be studied - these should be limited to 2 or 3 individual sources.

Select representative street sections to be studied - these should be limited to 2 or 3 individual street sections.

Note: The selection process will depend upon a number of factors including, but not limited to:

a. Non-attainment areas
b. VMT levels
c. Existing control measures

Step 2: Select the abatement method to be used to prevent trackout and select the cleaning methods to be studied. This selection process will depend on several factors, including primarily technical and economic feasibility.

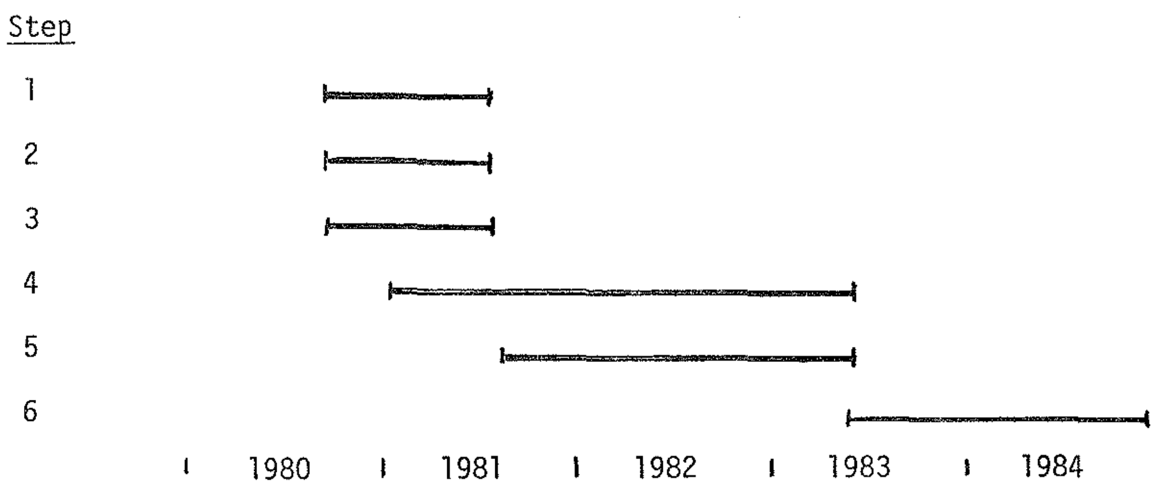
Step 3: Develop a method of measuring entrainable soils on paved streets. This will involve an extensive literature search and the purchase of or fabrication of sampling equipment.

Step 4: Develop a quantitative relationship between street loadings and emissions per VMT. This will require an extensive literature search as well as direct emissions measurements of several street sections within the AQMA. Numerous factors will have to be considered in the development of this study, the details of which will be developed following the extensive literature search.

Step 5: Measure the effectiveness of the selected trackout abatement and street cleaning measures. This will involve a number of small scale studies measuring the effectiveness of the selected strategies on the related sources using the technique developed in Step 3. These studies will be developed in cooperation with the parties involved, including the land owners of selected trackout sources and the Departments of Public Works for the selected street sections.

Step 6: Develop a control strategy for paved road dust. This will involve a detailed study of each non-attainment grid to determine which strategy or combination of strategies will best reduce the emissions in that grid. This will further require the use of the grid model in estimating the air quality improvements to be attained by the selected control strategies using the emission factor developed in Step 4.

It is anticipated that these 6 steps will require a significant expanse of time to complete. An approximate time line is as follows:



Appendix 4.6.4.3--1

Workplans: Phase II (Continued)

Workplan No. 2: Inhalable Particulate Control Strategies

This workplan represents the current best estimate of the needed effort. This will be reviewed periodically on at least an annual basis and necessary adjustments will be made. These adjustments will be based primarily upon a re-evaluation of the project need and resource availability.

With the realization that an IP standard will be promulgated in the near future, the LRAPA is preparing now to develop ambient and source specific data bases for that eventuality. Specific control strategies may also be developed. As a result, the LRAPA is committed to the following activities:

A. Monitor at two AQMA sites and an upwind background site for inhalable particulate (<15μm). This will be an ongoing program on at least an every 6th day sampling schedule to develop an ambient data base. This sampling will begin January, 1981.

B. Wood Space Heating. The LRAPA will promote the use of drier wood throughout the AQMA to help reduce home wood burning emissions. The LRAPA will also perform a literature search to determine the size distribution of these emissions.

C. Slash burning. The LRAPA will monitor slash burning activities, including aircraft tracking on some smoke intrusion days to document the source of the intrusion. LRAPA will simulate the use of the APM to augment the smoke management plan to evaluate the effectiveness of this technique over a period of several months. It is expected that this technique may well result in a control strategy similar to that developed for field burning, using the APM to augment the smoke management plan. This activity will begin in March, 1982 and end in December, 1982.

D. Wood Fired Boilers. The LRAPA is committed to source testing four wood fired boilers within the AQMA, to determine the inhalable particulate fraction of the emissions. This effort will occur over the period from January, 1981 through December, 1982. The LRAPA will also promote the efforts of the Lane Boiler Owners Association to reduce emissions through modified operations practices (see Appendix 4.6.4.3--3).

E. Open Burning. The LRAPA will investigate techniques to improve the emissions data base. If a feasible technique is found, then the data base will be improved. Further actions will await the inhalable particulate standard.

F. Soils. The LRAPA will measure the fine particulate fraction of fugitive dust sources to determine their relative importance with respect to an inhalable particulate standard. The details of the workplan will be developed and initiated upon promulgation of an IP standard.

G. Field Burning. As an ongoing project, the LRAPA will monitor the effectiveness of the DEQ smoke management program and assist the DEQ in air quality monitoring, complaint response, and public information.

Appendix 4.6.4.3--1

Workplans: Phase II (Continued)

Workplan No. 3: Modeling Improvement

This workplan represents the current best estimate of the needed effort. This will be reviewed periodically on at least an annual basis and necessary adjustments will be made. These adjustments will be based primarily upon a re-evaluation of the project need and resource availability.

As was described in Appendix 4.6.4.1--2 the model has several inadequacies. In an attempt to improve the modeling effort, the LRAPA is committed to performing the following activities.

A. Worst Case Day Analysis. The modeling analysis for the SIP submittal used only one actual worst case day. It has been amply demonstrated in Section 4.6.2.2 that violations occur during different seasons of the year and as a result only modeling one wintertime exceedence day is not adequate for determining the causes of all the 24-hour exceedences throughout the year. The LRAPA will analyze the worst case day meteorology and develop an adequate number of regimes to define the meteorology on those dates. To assist in this analysis, the LRAPA will continue to collect surface meteorological data at three sites within the AQMA at least through December, 1981. The LRAPA will also attempt to collect pibal data on worst case sampling days during 1981. These will be morning and afternoon runs on days when PM levels are forecast to be high using the APM and meteorological forecasts. This will provide upper air data which currently does not exist.

No CMB analysis was performed on the one worst case day that was used in the modeling effort. To remedy this deficiency, the DEQ will provide elemental analysis on at least six historical worst case days with LRAPA performing the CMB analysis. In addition, the LRAPA will collect samples on the appropriate filter media at at least one site within the AQMA and one background site on an every 6th day sampling schedule during the calendar year 1981 to allow CMB analysis of worst case days during this period. The DEQ will perform the elemental analysis on these worst case days with LRAPA performing the CMB analysis.

B. Model calibration at projected non-attainment monitoring site. The model projected two existing monitoring stations to be in non-attainment by 1987 for which there is no CMB analysis available. These are the PNB site in Springfield and the Westmoreland site in Eugene. The LRAPA will collect samples on the appropriate filter media at these two sites on an every 6th day sampling schedule for a period of one year. The DEQ will then perform elemental analysis of these filters and the LRAPA will perform the CMB analysis. This will provide the data necessary to calibrate the model at these sites. This project will begin in September, 1980 and conclude in December, 1981.

C. Model validation and calibration in unmonitored grids. The modeling results indicated several grids to be in non-attainment for which there was no monitoring data available. Given that the modeling results can only be interpreted as approximate and not absolute, these results indicate those grids having a good potential for air quality problems. In order to validate the modeling, the LRAPA will institute routine PM monitoring using high volume samplers in the two grids showing the highest potential for problems (Grids 53 and 60). In addition, the LRAPA will institute a program to collect samples on the appropriate filter media at these two sites to provide the data base for CMB analysis. These will be collected on an every 6th day sampling schedule for a period of one year beginning in September, 1980 and ending in August, 1981. The DEQ will then perform the elemental analysis of these filters and the LRAPA will perform the CMB analysis. This will provide the data necessary to calibrate the model at these two sites. A final report will be generated by December, 1981.

D. Soil decay factor study. No decay for soils was used in the modeling effort. To determine the feasibility and necessity of applying a decay factor, the LRAPA will perform a literature search which will be completed by July, 1981. If an appropriate factor can be found and if it is determined to be necessary, then a factor will be applied to all future modeling efforts.

E. Grid model transfer. By March, 1981, the DEQ will have transferred the grid model with attendent data bases to the LRAPA. The DEQ will provide the necessary technical assistance to insure its proper operation by LRAPA staff.

Appendix 4.6.4.3.1--1

Summary of Programs to Encourage and Finance Energy Conservation

Appendix 4.6.4.3.1--1

Summary of Programs to Encourage and Finance Energy Conservation

The apparent need to conserve the use of energy in residences has been more acute as costs of electricity and gas continue to rise. Part of the Air Quality Maintenance Area planning effort has addressed the effects of home wood-burning appliances, such as stoves and fireplaces, on air quality in the urbanized AQMA. There is growing evidence that wood burning in urban areas can constitute a sizeable portion of the total concentrations of suspended particulate matter during given periods of time in the winter. It is theorized that minimizing heat loss through insulation and weatherization may, itself, reduce the necessity to use wood or any other heat source in private residences, to the extent that as much as 60% reduction of emissions can be achieved, if all existing wood-burning residences are weatherized.

A variety of programs throughout the urbanized area of Lane County have sprung up in response to this need. This report summarizes the current status of those activities and estimates the actual and potential effects on emissions of wood smoke. The following entities which have energy conservation programs in place or in the planning phases were contacted: Lane County, the Cities of Eugene and Springfield, Eugene Water and Electric Board, the State Department of Veteran's Affairs, and the Oregon Department of Energy.

Lane County is "Community Energy Conservation." The program is, basically, an effort to induce landlords and owners of large apartments to weatherize their properties by making low-interest loans available. There are potentially 13,500 residential rental units which may be affected, county-wide. 20% weatherization of rental units is the target by December of 1982.

This program, however, depends upon funding by the U. S. Department of Energy through a grant-in-aid. Lane County has applied for the grant, but information from County staff is that award of a grant is at question because of the large number of applicants.

City of Eugene. The Eugene City Council has instructed its attorney to develop an ordinance which provides weatherization of privately owned residences and commercial establishments by 1985, at which time weatherization to a ten-year payback standard will become mandatory. The City will consider adoption of an ordinance in October of 1980. The City's goal, ultimately, is to have 100% weatherization of these homes. This program is proposed in conjunction with the financial aid proposed by EWEB, as described below.

City of Springfield. The City of Springfield has adopted an ordinance requiring energy audits six months after a residence is sold to a new owner. The City has performed a preliminary organizational work to implement addition energy conservation programs in accordance with State Energy Conservation guidelines. The City, however, anticipates budgetary constraints and implementation of additional programs contingent upon successful passage of the new budget.

EWEB has initiated a program to make zero, or low-interst loans available to its customers who utilize electricity. A legal obstacle has prevented EWEB from fully implementing this program. There is a Constitutional provision which prevents municipal entities from lending funds to private corporations. EWEB will proceed with its financing program. Briefs have been filed in the case. As noted above, if EWEB is successful in defense of its position, this plan will complement the City's home weatherization ordinance.

State Department of Veteran's Affairs. The DVA has made low interest weatherization loans available in the Eugene-Springfield metropolitan area. These loans can be added to existing mortgages.

The State Department of Energy. The Oregon Legislature authorized the State to subsidize lending institutions to make available 6 1/2% loans to persons who wish to weatherize. This program is currently ineffective, due to the generally high rate of interest. In order to revise the program, the Legislature would have to increase the percentage allowed to be charged by the lending institutions.

Tax Credits. In addition to low-interest loans, both the federal and state tax laws allow tax credits to tax payers for weatherization. It is difficult to estimate the effect on wood burning as a result of tax credits.

Other Utilities. Most utilities offer free energy audits to home owners. They also, through one program or another (mostly rural areas affected), provide 0% deferred payment loans.

It is estimated that the cumulative result of these programs on emissions is that by 1987, 50% of the wood-burning residential dwelling units in the AQMA will be upgraded, and this will produce a 30% reduction of wood utilization in those buildings where wood is used and will result in a 15% oervall reduction in wood smoke emissions from home space heating.

Appendix 4.6.4.3.2--1

General Plan

Lane Boiler Owners Association

Lane Boiler Owners Assn.
P.O. Box 7434
Eugene, Oregon 97401
(503) 683-0854

September 10, 1980

Mr. Donald R. Arkell
Program Director
LANE REGIONAL AIR POLLUTION AUTHORITY
16 Oakway Mall
Eugene, Oregon 97401

Dear Mr. Arkell:

Responding to your letter of August 27, after reviewing your proposed outline, we have revised some of the wording and schedules in order to meet the basic goals of LBOA.

Enclosed you will find our final draft and general plan of action with corresponding completion dates.

If needed a graph could be prepared by your agency that reflects the dates we have submitted.

Cordially,

LANE BOILER OWNERS ASSN.

Paul B. Cole

Paul B. Cole,
President

PBC/ilb

Lane Boiler Owners Assn.
P.O. Box 7434
Eugene, Oregon 97401
(503) 683-0854

GENERAL PLAN OF ACTION

GOAL:

It is the goal of the Lane Boiler Owners Association to reduce the tons per year emissions through improvements in operational practices, and mechanical upkeep, while maintaining the current RACT emission rate of 0.20 gr./scf.

The following schedule represents our best estimate of what is necessary to meet the goal. It constitutes a commitment to attempt to meet our goal by the times indicated in the bar graph.

PROGRAM-ELEMENTS:

1. Baseline Data
   - a. 11- 1-80 Gather information on all boilers of the LBOA members
   - b. 1- 1-81 Test all boilers of the LBOA members
   - c. 3- 1-81 Inventory all boilers of LBOA members
2. Evaluation and Review Program
   - a. 5- 1-81 Evaluate and review all boilers of LBOA members
   - b. 9- 1-81 Perform an energy management review of all boiler operations of LBOA members
   - c. 10- 1-81 Perform an "on-site" operational and mechanical review of all boilers of LBOA members
3. Evaluation Team
   - a. 3- 1-84 Develop an industrial team or an industrial/consultant team to analyze data and physical plant to provide for improved efficiency of all boilers of LBOA members, through better operating and maintenance practices.
4. Operating Practices
   - a. 12-31-84 Develop and adopt operating practices, fuel specifications and operating aids requirements that maximizes emission reductions within the current standard.

Lane Boiler Owners Assn.
P.O. Box 7434
Eugene, Oregon 97401
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5. Procedures
   - a. 12-31-84 Develop and utilize an operational procedure for each facility
   - b. 12-31-84 Develop and utilize an annual LBOA testing procedure for each facility
6. Operator/Maintenance Personnel Education
   - a. 12-31-84 Develop, adopt and provide an educational program for all boiler operators and maintenance personnel

The above indicates the approximate times the listed plan elements are to tentatively scheduled to occur. As information is developed, some of the plan elements and their representative starting and completetion dates may change, depending on resources and priorities.

Appendix 4.6.6--1

LRAPA Regulation

Air Conveying Systems

Appendix 4.6.6--1

L R A P A

P R O P O S E D   N E W   R E G U L A T I O N

Section 32-800 Air Conveying Systems

Notwithstanding the general and specific emission standards and regulations contained in these Rules, all air conveying systems which handle dry material, use a cyclone or other uncontrolled separating device, and emit greater than 1 (one) ton per year of particulate matter to the atmosphere at the time of adoption of these Rules shall, with prior written approval of the Authority, be equipped with a control system with a collection efficiency of at least 98.5 percent. Air conveying systems of 5 (five) ton or greater sources only shall comply with this rule as soon as practicable, but no later than January 1, 1983 or 18 months after approval of control strategy by EPA, whichever is longer. Air conveying systems of 1 (one) ton to 5 (five) ton sources shall comply with this rule as soon as practicable, but no later than July 1, 1985. Compliance schedules shall be submitted for approval within 90 (ninety) days after adoption of this rule and shall contain reasonable interim dates for engineering, procurement, fabrication, and installation and adjustment.*

* The terminology of this rule will incorporate mass emission units (lbs./hr., tons/year) to achieve the 98.5 percent reductions.

Section 11-015 Definitions

.013 "Air Conveying System" means an air moving device such as a fan or blower associated ductwork, and a cyclone or other collection device, the purpose of which is to move material from one point to another by entrainment in a moving airstream.

.078 "Collection Efficiency" means the overall performance of an air cleaning device in terms of ratio of weight of material collected to total weight of input to the collector.

.133 "Dry Material" includes, but is not limited to, sanderdust shavings from kiln or air dried wood, sawdust from kiln or air dried wood, or material from any other size reduction equipment processing kiln or air dried wood, rock, feed, seed or other.

Appendix 4.6.6--2

City of Springfield Ordinance No. 4509

ORDINANCE NO. 4509 (GENERAL)

AN ORDINANCE AMENDING CHAPTER 3 "UTILITIES" OF THE SPRINGFIELD MUNICIPAL CODE 1965, BY ADDITION OF ARTICLE 5, ENERGY CONSERVATION, AND DECLARING AN EMERGENCY.

THE CITY OF SPRINGFIELD DOES ORDAIN AS FOLLOWS:

Section 1: Chapter 3 of the Springfield Code 1965 is hereby amended by the addition of Article 5 "Energy Conservation" as follows:

"3-5-1 Statement Of Policy. The wise and efficient use of energy is a necessary and desirable objective. In order to promote energy efficiency a comprehensive and systematic conservation strategy is essential. As part of that strategy, an energy analysis of residential and commercial structures within the City of Springfield is desirable. The analysis would provide the owners of such residential and commercial structures the information necessary to weatherize the structures or modify personal use patterns to improve energy efficiency and implement effective conservation. Requiring such an analysis will provide citizens with the information necessary to improve energy efficiency and reduce consumption, and encourage the conservation of energy.

3-5-2 Definitions.

(1) Energy Analysis. An evaluation of the existing energy loss of a given structure's exterior envelope (walls, ceilings and floors) and appliances/equipment contained within (i.e.. water heaters, heating equipment, etc.). Suggested improvements to the existing situation will be made by the analyst based upon the current Oregon State Building Codes and energy guidelines.

(2) Residential Structures. Any structure defined in Article 35, Paragraphs 27, 28, 29, 30, and 31 of the Comprehensive Zoning Code of the City of Springfield - 1978.

(3) Commercial Structure. Any structure utilized for the uses set forth in Section 14.02, 14.03, 15.02, 15.03, 16.02, 16.03, 17.02, and 17.03 of the Comprehensive Zoning Code of the City of Springfield - 1978; or, any structure utilized for other uses of, or engaged in commerce similar to the foregoing uses.

(4) Analysis Agency. The City of Springfield or its designated agent.

(5) Sale. Any disposition or transfer of, or sale of any parcel of improved real property.

3-5-3 Energy Analysis Requirement. Within six (6) months after recordation of a sale of improved real property on which is situated residential or commercial structures, the purchaser of said property shall obtain an Energy Analysis of said structure. The Energy Analysis shall be performed by the City of Springfield or its designated agent. Failure to obtain said Energy Analysis is declared to be unlawful and an offense.

3-5-4 Penalties. The violation of Section 3-5-3 shall be punished by a fine not exceeding $100.00.

3-5-5 Applicability. The provisions of this Article 5 shall not apply to residential structures which receive certificates of occupancy from the City of Springfield after January 1, 1979. The provisions of this Article 5 shall not apply to commercial structures which receive certificates of occupancy from the City of Springfield after July 1, 1980."

Section 2: It is hereby found and determined by the Common Council that matters concerning energy conservation and energy analysis are matters affecting the public safety and welfare and that an emergency therefore exists, and this Ordinance shall therefore take effect immediately upon its passage by the Council and approval by the Mayor.

Adopted by a vote of -6- for and -0- against this 7th day of July, 1980.

Approved by the Mayor this 7th day of July, 1980.

Vern Meyer
Mayor

ATTEST:
[signature]
City Recorder

Appendix 4.6.6--3

City of Eugene Draft Weatherization Ordinance

8/28/80

DRAFT

ORDINANCE NO. ____

AN ORDINANCE RELATING TO HOUSING, ESTABLISHING MANDATORY WEATHERIZATION STANDARDS FOR EXISTING SINGLE-FAMILY TO FOUR-PLEX RESIDENTIAL STRUCTURES WHICH WERE CONSTRUCTED WITH BUILDING PERMITS ISSUED BY THE CITY OF EUGENE PRIOR TO JULY 1, 1974

WHEREAS, the Eugene City Council has given high priority for the development of a community-wide energy conservation program.

WHEREAS, on October 31, 1979, the Eugene City Council by Resolution No. 3270, created an Energy Conservation Policy Board to develop recommendations for incentives, educational programs, and mandatory measures to increase energy efficency through the use of energy conservation and renewable resources in existing structures. This board consists of representatives of the City Council, City Planning Commission, and Eugene Water & Electric Board.

WHEREAS, the Eugene Water & Electric Board has determined that new generation resources needed to help meet the community's electical load demand will be more expensive to the community than the conservation measures proposed by this ordinance.

WHEREAS, the Eugene Water & Electric Board has testified before the City Council that the community and the Pacific Northwest may face electrical load shortages in the mid 1980's to early 1990's.

WHEREAS, the City Council's Energy Conservation Policy Board has held extensive public hearings to review different methods to encourage conservation in the residential sector. The Energy Conservation Policy Board has found that significant opportunities exist for both energy and cost savings through the retrofit of proven energy conservation technologies in existing homes. Furthermore, the retrofit of energy conservation devices has been found to be a potential growth industry in Eugene capable of creating local job opportunities and generating local revenue.

WHEREAS, on May 27, 1980, the Eugene Water & Electric Board, by resolution (Document No. 6334-6) adopted the Eugene Water & Electric Board Residential Conservation Service Program under the National Energy Conservation Policy Act. As part of this program, EWEB has proposed voluntary financing for the ~~for~~ cost ~~of~~ effective ~~future~~ conservation measures with:

a. Zero percent interest loans for electrically space heated homes.

b. Low interest loans for non-electrically space heated homes.

c. Matching grants for some materials installed in electrically space-heated homes.

d. These loans may be deferred until time of resale or paid monthly.

WHEREAS, on August 13, 1980, the Energy Conservation Policy Board, based upon the adoption of the proposed financing program by the EWEB Board of Commissioners, recommended that the Eugene City Council adopt the weatherization standards as proposed under this ordinance. Each measure has been found to be cost-effective over the lifetime of the device in the average home.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY OF EUGENE AS FOLLOWS:

Section 1. Section 8.270 of the Eugene Code, 1971, is hereby amended by inserting in alphabetical order the following words and their accompanying meanings.

Attic. The space between the ceiling joists and the roof deck.

Caulking. Pliable materials used to reduce the passage of air and moisture by filling small gaps, including: a) at fixed joints on a building; b) underneath baseboards inside a building; c) exterior walls at electric outlets; d) around pipes and wires entering a building; and e) around dryer vents and exhaust fans in exterior walls. Caulking includes, but is not limited to, materials commonly known as "sealants," "putty," and "glazing compounds."

Covered Residential Building. An existing building used for habitation either seasonally or permanently by one or more persons, containing four or fewer dwelling units which was constructed with a building permit issued prior to July 1, 1974, or which was built prior to July 1, 1974.

Crawlspace. The enclosed space between the first floor and the surface of the ground.

Domestic Water Heater. An appliance designed primarily to supply hot water and is equipped with automatic controls limiting water temperature to a maximum of 210 degrees Fahrenheit.

Insulation. Any material or assembly of materials used primarily to provide resistance to heat flow in buildings, including but not limited to mineral fibrous, mineral cellular, organic fibrous, organic cellular, or reflective materials, whether in loose fill, flexible, or semi-rigid form.

Joist. A series of parallel framing members used to support floor and ceiling loads and supported in turn by larger beams, girders, or bearing walls.

"R" Value. Measure of resistance to heat flow through a material or the reciprocal of the heat flow through a material expressed in British Thermal Units per hour per square foot per degree Fahrenheit at 75 degrees Fahrenheit mean temperature. This definition is intended to produce the same results as Section 5302 of the State Structure Specialty Code.

Rafter. One of a series of structural members of a roof designed to support roof loads.

Ridge. The top horizontal edge or peak of a roof.

Weather Stripping. Narrow strips of material placed over or in movable joints of windows and doors to reduce the passage of air and moisture.

Unconditioned Space. An area, room, a pace not normally occupied nor heated or cooled.

Section 2. Section 8.290(1) is amended to read,

(1) the inspection of all buildings or portions thereof, subject to the application of this code for the purpose of determining whether any conditions exist which render places substandard buildings within the terms of Section 8.305 and Section 8.325. Such inspections may be on an area basis, on the basis of observations of duly authorized representatives of the Building Inspection Division, or any other authorized official of the City and the Eugene Water & Electric Board.

Section 3. Section 8.325 of the Eugene Code, 1971, is hereby added entitled Minimum Weatherization Standardizations and reads:

Section 8.325(1) Purpose and Scope. It is hereby found and declared that there exists, within the City of Eugene, buildings inadequately weatherized. Furthermore, it is hereby found and declared that certain circumstances result in inefficient and wasteful uses of energy which would jeopardize the general welfare of the public. Thus, a purpose of this code is to establish weatherization standards which promote conservation of our scarce energy resources. Minimum weatherization standards set forth in this chapter are established for the purpose of promoting efficient energy use and reducing energy waste. The minimum standards and requirements set forth in Section 8.325(2) are mandatory for all covered residential buildings.

The weatherization standards contained in Section 8.325(2) are declared necessary to make dwellings habitable in this community and are part of the essential services property owners must provide their tenants. It is the intent of the council to offer tenants remedies available under the Landlord and Tenant Act.

SECTION 8.325(2) REQUIREMENTS. Each covered residential building shall comply with the following requirements and standards by January 1, 1985, hereafter referred to as the mandatory date of compliance.

(A) ATTIC INSULATION.

Attics shall be insulated to the level of R-30 or greater. Exceptions; the following buildings shall be exempt from this requirement.

(i) Buildings which have attic insulation of the R-11 or greater level prior to the mandatory date of compliance

(ii) Buildings which have a vertical clear height of 30 inches or less from the attic floor to the ridge.

(iii) Buildings which do not have attics.

(iv) Buildings which have attics where the depths of the joists or other obstructions prevent insulation of R-30 insulation. These attics shall be insulated to the highest R value structurally allowable.

(v) Buildings which have attics with unsafe electric wiring or other conditions which would result in significant fire or other hazards if insulated.

(ye olde loophole!)

(B) VENTILATION

Attics shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow. The net free ventilating area shall be not less than 1/150 of the area of the space ventilated, except that the area may be 1/300, provided at least 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least three feet above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.

(C) FLOOR INSULATION

Floors shall be insulated to the level of R-11 or better over any crawl space which provides at least an average of 18 inches of vertical space between the bottom of the joist and the ground.

(D) CRAWL SPACE VAPOR BARRIER

Any crawl space which provides at least an average of 18 inches of vertical space between the bottom of the joist and the ground must be provided with a vapor barrier, which performance is at least equivalent to .006 inch (6 mill) polyethylene.

(E) CAULKING, SEALING, AND WEATHER STRIPPING

Cracks at window frames shall be filled with a sealant material or weather-resistant caulking. Cracks at frames of exterior doors providing access from unconditioned to conditioned floor areas shall be filled with a sealant material, weather-resistant caulking, or insulation. Exterior doors, doors providing access from unconditioned spaces and windows shall be weatherstripped.

(F) DOMESTIC WATER HEATER

Domestic water heaters shall be insulated to a level of R-11 or better. EXEMPTIONS: Any domestic water heater is exempt from this requirement if the domestic water heater must be physically moved, or structural changes to the interior of the building would be necessary to comply with the requirement.

(G) DOMESTIC WATER HEATER TEMPERATURE

Domestic water heater thermostats (or equivalent) shall be set at a temperature no higher that 140 degrees (140°) Fahrenheit.

(H) HEATING DUCT INSULATION

Each accessible heating duct that is located in an unconditioned area with 18 inches or more of vertical access space shall be insulated to the level of R-11 or better.

SECTION 8.325(3) VACATED BUILDINGS

Any vacated covered residential building that consumes no energy whatsoever shall be exempt from the requirements and standards in Section 8.325(2), provided that prior to reoccupancy, the building shall be brought into compliance with the requirements and standards of Section 8.325(2).

SECTION 8.325(4) INSPECTIONS; Alternative I

After the mandatory date of compliance, the Eugene Water & Electric Board shall inspect each covered residential building within 30 days after a time of change in utility service is requested by the resident of the covered residential building to determine compliance with the weatherization standards and requirements, set forth in Section 8.325(2) of this code.

The Eugene Water and Electric Board shall issue to the covered residential building owner, at the time of inspection, a certification of weatherization compliance pursuant to Section 8.325(2) of this code, if it is determined that the covered residential building is weatherized in compliance with Section 8.325(2).

Each owner of a covered residential building, which upon first inspection is found not to comply with the requirements and standards of this ordinance, and is not determined to be exempt from the requirements and standards or portions thereof, shall be issued a notice of violation pursuant to Section 8.290 by the Eugene Water & Electric Board.

A residential business owner shall be given ninety days (90) days to bring the residential building into compliance with Section 8.325(2) of this code. When the required period of compliance has elapsed, reinspections(s) shall take place. If at the time of reinspection the residential building is found to comply with Section 8.325(2) of this code, the residential building owner shall be issued a certificate of weatherization compliance pursuant to Section 8.325(2) of this code. If, within the 90 days, the covered residential building is not found to comply with Section 8.325(2) of this code, Eugene Water and Electric Board will forward the names of the building owner and a list violations to the City building official for enforcement of civil penalties pursuant to Section 8.290 and Section 8.990.

There shall be no fee charged to residential building owners for the initial weatherization inspection and one subsequent reinspection for compliance. As subsequent inspections are deemed necessary, the residential building owner may be charged a fee not to exceed the actual cost to the Eugene Water and Electric Board or the City as determined by the building official.

V Alternative II Section 8.325(4) Inspections.

After January 1, 1985, all customers requesting electrical service from the Eugene Water & Electric Board shall receive a "notice of mandatory weatherization," within thirty (30) days of requesting that service. This notice shall outline the terms and standards of Section 8.325 of this code and clearly state the exact date after which that owner must comply with the code. Copies of the "notice of mandatory weatherization" shall be mailed to both the owner of the covered residential building, and the person requesting electrical service.

Each owner of a covered residential building shall be given ninety (90) days, after the date of issuance of the "notice of mandatory weatherization" to bring the residential building into compliance with Section 8.325(2) of this code. During the ninety-day period, owners or residents of covered residential buildings may request energy analyses from the Eugene Water & Electric Board. At the end of that ninety-day period, the Eugene Water & Electric Board shall inspect the building for compliance with the weatherization standards and requirements set forth in Section 8.325(2) of this code. If at the time of inspection the residential building is found to comply with Section 8.325(2) of this code, the residential building owner shall be issued a "certificate of weatherization compliance" pursuant to Section 8.325(2) of this code. If, at the time of inspection, the building is not found to comply with Section 8.325(2) of this code, the Eugene Water & Electric Board shall issue to the building owner a "notice of violation" pursuant to Section 8.290 of this code.

GP:so/CM28a10

Appendix 4.6.6--4

EWEB Resolution and Information Bulletin

7/11
Van ✓

Eugene Water & Electric Board

Testimony Before

The HOUSE INTERIM ENVIRONMENT AND ENERGY COMMITTEE

August 6, 1980

EWEB is very concerned about regional energy supply over the next 10 years. Already we are experiencing rate increases as a result of the increasing costs of doing business and procuring energy. Customers blame conservation for the rate increase, however, the average use per residential customer has declined only 2% between 1975 and 1980.

Our projections for energy demand and supply show a deficit in the energy supply beginning in 1984 unless we conserve 15% of our energy use. Even with 15% conservation a shortfall is projected to occur by 1991. We are therefore pursuing an accelerated program of renewable resource development. We are involved in 6 renewable resource areas; cogeneration, geothermal, solar, small or low head hydro, wind and wood waste utilization.

However, when these projects are completed and producing power, the generation capacity may be subtracted from our Bonneville Power Administration Allocation. How ever the supply situation is resolved, it is clear we will need a vigorous and concentrated conservation program to fill in the gap in the power supply over the next 10 years.

We have completed 3,600 residential energy analyses, of those completed 50% have responded to a follow up survey. Of those who responded, 60% have completed some or all of the recommendations of the EWEB energy analyst.

Some of our particular problems in trying to implement conservation in the Eugene area are the following:

1. Energy costs 1.4¢/kwh (new rate 1.8¢) when the national average is over 4¢/kwh.

2. 70% of Eugene residences are heated with electricity.

3. 99% of new homes are installing electric heat.

4. 50% of electrically heated residences are rentals.

5. In the Eugene city limits we estimate that there are approximately 15,000 electrically heated residences in need of weatherization.

6. If we were able to weatherize all 15,000 units at an annual savings of 5,000 kwh per residence we can save only 7.6% of our residential energy use.

Realizing that we have not yet set the course to achieve 15% conservation and that we are dealing only with the residential sector, the following is a brief outline of the EWEB Plan to make weatherization available to all residential units in the EWEB service area.

SUMMARY OF THE RESIDENTIAL CONSERVATION SERVICE

A program announcement will be mailed to every eligible customer early in 1981. The announcement will describe all the services and benefits of the plan. The major services which EWEB will provide are:

1. A residential energy analysis.
2. Lists of installers, lenders and suppliers.
3. Arranging installation service.
4. Arranging financing service.

The benefits which come with the arranging services are:

1. Help in obtaining bids from contractors and filling out forms for loans.
2. A one year warranty on all program measures.
3. Standards and specifications for materials and installation of program measures.
4. Post installation inspections to assure compliance with standards.
5. Repayment of conventional loans through utility billing.
6. Access to conciliation conference and redress procedures.

Included with the program announcement will be a list of the expected dollar savings in the first year for all program measures and energy conserving practices in a typical home.

THE ENERGY ANALYSIS

The energy analysis calculations will be computerized so each energy analyst will carry a portable computer terminal into the home. The analyst can then complete the energy analysis in the home in a shorter time, explain the results to the customer and leave all the necessary information in one stop. The following information will be calculated for all of the program measures including passive solar retrofit measures and solar swimming pool heater replacements.

1. Expected annual energy cost savings.
2. Estimated cost for contractor installed program measures.
3. Estimated cost of material for do-it-yourself installation.
4. Estimated yearly cost of maintenance, if any.

In our arranging services, we will be offering a number of services which go beyond the federal rule--for example:

1. Providing workshops and brochures for do-it-yourself installers
2. Providing post-installation inspections for all customers who request it.
3. Providing utility financing for program measures.

EWEB PROPOSED WEATHERIZATION FINANCING PROGRAM

EWEB will finance RCS Program Measures which are cost effective based on the estimated lowest cost of a new electric generating plant or capacity purchases from new generation which could be available to EWEB within two years.

Electric Space Heat Customers

1. 0% interest loans can be repaid in two ways; the principal can be repaid at transfer of title, or, the principal can be repaid in monthly installments to be included with utility service billing (assumable loan upon resale).

2. Matching grants will be available for some of the more cost effective measures installed by the customer. If the customer provides the labor EWEB provides the grant.

Customers Without Electric Space Heating

1. Loans will be available to non-electric space heat customers at an interest rate and finance charge equal to the cost to EWEB in providing the funds. Repayment choices are the same as for electric space heat customers.

Installer Bidding Process

1. EWEB will arrange for the customer to have at least 3 bids for each measure financed.

2. Installers will be selected by the customer.

3. EWEB will pay for conservation and renewable resource measures in order of their cost effectiveness.

4. The amount financed by EWEB will be equal to or less than the average of the bids received.

Mrs. Pratt said she thought this perhaps had been delegated by the Council. She then asked if there were any further comments by the staff about this program. There were none. She asked if there were any comments from the Board members regarding the plan dated May 27.

Mr. Freeman indicated he would like a short review, inasmuch as it is essentially a tailored down, improved and revised version of what the Board had been given previously. Mrs. Pratt explained that it is the same document, with the exception of minor corrections pointed out by Ms. Reeder, many of which were of a typographical and clarity nature. She noted that there had been a very detailed presentation of the plan on May 12. She then asked if there was a specific portion he would like to address. Mr. Freeman indicated that he was specifically concerned about the modifications made to the landlord's property by the renter, whether it is required, and the exter of this loan if granted to the renter.

Ms. Reeder explained that the language in the financing section had been broadened to include all different kinds of cases so that when the court decides on the test case, the program can be written the way the staff feels it will work best. She noted that there is no specific language as to renter or notification of landlords at the present time, and when it is written it will be brought back to the Board.

Mr. Freeman noted the importance of alerting the landlords to this situation, because under the common law view of the landlord's property rights, any modification made to the building must be okayed through normal rental contracts by the landlord and this, in turn, becomes the landlord's property. He pointed out that this might also become the landlord's debt if such is unpaid by the renter. He said he wanted to be sure that the Board keeps these things in mind in establishing its directives.

Mrs. Pratt said she believed that the Board and staff members shared his concerns about property rights, and how the plan should be finally written, but at this time the plan, hopefully, is written in a substantial form which conforms with the rules that have been given to EWEB and gives enough substance to the plan to make it acceptable to the federal authorities. She assured Mr. Freeman that this would be specifically dealt with at a later time when it is known how EWEB's court case comes out, but nothing can be done before that.

At Mrs. Pratt's request, Mr. Parks then read the following resolution:

"WHEREAS, the National Energy Conservation Policy Act of 1978 (NECPA, 42 U.S.C.A. § 8201 et seq. (1979 Supp.), provides that the Eugene Water & Electric Board (EWEB) establish a program to encourage and facilitate the installation of energy conservation measures and renewable resource measures pursuant to regulations adopted by the U.S. Department of Energy (DOE);

"WHEREAS, the DOE adopted regulations implementing the Residential Conservation Service (RCS) Program on November 7, 1979, in 44 Federal Register 64,602 (1979) (to be codified at 10 CFR Part 456);

"WHEREAS, the regulations for the RCS Program require that EWEB, as a covered, nonregulated utility, file a conservation plan (EWEB Plan) with the DOE and also permit EWEB to file temporary programs and waivers:

"WHEREAS, the EWEB staff prepared a proposed plan, a final proposed plan and a final plan which includes a financing program, and a temporary program;

"WHEREAS, various notices of hearings including the 30 day's notice required by section 456.405 to the regulations for the RCS Program, inviting testimony and comment on the Proposed EWEB Plan were given prior to the hearings;

"WHEREAS, EWEB held public hearings pursuant to the provisions of NECPA and the RCS Program on April 14, 15, 16, 17 and 23, 1980 to take oral testimony and receive written comments;

"WHEREAS, the hearings were conducted in accordance with the EWEB Procedures Manual for Hearings under the National Energy Act, adopted by the EWEB Commissioners (the Board) at their May 7, 1979 meeting, and the NECPA Hearings Procedures Rules, adopted by the Board at their March 17, 1980 meeting;

"WHEREAS, the Board has considered the testimony presented at the hearings and other comments received by EWEB and,

"WHEREAS, the Board has considered the record of the hearings, including written comments, the Proposed EWEB Plan, the Final Proposed EWEB Plan and the EWEB Plan itself;

"NOW, THEREFORE, the Board, having fully considered the matter of adoption of a conservation plan under NECPA and the RCS Program and being fully advised in the premises, it is hereby resolved that the EWEB Plan under the RCS Program of NECPA, a copy of which is attached hereto as Exhibit A, is hereby adopted. The EWEB General Manager-Secretary or Assistant Secretary are hereby authorized and directed to execute such documents and take such steps as are required or permitted by NECPA; the regulations for the RCS Program, including, but not limited to the submittal of waivers, temporary programs and petitions and the EWEB Plan."

It was moved by Mr. Craig, seconded by Mr. Bartels, to adopt the above resolution as read. There being no further discussion, Mrs. Pratt called for the question. Voting Yes - 3 (Pratt, Bartels and Craig); No - 1 (Freeman). At this time, Mr. Freeman said that he wished to change his vote to affirmative so that he would be able to bring this matter up again. Mrs. Pratt then indicated that there were four affirmative votes. Voting Yes - 4 (Pratt, Freeman, Bartels and Craig); No - 0. Motion carried.

Hal Worcester, Power Resource Manager, presented Addendum No. 1 to the Pacific Northwest Coordination Agreement (between the Bonneville Power Administration, Eugene Water & Electric Board and the Northwest Generating Utilities), which is needed for a name change. He explained that the Bureau of Reclamation has now become the Water & Power Resources Service, and this Addendum merely reflects that change in the signatories. He then referred to the following resolution, which the Board members had before them:

"WHEREAS, Addendum No. 1 to the Pacific Northwest Coordination Agreement between the Bonneville Power Administration, the Eugene Water & Electric Board and the Northwest Generating Utilities, has been submitted to the Board of said Eugene Water & Electric Board at its Special Board Meeting this 27th day of May 1980, and

"WHEREAS, the addendum has been found to be satisfactory to the Board, and has received approval by its General Counsel.

"BE IT RESOLVED, that the Eugene Water & Electric Board enter into this agreement with the Bonneville Power Administration and the Northwest Generating Utilities, and that the General Manager-Secretary be directed to execute same."

(For Addendum No. 1 to the Pacific Northwest Coordination Agreement, see Document No. 2098 of the EWEB files.)

There being no discussion, it was moved by Mr. Craig, seconded by Mr. Bartels, to adopt the above resolution as written. Voting Yes - 4 (Pratt, Freeman, Bartels and Craig); No - 0. Motion carried.

Mr. Worcester presented Revision No. 2 of Exhibit F to the City of Eugene's Power Sales Contract No. 14-03-59191 (between the Bonneville Power Administration and Eugene Water & Electric Board), which changes EWEB's point of delivery from Bonneville. He explained that Willow Creek Substation has been taken off the small Bonneville 115 kV line, which now runs out to Lane Substation, and the only money involved is for fees for vacating EWEB's breaker and some facilities out of the main substation. He noted that this is a great improvement in service, because the capacity is now substantially higher than before. He then referred to the following resolution:

"WHEREAS, a Proposed Revision No. 2 of Exhibit F to the City of Eugene's Power Sales Contract No. 14-03-59191, between the Bonneville Power Administration and the Eugene Water & Electric Board, has been submitted to the Board of said Eugene Water & Electric Board at its Special Board Meeting this 27th day of May 1980, and

"WHEREAS, the revision has been found to be satisfactory to the Board, and has received approval by its General Counsel.

"BE IT RESOLVED, that Revision No. 2 of Exhibit F to Contract No. 14-03-59191 be executed by the General Manager-Secretary."

(For Revision No. 2 of Exhibit F to the City's Power Sales Contract No. 14-03-59191, see Document No. 4848 of the EWEB files.)

There being no discussion, it was moved by Mr. Craig, seconded by Mr. Bartels, to adopt the above resolution as written. Voting Yes - 4 (Pratt, Freeman, Bartels and Craig); No - 0. Motion carried.

Mr. Worcester presented Table 3 (replacing existing Table 3), Exhibit A to Contract No. EW-78-Y-83-0019 (between the Bonneville Power Administration and Eugene Water & Electric Board), which provides that BPA will operate and maintain an EWEB-owned 115 kV line terminal position in the Government's Lane Substation at EWEB's expense.

During discussion that followed, Mr. Worcester explained that the newly installed terminal position for the Hawkins Substation has replaced the tap that was removed from the Alvey/Eugene line, which is no longer necessary for any possible expansion of the EWEB service territory.

He then referred to the following resolution:

"WHEREAS, Table 3, Exhibit A to Contract No. EW-78-Y-83-0019 between the Bonneville Power Administration and the Eugene Water & Electric Board, has been submitted to the Board of said Eugene Water & Electric Board at its Special Board Meeting this 27th day of May 1980, and

"WHEREAS, the agreement has been found to be satisfactory to the Board, and has received approval by its General Counsel.

"BE IT RESOLVED, that Table 3, Exhibit A to Contract No. EW-78-Y-83-0019 be executed by the General Manager-Secretary."

(For Table 3, Exhibit A to Contract No. EW-78- -83-0019, see Document No. 6352 of the EWEB files.)

There being no further discussion, it was moved by Mr. Craig, seconded by Mr. Freeman, to adopt the above resolution as written. Voting Yes - 4 (Pratt, Freeman, Bartels and Craig); No - 0. Motion carried.

Mr. Worcester presented Contract No. DE-MS79-79BP90019 (between the Bonneville Power Administration, the Washington Public Power Supply System and Participants) which relates to the net billing payments that EWEB makes to WPPSS from Bonneville's power bill for the National Production Reactor, which is now a part of WPPSS No. 1 project.

Following an explanation of the contract and some Board discussion, primarily related to the procedures that are outlined in the contract, Mr. Worcester referred to the following resolution:

Eugene Water & Electric Board

NOTIFICATION OF RETROACTIVE FINANCING

EWEB is attempting to make weatherizing your home affordable, attractive and rewarding by developing a program to offer low interest or no interest weatherization loans to its customers. EWEB must clarify its legal authority to implement such a loan program. The clarification will require a court test of the program, which is expected to take at least one year.

Although such a financing program may never be established, EWEB continues to encourage conservation and weatherization efforts. EWEB wants to avoid creating a "wait and see" atmosphere toward weatherization while the legal problems are being addressed. Therefore, if a financing program is implemented by EWEB, it will be retroactive to May 27, 1980 -- the date on which the EWEB Board adopted the residential conservation service plan. This would mean that, if and when the financing program goes into effect, EWEB would finance any weatherization completed after May 27, 1980, if the customer qualifies and if the weatherization is completed in conformance with the financing program.

You may be able to get at least partial financing under the proposed EWEB financing program after the court authorization for weatherization work done <u>now</u> if you:

1. Obtain an EWEB Energy Analysis;
2. Ask for at least 3 bids on the weatherization work you wish to do;
3. Save your bids, receipts and invoices, and;
4. Make sure that your materials and installation comply with Federal Department of Energy Standards (available from EWEB).

The most cost effective weatherization as determined from the Energy Analysis is the most likely to be financed by EWEB if its financing program is authorized.

<u>NOTE, HOWEVER, THE ENTIRE EWEB FINANCING PROGRAM, INCLUDING ITS RETROACTIVE APPLICATION, IS CONTINGENT UPON COURT AUTHORIZATION. ANY WEATHERIZATION UNDERTAKEN SHALL BE AT THE CUSTOMER'S OWN RISK AND EXPENSE AND NO RELIANCE SHOULD BE PLACED UPON ANY STATEMENTS CONTAINED IN THIS HANDOUT.</u>

It could pay you to weatherize now with a regular bank home improvement loan at the current loan rate rather than waiting for the possibility of a low-interest or no-interest utility loan. Your bank loan will qualify for both Federal and State income tax credits and can help make up for the cost of the loan. If you itemize your deductions on your income taxes you can also take a deduction for the interest paid on your loan.

The chart below shows a comparison of loan costs to do the following weatherization items on a typical 1,100 square foot residence with electric resistance heat. The cost to weatherize your home and the savings from weatherization may be greater or smaller than what is shown here.

1. Contractor installed R-19 blown-in insulation to add to an existing R-11 layer of insulation in the ceiling -	Approx. cost	$275
2. Contractor installed R-19 batt type insulation in an already uninsulated floor -	Approx. cost	$550
3. Contractor installed 6-mil plastic vapor barrier under the house -	Approx. cost	$110
4. Material costs for "do-it-yourself" caulking and weatherstripping for doors and windows -	Approx. cost	$ 35
5. Material costs for "do-it-yourself" hot water heater insulating jacket -	Approx. cost	$ 15
		$985

COST OF $1,000 LOAN

	Bank Home Improvement Loan	Credit Union Loan	State-Sponsored Weatherization Loan	Utility Loan
Principal	$1,000.00	$1,000.00	$1,000.00	$1,000.00[1]
Date Loan Taken & Work is Done	July '80	July '80	July '80	July '81
Interest Rate	15%	12%	6½%	0%
Loan Period	36 months	36 months	36 months	---
Monthly Payment	$ 34.67	$ 33.21	$ 30.64	---
Total of Monthly Payments	$1,247.95	$1,195.71	$1,103.04	$1,000.00
State Income Tax Credit, 25% up to $125	-125.00	-125.00	- 0	- 0
Fed. Income Tax Credit, 15% up to $300	-150.00	-150.00	-150.00	-150.00
Energy Saved 6/80 - 6/81	- 95.00	- 95.00	- 95.00	- 0
Income Tax Interest Deduction for combined State and Federal tax rate of 35%	- 86.79	- 68.50	- 36.06	- 0
NET COST	$ 791.16	$ 757.21	$ 821.98	$ 850.00

1. This assumes that between July, 1980 and July, 1981, the price of weatherization does not increase.

2. The Oregon Department of Veterans Affairs offers low-interest loans for weatherization to qualified veterans, contact your nearest Department of Veterans Affairs for more information.

Appendix 4.6.6--5

Agency Commitments

VICTOR ATIYEH
GOVERNOR

Department of Environmental Quality

522 S.W. 5th AVENUE, P.O. BOX 1760, PORTLAND, OREGON 97207 PHONE (503) 229-5395

November 6, 1980

Mr. Don Arkell, Director
Lane Regional Air Pollution Authority
16 Oakway Mall
Eugene, Oregon 97401

Re: Hearing Testimony on TSP SIP

Dear Don:

The Department would like the following comments entered into your TSP SIP hearing record.

Conformance with Federal and State Requirements

Overall the effort and product of the LRAPA staff and Citizen Advisory Committee are to be complimented. The draft TSP SIP appears to present a very practical way of dealing with the non-attainment situation in a manner which is very sensitive to local conditions. The phased approach makes sense in light of further data needs to accurately access impacts and effectiveness of area source controls, and in light of possibilities of a new federal inhalable/respirable particle standard.

Other than the need for a Lowest Achievable Emission Rate (LAER) Rule, which is being developed now at the State level and should eventually be adopted by LRAPA, we believe your TSP SIP will be acceptable to the EQC and EPA. We do have some minor comments and suggestions, though, which are mentioned below.

Government Commitments

Several key elements of the plan require finalized government commitments. It is realized that obtaining adopted commitments takes time, but we would urge you to make obtaining of these commitments an item of highest priority, as success of the plan is dependent on this. Furthermore, since some commitments may need to be changed because of results of data base studies or changes in the standards, we suggest you qualify the entire SIP subject to change because of these unknowns.

Cyclone Standard

Based on comments we have had during development of our plant site emission limit rule, it has become clear to us that we must strive to adopt specific mass emission limits for as many source categories as possible. These limits

DEQ-1

should closely reflect actual emissions or performance of control systems. In keeping with this objective we recommend that you express your cyclone rule in terms of a maximum 1 ton/year emission limit for all dry wood cyclone systems. We intend to revise our Medford rule similarly.

Area Redesignation

As you know, Federal rules now recommend non-attainment designation only apply to the areas actually exceeding standards in order to avoid overly stringent control of sources that might be located in an attainment portion of a designated non-attainment area. We do believe some buffer zone should be provided around the actual non-attainment areas to allow for inaccuracies in actually identifying the non-attainment area. We understand that you believe the existing AQMA boundaries would best fit this objective. Considering the small size of the AQMA boundaries, we tend to agree with your approach.

New Source Review

We believe our draft new source review rule will adequately address the concern about keeping impacts from sources external to the AQMA at essentially a zero impact. We are proposing that mitigation be required of all major sources down to the point where their impact would not exceed 0.2 ug/m^3 annual average and 1.0 ug daily average, which is below measurable or modelled limits.

DEQ Commitments

In regard to further assistance that is needed from DEQ to carry on the Phase II effort, we will commit to assist in performing elemental analysis on up to 3 ambient sites for 18 days and 6 source samples. This assistance may be either direct lab analysis or assistance in obtaining supplemental federal funds for contracting of this work.

We will transfer the Grid model and its data bases to LRAPA and provide training in how to operate it. We are not proposing to teach LRAPA all of the intricacies of the model, as this can best be done by LRAPA hands-on-experience.

We will also provide you with the CMB program. LRAPA will have to make this program compatible with its computer, though, as the CMB program is written in a non-conforming version of Fortran.

Again, may I say that we believe LRAPA has produced a TSP SIP which will be found acceptable to the EQC and EPA, and, of most importance, will bring cleaner air to the Eugene-Springfield area in a manner most acceptable to local residents.

Sincerely,

William H. Young

WILLIAM H. YOUNG
Director

WHY:h

PUBLIC WORKS DEPARTMENT • 858 PEARL ST. • EUGENE, OREGON 97401

City of EUGENE

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LANE REGIONAL AIR POLLUTION AUTHORITY
30416

November 6, 1980

Don Arkell
Lane Regional Air Pollution Authority
16 Oakmont Way
Eugene OR 97401

Dear Don:

After reviewing our street paving activities and your request to submit a resolution to the City Council requiring additional paving, an alternative approach to reducing unpaved street dust appears to be more satisfactory.

A general paving resolution seems unnecessary. So far the City has reduced emissions from priority unpaved streets by 83 percent, mostly through normal paving activities. Only two streets, Jefferson and Lassen, were initiated by the council for air quality reasons. In my view, the technical data on the area-wide air quality benefits of paving in Eugene is not strong enough for me to recommend to the council initiating more paving of unpaved streets for this reason alone. In addition, there are worse non-traditional dust sources near many of the remaining unpaved streets. Finally, any resolution that is binding enough for SIP purposes will either have to call for paving of the remaining unpaved streets during the term of the council that passes the resolution, or it runs into the problem of binding future councils. Both of these are unacceptable.

After examining the remaining priority unpaved streets, we find that four are very likely to be paved during the next few years as a result of property owner petitions or development. These are:

Street		Annual Emissions
Fir Acres	Willagillespie to end	10.6
Port	Barger Drive to end	6.7
South Shasta Loop	Barger Drive to city limits	9.3
Dove Lane	Ruskin to end	1.7

The remaining four priority streets are less likely to be paved before 1987 through regular procedures. These are:

Kintyre	Bethel to end	16.4
Wallis/12th Avenue	Sam R. to end	30.4
Ogle	Bethel to Allane	7.6
Allane	Bethel to Ogle	5.6

Finally, we have found that Rikhoff off Bethel is not a city street as we had thought but is a county road. Rikhoff should therefore be removed from Eugene's priority unpaved road list.

An alternative approach to the suggested resolution seems viable. First, we would like you to determine that these five streets have an important air quality impact. Then we will write the adjoining property owners to inform them of your determination and the other benefits of paving and ask if they would like the street to be paved. This will probably result in a few petitions for paving and may generate enough support that the Public Works staff would recommend paving for those streets with nearly 50-percent approval by the property owners. There may also be strong opposition to paving some streets. With this information, LRAPA and Public Works could jointly determine a reasonable paving program. We would then submit to the council your determination of the importance of paving these streets, results of the property owner poll, and staff recommendations for paving.

There are obvious advantages to this approach. If some streets are not paved because of public opposition, the City has still eliminated the majority of emissions from unpaved roads. LRAPA will have a legally enforceable plan by the City and will know how large an emissions reduction to include in the SIP. This acknowledges the role of air quality with regard to unpaved roads without overemphasizing that role.

If this approach is acceptable to you, we will prepare the property owner poll as soon as you determine that the four unpaved streets are important. Please contact me if you have any questions.

Sincerely,

Terry Smith

Terry Smith
Environmental Analyst

TS:db/Thall

cc: Dave Whitlow

DRA
cc: [illegible]

CITY OF SPRINGFIELD

SPRINGFIELD, OREGON 97477

OFFICE OF THE
CITY MANAGER

325 NORTH A STREET
726-3700

November 3, 1980

Mr. Don Arkell
Director
Lane Regional Air Pollution Authority
16 Oakway Mall
Eugene OR 97401

PARTICULATE SIP DOCUMENT

Dear Don:

We have reviewed the Eugene-Springfield Air Quality Maintenance Area State Implementation Plan (SIP) for particulate matter and find the document generally acceptable. We agree with the Plan's concept of phased improvements and feel the action plan is a reasonable approach to obtaining further air quality improvement in the Eugene-Springfield area. We do, however, have some general comments as follows:

1) The Phase I strategy includes paving the "worst ten miles" within the study area by 1987. Approximately 4.7 miles of this total are within Springfield's corporate limits and some of the identified streets have already been improved during this last year. Although we will certainly do all we can to encourage the improvement of the remainder, we cannot guarantee success since the City Charter provides a remonstrance clause allowing the majority of affected property owners the right to determine the fate of any proposed public improvement project.

2) The Phase I strategy includes weatherization and insulation of approximately 50% of existing dwellings to certain standards by 1987 in order to reduce the need to burn wood or use other energy sources to heat those dwellings. Because of the magnitude of this effort, the fact that such effort on the part of home owners is presently not mandatory and the lack of low or no interest loans being available through EWEB or SUB, we question whether this strategy will be successful by 1987.

Continued Page Two

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3) The concept of growth management and strategies such as "controlled trading", "offsetting", and "banking" are sensitive issues and need to be clearly addressed by all three local governmental jurisdictions. Whatever growth management plan is adopted, control and allocation authority must remain with the Public Sector and such allocations need to be equitably administered so that industrial growth is not unfairly withheld from any geographic area.

Sometime during the next thirty days, we will present the action plan to the City Council for their review and consideration. We would like to have you and/or your staff present to aid in the presentation. We will notify you of a definite schedule as soon as it is established.

Thank you for the opportunity to comment on the draft AQMA plan.

Sincerely,

Steven C. Burkett

Steven C. Burkett
City Manager

CITY OF SPRINGFIELD

rah

cc: Mike Kelly, Public Works Director

Appendix 4.6.6--6

State of Oregon Draft New Source Review Rule

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY — INTEROFFICE MEMO

TO: See Attached List

DATE: Dec. 2, 1980

FROM: Lloyd Kostow, Air Quality Division, DEQ

SUBJECT: Discussion Drafts of New Source Review and Plant Site Emission Limit Rules

DEQ is preparing proposed revisions to the New Source Review and Plant Site Emission Limit Rules. I am circulating the attached discussion drafts to interested persons for preliminary comment.

The New Source Review rule revisions will correct deficiencies in the DEQ rules which were identified by EPA and will consolidate the new source requirements for nonattainment and attainment areas into one rule. DEQ is also proposing an offset/banking program and the development of growth sources.

DEQ's present plan is to request authorization to hold a hearing on these revisions at the January EQC Meeting.

If you have any questions or comments, please feel free to telephone them to me or send them in writing by December 19. I shall be happy to meet with interested groups to discuss the drafts or to receive comments or suggestions. My phone number is 229-5186.

LK:i
Attachments
AI604

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LANE REGIONAL AIR POLLUTION AUTHORITY

DRAFT PLANT SITE EMISSION LIMIT RULES

340-20-186 Requirement for Plant Site Emission Limits

Plant site emission limits (PSEL) shall be incorporated in all regular permits as a means of allocating and managing airshed capacity. All sources subject to regular permit requirements shall be subject to PSELs for at least all Federal criteria pollutants. PSELs will be incorporated in permits when permits are renewed, modified, or newly issued.

The emissions limits established by PSELs shall provide the basis for:

1. Assuring that reasonable further progress is being achieved toward attaining compliance with ambient air standards.
2. Assuring that compliance with ambient air standards and Prevention of Significant Deterioration increments is being maintained.
3. Administering offset, banking and bubble programs.
4. Establishing the baseline for Prevention of Significant Deterioration Increments.

340-20-187 Definitions

1. "Actual Emissions" means the rate of emissions of a pollutant which is representative of actual operation of a source.

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AIR POLLUTION AUTHORITY

Actual emissions shall be calculated using emission factors and the sources actual control equipment, operating hours, production rates, and types of materials processed, stored or combusted. The Department may require specific source tests to determine appropriate emission factors.

2. "Baseline Emissions for Nonattainment Areas" means the mass emission rate allowed by specific source category mass emission limits in the State Implementation Plan and based on actual operating levels for the calendar year 1978. For sources where the State Implementation Plan does not specify a specific mass emission limit, the allowed emission rate shall be based on the actual mass emissions for 1978. For areas designated nonattainment in the future, baseline emissions shall mean the same as for existing nonattainment areas except that the baseline year shall be the year in which the area is designated nonattainment.

3. "Baseline Emissions for Attainment or Unclassified Areas" means actual emission during the calendar year 1978 for a source located in an attainment or unclassified area.

4. "Plant Site Emission Limit (PSEL)" means the total allowed emissions of an individual air pollutant specified in a permit for a contiguous plant site which is under one ownership.

340-20-188 Criteria for Establishing Plant Site Emission Limits

1. PSELs shall be based on the sum of actual emissions for a particular pollutant at a plant site. PSELs shall be established on at least an annual and maximum daily or hourly basis and shall be derived from the best emission factors, source tests, and other information available.
2. PSELs may be established separately within a particular source for process emissions, combustion emissions, and fugitive emissions.
3. Documentation of PSEL calculations shall be available to the permittee and other interested parties for review.
4. For new sources PSELs shall be based on application of applicable control equipment and projected operating conditions.
5. For existing sources PSELs shall be based on baseline emissions for the nonattainment, attainment, or unclassified area whichever is applicable.
6. PSEL may be changed when:
    a. Errors are found or better data is available for calculating PSELs,
    b. More stringent control is required by a rule adopted by the Environmental Quality Commission,
    c. Application is made to modify a permit pursuant to the New Source Review and permit requirements and a growth increment, offset or Prevention of Significant Deterioration increment is available.

Draft New Source Review

Regulation

Program Planning and Development Section

Air Quality Division

Department of Environmental Quality

December 1, 1980

Introduction-

The purpose of this proposed regulation is to update the New Source Review provisions of the State Implementation Plan. In addition, the new source requirements of the Prevention of Significant Deterioration provisions have been incorporated into this regulation.

AQ0958.B (DRAFT ONLY)

Index

340-20-220 Applicability

1. No owner or operator shall commence construction of a major source or a major modification of an air contaminant source without having received an Air Contaminant Discharge Permit from the Department of Environmental Quality and having satisfied OAR 340-20-230 through 280 of these Rules.

2. Owners or operators of proposed non-major sources or non-major modifications are not subject to these New Source Review rules. Such owners or operators should refer to the rules for Notice of Construction and Approval of Plans (OAR 340-20-020 to 032) and Air Contaminant Discharge Permits (OAR 340-20-140 to 185) for applicable requirements.

340-20-225 Definitions

1. "Actual emissions" means the rate of emissions of a pollutant which is representative of actual operation of a source. Actual emissions shall be directly measured or shall be calculated using emission factors and the sources actual control equipment, operating hours, production rates, and types of materials processed, stored, or combusted. The Department may require specific source tests to determine appropriate emission factors.

2. "Allowable emissions" means the rate of emissions of a pollutant specifically established and quantifed in an Air Contaminant Discharge Permit. If the allowable emissions have not been specifically established and quantified in an Air Contaminant Discharge Permit, the allowable emissions shall be the actual emissions of the source during the baseline year (1978). In no case shall the allowable emissions exceed limits specified in a Department regulation or the emission limits specified in an applicable new source performance standard or standard for hazardous air pollutants.

3. "Baseline Concentration" means that ambient concentration level for a particular pollutant which existed in an area during the calendar year 1978. If no ambient air quality data is available in an area, the baseline concentration may be estimated using modeling based on actual emissions for 1978.

4. "Best Available Control Technology (BACT)" means an emission limitation (including a visible emission standard) based on the maximum degree of reduction of each air contaminant subject to regulation under the Clean Air Act which would be emitted from any proposed major source or major modification which, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such air contaminant. In no event, shall the

application of BACT result in emissions of any air contaminant which would exceed the emissions allowed by any applicable new source performance standard or any standard for hazardous air pollutants. If an emission limitation is not feasible, a design, equipment, work practice, or operational standard, or combination thereof, may be required. Such standard shall, to the degree possible, set forth the emission reduction achievable and shall provide for compliance by prescribing appropriate permit conditions.

5. "Commence" means that the owner or operator has obtained all necessary preconstruction approvals or permits from the Department of Environmental Quality and either has:

   a. Begun, or caused to begin, a continuous program of actual on-site construction of the source to be completed in a reasonable time, or

   b. Entered into binding agreements or contractual obligations, which cannot be canceled or modified without substantial loss to the owner or operator, to undertake a program of construction of the source to be completed in a reasonable time.

6. "Construction" means any physical change (including fabrication, erection, installation, demolition, or modification of an emissions unit) or change in the method of operation of a source

which would result in a change in actual emissions.

7. "Dispersion Technique" means any air contaminant control procedure which depends upon varying emissions with atmospheric conditions including but not limited to supplementary or intermittent control systems and excessive use of enhanced plume rise.

8. "Emissions Banking" means to presently reserve, subject to requirements of these provisions, emission reductions for use by the reserver or his assignee for future compliance with air pollution reduction requirements.

9. "Emissions Unit" means any part of a stationary source (including specific process equipment) which emits or would have the potential to emit any pollutant subject to regulation under the Clean Air Act.

10. "Fugitive emissions" means emissions of any air contaminant which escape to the atmosphere from any point that is not identifiable as a stack, vent, or duct.

11. "Good Engineering Practice Stack Height" means that stack height necessary to insure that emissions from the stack do not result in excessive concentrations of any air contaminant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, and wakes which may be created by the source structure, nearby structures, or nearby terrain obstacles and

shall not exceed the following:

a. 30 meters, for plumes not influenced by structures or terrain;

b. $H_G = H + 1.5\ L$, for plumes influenced by structures;

Where H_G = good engineering practice stack height,

H = height of structure or nearby structure,

L = lesser dimension (height or width) of the structure or nearby structure,

c. Such height as an owner or operator demonstrates, after notice and opportunity for public hearing, is necessary to avoid plume downwash.

12. "Lowest Achievable Emission Rate (LAER)" means that rate of emissions which reflects a) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or b) the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent. In no event, shall the application of this term permit a proposed new or modified source to emit any air contaminant in excess of the amount allowable under applicable new source performance

standards or standards for hazardous air pollutants.

13. "Major Modification" means any physical change or change of operation of a major source that would result in a net significant emission rate increase (as defined in definition 19) for any pollutant subject to regulation under the Clean Air Act. These cutoff levels also apply to any pollutants not previously emitted by the source. Calculations of net emission increases must take into account all accumulated increases and decreases in actual emissions occurring at the source since January 1, 1978, or since the time of the last construction approval issued for the source pursuant to the New Source Review Regulations, whichever time is more recent.

14. "Major source" means a stationary source which emits, or has the potential to emit, any pollutant regulated under the Clean Air Act at a Significant Emission Rate (as defined in definition 19).

15. "Potential to Emit" means the capability at maximum design capacity to emit an air pollutant after the application of air pollution control equipment. Enforceable permit conditions limiting emissions, the type or amount of fuel burned or the hours or rate of operation of a source shall be included in calculating potential to emit.

16. "Reconstruction" of a source or emission unit occurs when the fixed capital cost of the new components exceed 50 percent of

the fixed capital cost of a comparable entirely new source or emission unit.

17. "Resource Recovery Facility" means any facility at which municipal solid waste is processed for the purpose of extracting, converting to energy, or otherwise separating and preparing municipal solid waste for reuse. Energy conversion facilities must utilize municipal solid waste to provide 50% or more of the heat input to be considered a resource recovery facility.

18. "Secondary Emissions" means emissions from new or existing sources which occur as a result of the construction and/or operation of a source or modification, but do not come from the source itself. Secondary emissions must impact the same general area as the source associated with the secondary emissions. Secondary emissions may include, but are not limited to:

a. Emissions from automobiles, ships, trucks and trains coming to or from a facility,

b. Emissions from off-site support facilities which would be constructed or would otherwise increase emissions as a result of the construction of a source or modification.

c. Emissions (including fugitive emissions) resulting from modifications of traffic patterns or the addition of parking facilities.

19. "Significant emission rate" means emission rates equal to or greater than the following for air pollutants regulated under the Clean Air Act.

Table 1: Significant Emission Rates for Pollutants Regulated under the Clean Air Act

Pollutant	Significant Emission Rate
Carbon Monoxide	100 tons/year
Nitrogen Oxides	40 tons/year
Particulate Matter*	25 tons/year
Sulfur Dioxide	40 tons/year
Volatile Organic Compounds*	40 tons/year
Lead	0.6 ton/year
Mercury	0.1 ton/year
Beryllium	0.0004 ton/year
Asbestos	0.007 ton/year
Fluorides	3 tons/year
Sulfuric Acid Mist	7 tons/year

Hydrogen Sulfide	10 tons/year
Total reduced sulfur (including hydrogen sulfide)	10 tons/year
Reduced sulfur compounds (including hydrogen sulfide)	10 tons/year

/

Any emissions increase less than these rates associated with a new source or modification which would construct within 10 kilometers of a Class I area, and would have an impact on such area equal to or greater than 1 ug/m^3 (24 hour average) shall be deamed to be emitting at a significant emission rate.

* For the nonattainment portions of the Medford-Ashland Air Quality Maintenance Area, the Significant Emission Rates for particulate matter and volatile organic compounds are defined in Table 2.

Table 2: Significant Emission rates for the Nonattainment Portions of the Medford-Ashland Air Quality Maintenance Area.

	Emission Rate					
	Annual		Day		Hour	
Air Contaminant	Kilograms	(tons)	Kilograms	(lbs)	Kilograms	(lbs)
Particulate Matter	4,500	(5.0)	23	(50.0)	4.6	(10.0)

(TSP)						
Volatile Organic Compound (VOC)	18,100	(20.0)	91	(200)	--	--

21. "Significant Air Quality Impact" means an ambient air quality impact which is equal to or greater than:

	Pollutant Averaging Time				
Pollutant	Annual	24-hour	8-hour	3-hour	1-hour
SO_2	1.0 ug/m^3	5 ug/m^3		25 ug/m^3	
TSP	0.2 ug/m^3	1.0 ug/m^3			
NO_2	1.0 ug/m^3				
CO			0.5 mg/m^3		2 mg/m^3

For sources of volatile organic compounds (VOC), a major source or major modification will be deemed to have a significant impact if it is located within 30 kilometers of an ozone nonattainment area.

22. "Source" means any building, structure, facility, or installation which emits or is capable of emitting air contaminants to the atmosphere and is located on one or more contiguous or adjacent properties and is owned or operated by the same person or by persons under common control.

340-20-230 Procedural Requirements

1. Information Required

The owner or operator of a proposed major source or major modification shall submit all information necessary to perform any analysis or make any determination required under these Rules. Such information shall include, but not be limited to:

a. A description of the nature, location, design capacity, and typical operating schedule of the source or modification, including specifications and drawings showing its design and plant layout;

b. An estimate of the amount and type of each air contaminant emitted by the source in terms of hourly, daily, seasonal, and yearly rates, showing the calculation procedure;

c. A detailed schedule for construction of the source or modification;

d. A detailed description of the system of continuous emission reduction which is planned for the source or modification, and any other information necessary to determine that best available control technology or lowest achievable emission rate technology, whichever is applicable, would be applied;

e. To the extent required by these rules, an analysis of the air quality impact of the source or modification, including meteorological and topographical data, specific details of models used, and other information necessary to estimate air quality impacts; and

f. To the extent required by these rules, an analysis of the air quality impacts, and the nature and exent of all commercial, residential, industrial, and other growth which has occurred since

January 1, 1978, in the area the source or modification would affect.

2. Other Obligations

Any owner or operator who constructs or operates a source or modification not in accordance with the application submitted pursuant to these Rules or with the terms of any approval to construct, or any owner or operator of a source or modification subject to this section who commences construction after the effective date of these regulations without applying for and receiving an Air Contaminant Discharge Permit, shall be subject to appropriate enforcement action.

Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, if construction is discontinued for a period of 18 months or more, or if construction is not completed within 18 months of the scheduled time. The Department may extend the 18-month period upon satisfactory showing that an extension is justified. This provision does not apply to the time period between construction of the approved phases of a phased construction project; each phase must commence construction within 18 months of the projected and approved commencement date.

Approval to construct shall not relieve any owner or operator of the responsibility to comply fully with applicable provisions of the State Implementation Plan and any other requirements under local, State, or Federal law.

3. Public Participation

a. Within 30 days after receipt of an application to construct, or any addition to such application, the Department shall advise the applicant of any deficiency in the application or in the information submitted. The date of the receipt of a complete application shall be, for the purpose of this section, the date on which the Department received all required information.

b. As expeditiously as possible but at least within six months after receipt of a complete application, the Department shall make a final determination on the application. This involves performing the following actions in a timely manner.

A. Make a preliminary determination whether construction should be approved, approved with conditions, or disapproved.

B. Make available in at least one location in the region in which the proposed source or modification would be constructed, a copy of the preliminary determination and a copy or summary of other materials, if any, considered in making the preliminary determination.

C. Notify the public, by advertisement in a newspaper of general circulation in the area in which the proposed source or modification would be constructed, of the application, the preliminary determination, the extent of increment consumption that is expected from the source or modification, and the opportunity for a public hearing and for written public comment.

D. Send a copy of the notice of opportunity for public comment to the applicant and to officials and agencies having cognizance over the location where the proposed construction would occur as follows: The chief executives of the city and county where the source or modification would be located, any comprehensive regional land use planning agency, any State, Federal Land Manager, or Indian Governing Body whose lands may be affected by emissions from the source or modification, and the Environmental Protection Agency.

E. Upon determination that significant interest exists provide opportunity for a public hearing for interested persons to appear and submit written or oral comments on the air quality impact of the source or modification, alternatives to the source or modification, the control technology required, and other appropriate considerations.

F. Consider all written comments submitted within a time specified in the notice of public comment and all comments received at any public hearing(s) in making a final decision on the approvability of the application. No later than 10 days after the close of the public comment period, the applicant may submit a written response to any comments submitted by the public. The Department shall consider the applicant's response in making a final decision. The Department shall make all comments available for public inspection in the same locations where the Department made available preconstruction information relating to the proposed source or modification.

G. Make a final determination whether construction should be approved, approved with conditions, or disapproved pursuant to this section.

H. Notify the applicant in writing of the final determination and make such notification available for public inspection at the same location where the Department made available preconstruction information and public comments relating to the source or modification.

340-20-235 Review of New Sources and Modifications for Compliance With Regulations

The owner or operator of a proposed major source or major modification must demonstrate the ability of the proposed source or modification to comply with all applicable requirements of the Department of Environmental Quality and shall obtain an Air Contaminant Discharge

Permit.

340-20-240 Requirements for Sources in Nonattainment Areas

New major sources and major modifications which are located in designated nonattainment areas shall meet the requirement listed below.

Any proposed emissions unit which would in and of itself constitute a major source and any modification of a source or emissions unit (including reconstructions) which would in and of itself constitute a major modification shall be subject to these requirements regardless of emission reductions occurring elsewhere.

1. Lowest Achievable Emission Rate

The owner or operator of the proposed major source or major modification must demonstrate that the source or modification will comply with the lowest achievable emission rate (LAER). In the case of a major modification, the requirement for LAER shall apply only to each new or modified emission unit. For phased construction projects, the determination of LAER shall be reviewed at the latest reasonable time prior to commencement of construction of each independent phase.

2. Source Compliance

The owner or operator of the proposed major source or major modification must demonstrate that all major sources owned or operated by such person (or by an entity controlling, controlled by, or under common control with such person) in the State are in compliance or on a schedule for compliance, with all applicable emission limitations and standards under the Clean Air Act.

3. Growth Increment or Offsets

The owner or operator of the proposed major source or major modification must demonstrate that the source or modification will comply with any established emissions growth increment for the particular area in which the source is located or must provide emission reductions ("offsets") as specified by these rules. A combination of growth increment allocation and emission reductions may be used to demonstrate compliance with this section. Those emission increases for which offsets are reasonably available shall not be eligible for a growth increment allocation.

4. Net Air Quality Benefit

For cases in which emission reductions or offsets are required, the applicant must demonstrate that a net air quality benefit will be achieved in the affected area as described in OAR 340-20-260 (Requirements for Net Air Quality Benefit).

5. Alternative Analysis

An alternative analysis must be conducted for new major sources or major modifications of sources emitting volatile organic compounds or carbon monoxide locating in nonattainment areas.

This alternative anlaysis must include an analysis of alternative sites, sizes, production processes, and environmental control techniques for such proposed source or modification which demonstrates that benefits of the proposed source or modification significantly outweigh the environmental and social costs imposed as a result of its location, construction or modification.

6. Special Exemption for the Salem Ozone Nonattainment Area

Proposed major sources and major modifications of sources of volatile organic compounds which are located in the Salem Ozone nonattainment area shall comply with the requirements of Sections 1 and 2 of OAR 340-20-240 but are exempt from all other sections of this rule.

7. Growth Increments

a. Medford-Ashland Ozone Nonattainment Area

The ozone control strategy for the Medford-Ashland nonattainment area establishes a growth increment for new major sources or major modifications which will emit volatile organic compounds. The cumulative volatile organic compound growth increment may be allocated as follows:

year	cummulative volatile organic compound growth increment
1980 to 1982	185 tons of VOC
1983	388
1984	591
1985	794
1986	997
1987	1200

No single owner or operator shall receive an allocation of more than 50% of any remaining growth increment in any one year. The growth increment shall be allocated on a first come-first served basis depending on the date of submittal of a complete permit application.

340-20-245 Requirements for Sources in Attainment or Unclassified Areas
(Prevention of Significant Deterioration)

New Major Sources or Major Modifications locating in areas designated attainment or unclassifiable shall meet the following requirements:

1. Best Available Control Technology

The owner or operator of the proposed major source or major modification shall apply best available control technology (BACT) for each pollutant which is emitted at a significant emission rate (OAR 340-20-225 definition 19). In the case of a major modification, the requirement for BACT shall apply only to each new or modified emission unit. For phased construction projects, the determination of BACT shall be reviewed at the latest reasonable time prior to commencement of construction of each independent phase.

2. Air Quality Analysis

The owner or operator of the proposed major source or major modification shall demonstrate that emission increases of any pollutant emitted at a significant emission rate (OAR 340-20-225 definition 19), in conjunction with all other applicable emissions increases and reductions, would not cause or contribute to air quality levels in excess of:

a. Any State or National ambient air quality standard, or

b. Any applicable increment established by the Prevention of Significant Deterioration requirements (OAR 340-31-110), or

c. An impact on a designated nonattainment area greater than the significant air quality impact levels (OAR 340-20-225 definition 21).

3. Exemption for Sources Not Significantly Impacting Designated Nonattainment Areas.

A proposed major source is exempt from OAR 340-20-245 if:

a. The proposed source does not have a significant air quality impact on a designated nonattainment area, and

b. The potential emissions of the source are less than 100 tons/year for sources in the categories listed in Table 3 or less than 250 tons/year for sources not in the categories listed in Table 3.

Major modifications are not exempted under this section.

Table 3: Categories of Sources Subject to the 100 ton/year Cutoff Criteria.

1. Fossil fuel-fired steam electric plants of more than 250 million BTU/hour heat input

2. Coal cleaning plants (with thermal dryers)

3. Kraft pulp mills

4. Portland cement plants

5. Primary Zinc Smelters

6. Iron and Steel Mill Plants

7. Primary aluminum ore reduction plants

8. Primary copper smelters

9. Municipal Incinerators capable of charging more than 250 tons of refuse per day

10. Hydrofloric, sulfuric and nitric acid plants

11. Sulfuric acid plants

12. Nitric acid plants

13. Petroleum Refineries

14. Lime plants

15. Phosphate rock processing plants

16. Coke oven batteries

17. Sulfur recovery plants

18. Carbon black plants (furnace process)

19. Primary lead smelters

20. Fuel conversion plants

21. Sintering plants

22. Secondary metal production plants

23. Chemical process plants

24. Fossil fuel fired boilers (or combinations thereof) totaling more than 250 million BTU per hour heat input

25. Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels

26. Talconite ore processing plants

27. Glass fiber processing plants

28. Charcoal production plants

4. Air Quality Models

All estimates of ambient concentrations required under these Rules shall be based on the applicable air quality models, data bases, and other requirements specified in the "Guideline on Air Quality Models" (OAQPS 1.2-080, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C. 27711, April 1978). Where an air quality impact model specified in the "Guideline on Air Quality Models" is inappropriate, the model may be modified or another model substituted. Such a change must be subject to notice and opportunity for public comment. The written approval of the Department must be obtained for any modification or substitution. Methods like those outlined in the "Workbook for the Comparison of Air Quality Models" (U.S. Environmental Proteciton Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C. 27711, May, 1978) should be used to determine the comparability of air quality models.

5. Air Quality Monitoring

a. The owner or operator of a proposed major source or major modification shall submit with the application, subject to approval of the Department, an analysis of ambient air quality in the area of the proposed project. This analysis shall be conducted for each pollutant emitted at a significant emission rate by the proposed source or modification. As necessary to establish ambient air quality levels, the analysis shall include continuous air quality monitoring data for any pollutant emitted by the source or modification for which a State or National ambient air quality standard has been established, except for nonmethane hydrocarbons. Such data shall relate to, and shall have been gathered over the year preceding receipt of the complete application, unless the owner or operator demonstrates that such data gathered over a portion or portions of that year or another representative year would be adequate to determine that the source or modification would not cause or contribute to a violation of an ambient air quality standard.

The Department may exempt a proposed major source or major modification from monitoring for a specific pollutant if the owner or operator demonstrates that the air quality impact from the emissions increase would be less than the following amounts:

Carbon monoxide - 575 ug/m^3, 8 hour average

Nitrogen dioxide - 14 ug/m^3, annual average

Total suspended particulate - 10 ug/m^3, 24 hour average

Sulfur dioxide - 13 ug/m^3, 24 hour average

Ozone - Any net increase of 100 tons/year or more of volatile organic compounds from a source or modification subject to PSD is required to perform an ambient impact analysis, including the gathering of ambient air quality data.

Lead - 0.1 ug/m^3, 24 hour average
Mercury - 0.25 ug/m^3, 24 hour average
Beryllium - 0.0005 ug/m^3, 24 hour average
Fluorides - 0.25 ug/m^3, 24 hour average
Vinyl chloride - 15 ug/m^3, 24 hour average
Total reduced sulfur - 10 ug/m^3, 1 hour average
Hydrogen sulfide - 0.04 ug/m^3, 1 hour average
Reduced sulfur compounds - 10 ug/m^3, 1 hour average

b. The owner or operator of a proposed major source or major modification shall, after construction has been completed, conduct such ambient air quality monitoring as the Department may require as a permit condition to establish the affect which emissions of a pollutant for which an ambient air quality standard exists (other than nonmethane hydrocarbons) may have, or is having, on air quality in any area which such emissions would affect.

6. Additional Impact Analysis

a. The owner or operator of a proposed major source or major modification shall provide an analysis of the impairment to visibility, soils and vegetation that would occur as a result of the source or modification and general commercial, residential, industrial and other growth associated with the source or modification. The owner or operator may be exempted from providing an analysis of the impact on vegetation having no significant commercial or recreational value.

b. The owner or operator shall provide an analysis of the air quality concentration projected for the area as a result of general commercial, residential, industrial and other growth associated with the major source or modification.

7. Sources Impacting-Class I Areas

Where a proposed major source or major modification impacts or may impact a Class I area, the Department shall provide notice to the Environmental Protection Agency and to the appropriate Federal Land Manager of the receipt of such permit application and of any preliminary and final actions taken with regard to such application. The Federal Land Manager shall be provided an opportunity in accordance with OAR 340-20-230 Section 3 to present a demonstration that the emissions from the proposed source or modification would have an adverse impact on the air quality related values (including visibility) of any Federal mandatory Class I lands, notwithstanding that the change in air quality resulting from emissions from such source or modification would not cause or contribute to concentrations which would exceed the maximum allowable increment for a Class I area.

8. PSD Offsets

If the owner or operator of a proposed major source or major modification wishes to provide emission offsets such that a net air quality benefit (OAR 340-20-260) is provided, the Department may exempt such source or modification from the requirements of OAR 340-20-245 sections 2, 4, 5, and 6.

340-20-250 Exemptions

1. Resource recovery facilities burning municipal refuse and sources subject to federally mandated fuel switches may be exempted by the Department from requirements OAR 340-20-240 Sections 3 and 4 provided that:

   a. No growth increment is available for allocation to such source or modification, and

   b. The owner or operator of such source or modification demonstrates that every effort was made to obtain sufficient offsets, that every available offset was secured, and that offsets will continue to be sought and applied when they become available.

   Such an exemption may result in a need to revise the State Implementation Plan to require additional control of existing sources.

2. Temporary emission sources, such as pilot plants, portable facilities, and emissions resulting from the construction phase of a new source or modification must comply with LAER or BACT,

whichever is applicable, but are exempt from the remaining requirements of OAR 340-20-240 and OAR 340-20-245.

340-20-255 Baseline for Determining Credit for Offsets

The baseline for determining credit for emission offsets shall be the actual emission rate during calendar year 1978 for the source providing the offsets. Sources in violation of air quality emission limitations may not supply offsets from those emissions which are or were in excess of allowable emission rates. Offsets, including offsets from mobile and area source categories, must be quantifiable and enforceable and must be demonstrated to remain in effect throughout the life of the proposed source or modification.

Offsets may not be provided from the amount of emission reduction required by an air quality regulation or air quality attainment strategy that has been reserved by the Environmental Quality Commission (OAR 340-20-280).

340-20-260 Requirements for Net Air Quality Benefit

Demonstrations of net air quality benefit must include the following.

1. A demonstration must be provided showing that the proposed offsets will improve air quality in the same geographical area affected by the new source or modification. Generally, offsets for volatile organic compounds or nitrogen oxides may be within the same air basin as the proposed source. Offsets for total

suspended particulate, sulfur dioxide, carbon monoxide and other pollutants should be within the impacted area.

2. For new sources or modifications locating within a designated nonattainment area, the emission offsets must provide equivalent or greater emission reductions in terms of hourly, daily, seasonal, and yearly time periods as appropriate to the source and pollutant under consideration. For new sources or modifications locating outside of a designated nonattainment area which have a significant air quality impact (OAR 340-20-225 definition 21) on the nonattainment area, the emission offsets must be sufficient to reduce impacts to levels below the significant air quality impact level within the nonattainment area. Sources of volatile organic compounds located in or within 30 kilometers of an ozone nonattainment area shall provide equivalent or greater emission reductions.

3. The emission reductions must be of the same type of pollutant as the emissions from the new source or modification. Sources of fine particulate must be offset with particulate in a similar size range. Precursor offsets may be acceptable in areas where atmospheric reactions contribute to pollutant levels and a net air quality benefit can be shown.

4. The emission reductions must be contemporaneous, that is, the reductions must take effect simultaneously or within the year prior to the submittal of a complete permit application for the new source or modification. The Department may increase this time limitation as provided for in OAR 340-20-265 (Emissions

Banking). In the case of replacement facilities, the Department may allow simultaneous operation of the old and new facilities during the startup period of the new facility provided that net emissions are not increased during that time period.

340-20-265 Emissions Banking

The owner or operator of a source of air pollution who wishes to reduce emissions by implementing more stringent controls than required by a permit or by an applicable regulation may bank such emission reductions. Cities, counties or other local jurisdictions may participate in the emissions bank in the same manner as a private firm. Emissions banking shall be subject to the following conditions:

1. To be eligble for banking emission reductions must be in terms of actual emission decreases resulting from continuous control of existing sources.

2. Emission reductions may be banked for a specified period not to exceed five years unless extended by the Commission, after which time such reductions will revert to the Department for use in attainment and maintenance of air quality standards or to be allocated as a growth margin.

3. Emission reductions which are required pursuant to an adopted rule or those that are reserved for control strategies pursuant to OAR 340-20-280 shall not be banked.

4. Source shutdowns or curtailments are not eligible for banking by the owner or operator but will be banked by the Department for use in attaining and maintaining standards. The Department may allocate these emission reductions as a growth increment for area and point sources. Source shutdowns or curtailments may be used for contemporaneous offsets as provided in OAR 340-20-260 (4).

5. Option 1:

A moratorium on the use of banked emissions shall be declared by the Commission if it is established that reasonable further progress toward attainment of the air quality standards is not being achieved.

Option 2:

The amount of banked emissions shall be discounted for a particular source category when new regulations requiring emission reductions are adopted by the Commission. The amount of discounting of banked emissions shall be calculated on the same basis as the reductions required for existing sources which are subject to the new regulation.

Option 3:

The amount of banked emissions may be uniformly discounted by action of the Commission if it is established that reasonable further progress toward attainment of air quality standards is not being achieved.

6. Emission reductions must be in the amount of 25 tons per year or more to be eligible for banking.

7. Emission reductions are eligible to be banked if the following documentation is provided to the Department:

   a. A detailed description of the processes controlled,
   b. Emission calculations showing the types and amounts of actual emissions reduced,
   c. The date or dates of such reductions,
   d. Identification of the probable uses to which the banked reductions are to be applied,
   e. Procedure by which such emission reductions can be rendered permanent and enforceable.

8. Requests for emissions banking shall be submitted to the Department prior to or within the year following the actual emissions reduction. The Department shall approve or deny requests for emissions banking and, in the case of approvals, shall issue a letter to the owner or operator defining the terms of such banking. The Department shall take steps to insure the enforceability of the banked emission reductions by including appropriate conditions in Air Contaminant Discharge Permits and by appropriate revision of the State Implementation Plan.

9. The Department shall provide for the allocation of the banked emissions in accordance with the uses specified by the owner or operator providing the emission reductions. These specified

uses must be compatible with local comprehensive plans, Statewide planning goals, and Department rules.

340-20-270 Fugitive and Secondary Emissions

Fugitive emissions shall be included in the calculation of emission rates of all air contaminants. Fugitive emissions are subject to the same control requirements and analyses required for emissions from identifiable stacks or vents. Secondary emissions need not be included in emission calculations which are made to determine if a proposed source or modification is major. Once a source or modification is identified as being major, secondary emissions must be added to the primary emissions for purposes of these rules.

340-20-275 Stack Heights

1. The degree of emission limitation required for any air contaminant regulated under these rules shall not be affected in any manner by so much of the stack height as exceeds good engineering practice or by any other dispersion technique.

2. Paragraph 1 of this section shall not apply with respect to stack heights in existence before December 31, 1970, or to dispersion techniques implemented before that date.

340-20-280 Reserved Control Strategies

The Environmental Quality Commission may reserve control strategies which are under consideration for inclusion in the State Implementation Plan. Emission reductions from sources in those categories that have been identified for future control may not be banked or used for offsets.

The following categories of volatile organic compound sources are hereby reserved in the Portland ozone nonattainment area.

1 - Annual Automobile Inspection Maintenance Program

2 - Architectural Coatings

3 - Gasoline Service Stations, Stage II

4 - Barge and Vessel loading of gasoline and other light petroleum products

5 - Paper coating in manufacturing

6 - Petroleum Base (Stoddard) Dry Cleaners

Appendix 4.6.6--7

Field Burning Performance Standards

DIVISION 26

AGRICULTURAL OPERATIONS

Agricultural Burning

Definitions

340-26-005 As used in this general order, regulation, and schedule, unless otherwise required by context:

(1) Burning seasons:

(a) "Summer burning season" means the four-month period from July 1 through October 31.

(b) "Winter burning season" means the eight-month period from November 1 through June 30.

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

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

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

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

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

(b) Areas within one mile of airports servicing regularly scheduled airline flights.

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

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

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

(6) "Prohibition conditions" means atmospheric conditions under which all agricultural open burning is prohibited (except where an auxiliary fuel is used such that combustion is nearly complete, or an approved sanitizer is used, or burning is specifically authorized by the Department for experimental purposes pursuant to section 340-26-013(6) or for the purpose of confirming forecasted atmospheric dispersion conditions).

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

(8) "Ventilation Index (VI)" means a calculated value used as a criterion of atmospheric ventilation capabilities. The Ventilation Index as used in these rules is defined by the following identity:

Mixed depth (feet)/1000 times the average wind speed through the effective mixing height (knots).

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

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

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

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

(11) "Local fire permit issuing agency" means the county court or board of county commissioners, or fire chief of a rural fire protection district or other person authorized to issue fire permits pursuant to ORS 477.515, 477.530, 476.380, or 478.960.

(12) "Open field burning permit" means a permit issued by the Department pursuant to ORS 468.458.

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

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

(15) "Open field burning" means burning of any perennial grass seed field, annual grass seed field, or cereal grain field in such manner that combustion air and combustion products are not effectively controlled.

(16) "Backfire burning" means a method of burning fields in which the flame front does not advance with the existing surface winds. The method requires ignition of the field only on the downwind side.

(17) "Into-the-wind strip burning" means a modification of backfire burning in which additional lines of fire are ignited by advancing directly into the existing surface wind after completing the initial backfires. The technique increases the length of the flame front and therefore reduces the time required to burn a field. As the initial burn nears approximately 85% completion, the remaining acreage may be burned using headfiring techniques in order to maximize plume rise.

(18) "Perimeter burning" means a method of burning fields in which all sides of the field are ignited as rapidly as practicable in order to maximize plume rise. Little or no preparatory backfire burning shall be done.

(19) "Regular headfire burning" means a method of burning fields in which substantial preparatory backfiring is done prior to ignition of the upwind side of the field.

(20) "Approved alternative method(s)" means any method approved by the Department to be a satisfactory alternative method to open field burning.

(21) "Approved interim alternative method" means any interim method approved by the Department as an effective method to reduce or otherwise minimize the impact of smoke from open field burning.

(22) "Approved alternative facilities" means any land, structure, building, installation, excavation, machinery, equipment, or device approved by the Department for use in conjunction with an approved alternative method or an approved interim alternative method for field sanitation.

(23) "Drying day" means a 24-hour period during which the relative humidity reached a minimum less than 50% and no rainfall was recorded at the nearest measuring site.

(24) "Basic quota" means an amount of acreage established for each permit jurisdiction, including fields located in priority areas, in a manner to provide, as reasonably as practicable, an equitable opportunity to burn.

(25) "Priority area quota" means an amount of acreage established for each permit jursidiction, for fields in priority areas, in a manner to provide, as reasonably as practicable, an equitable opportunity to burn.

(26) "Effective mixing height" means either the maximum height of actual plume rise as determined by aircraft measurement or the calulated mixing height, whichever is greater.

(27) "Cumulative hours of smoke intrusion in the Eugene-Springfield area" means the average of the totals of cumulative hours of smoke intrusion recorded for the Eugene site and the Springfield site. Provided the Department determines a smoke intrusion to have been significantly contributed to by field burning, it shall record for each hour of the intrusion which causes the nephelometer hourly reading to exceed background levels (the average of the three hourly readings immediately prior to the intrusion) by:

(a) 5.0×10^{-4} b-scat units or more, two hours of smoke intrusion;

(b) 4.0×10^{-4} b-scat units or more, for intrusions after September 15 of each year, two hours of smoke intrusion;

(c) 1.8×10^{-4} b-scat units or more but less than the applicable value in subsection (a) or (b), one hour of smoke intrusion.

Stat. Auth.: ORS Ch. 468
Hist: DEQ 29, f. 6-12-71, ef. 7-12-71; DEQ 93(Temp), f. & ef. 7-11-75 thru 11-28-75; DEQ 104, f. & ef. 12-26-75; DEQ 114, f. & ef. 6-4-76; DEQ 138, f. 6-30-77; DEQ 140(Temp), f. & ef. 7-27-77 thru 11-23-77; DEQ 6-1978, f. & ef. 4-18-78; DEQ 8-1978(Temp), f. & ef. 6-8-78 thru 10-5-78; DEQ 22-1978, f. & ef. 12-28-78; DEQ 24-1979(Temp), f. & ef. 7-5-79; DEQ 28-1979, f. & ef. 9-13-79; DEQ 30-1979, f. & ef. 9-27-79, DEQ 2-1980, f. & ef. 1-21-80; DEQ 12-1980, f. & ef. 4-21-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

General Provisions

340-26-010 The following provisions apply during both summer and winter burning seasons in the Willamette Valley unless otherwise specifically noted:

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

(2) Permits required:

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

(b) Applications for open field burning permits shall be filed on registration application forms provided by the Department.

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

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

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

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

(g) Open field burning permit issuing agencies shall submit to the department, on forms provided, weekly summaries of field burning activities in their permit jurisdiction during the period July 1 to October 15. Weekly summaries shall be mailed and postmarked no later than the first working day of the following week.

(3) Fuel conditions shall be limited as follows:

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

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

(4) In accordance with ORS 468.450, the Department shall establish a schedule which specifies the extent and type of burning to be allowed each day. During the time of active field burning, the Department shall broadcast this schedule over the Oregon Seed Council radio network operated for this purpose, on an as needed basis, depending on atmospheric and air quality conditions:

(a) Any person open burning or preparing to open burn under these rules shall conduct the burning operation in accordance with the Department's burning schedule.

(b) Any person open burning or preparing to open burn fields under these rules shall monitor the Department's field burning schedule broadcasts and shall conduct the burning operations in accordance with the announced schedule.

(5) Any person open field burning under these rules shall actively extinguish all flames and major smoke sources when prohibition conditions are imposed by the Department.

Stat. Auth.: ORS Ch. 468
Hist: DEQ 29, f. 6-12-71, ef. 7-12-71; DEQ 93(Temp), f. & ef. 7-11-75 thru 11-28-75; DEQ 104, f. & ef. 12-26-75; DEQ 114, f. 6-4-76; DEQ 138, f. 6-30-77; DEQ 140(Temp), f. & ef. 7-27-77 thru 11-23-77; DEQ 6-1978, f. & ef. 4-18-78; DEQ 8-1978(Temp), f. & ef. 6-8-78 thru 10-5-78; DEQ 22-1978, f. & ef. 12-28-78; DEQ 30-1979, f. & ef. 9-27-79; DEQ 2-1980, f. & ef. 1-21-80; DEQ 12-1980, f. & ef. 4-21-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Certified Alternative to Open Field Burning

340-26-011 (1) The Department may certify approved alternative methods of field sanitation and straw utilization and disposal on a permanent or interim basis provided the applicant for such certification:

(a) Provides information adequate to determine compliance with such rules and emissions standards as may be developed pursuant to section (2) of this rule as well as other state air, water, solid waste, and noise laws and regulations; and

(b) Conducts the approved alternative method and operates any associated equipment subject to sections (2) and (3) of this rule.

(2) Pursuant to ORS 468.472, the Commission shall establish rules and emission standards for alternative methods to open field burning. Such standards shall be set to insure an overall improvement in air quality as a result of the use of the alternative as compared to the open field burning eliminated by such use.

(3) Mobile field sanitizers and other alternative methods of field sanitation specifically approved by the Department, and propane flamers are considered alternatives to open field burning for the purposes of fee refunds pursuant to ORS 468.480 and may be used subject to the following provisions:

(a) Open fires away from the machines shall be actively extinguished.

(b) Adequate water supply shall be available to extinguish open fires resulting from the operation of field sanitizers.

(4) Propane flamers may be used as an approved alternative to open field burning provided that all of the following conditions are met:

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

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

(c) One of the following conditions exists:

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

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

Stat. Auth.: ORS Ch. 468
Hist: DEQ 105, f. & ef. 12-26-75; DEQ 114, f. 6-4-76; DEQ 138, f. 6-30-77; DEQ 140(Temp), f. & ef. 7-27-77 thru 11-23-77; DEQ 6-1978, f. & ef. 4-18-78; DEQ 8-1978(Temp), f. & ef. 6-8-78 thru 10-5-78; DEQ 2-1980, f. & ef. 1-21-80; DEQ 12-1980, f. & ef. 4-21-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Registration and Authorization of Acreage to Be Open Burned

340-26-012 (1) On or before April 1 of each year, all acreages to be open burned under this rule shall be registered with the local fire permit issuing agency or its authorized representative on forms provided by the Department. A nonrefundable $1.00 per acre registration fee shall be paid at the time of registration.

(2) Registration of acreage after April 1 of each year shall require:

(a) Approval of the Department.

(b) An additional late registration fee of $1.00 per acre if the late registration is determined by the Department to be the fault of the late registrant.

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

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

(5) Burn authorizations shall be issued by the local fire permit issuing agency up to daily quota limitations established by the Department and shall be based on registered fee-paid acres and shall be issued in accordance with the priorities established by section (1) of rule 340-26-010, except that fourth priority burning shall not be permitted from July 15 to September 15 of any year unless specifically authorized by the Department.

(6) No local fire permit issuing agency shall authorize open field burning of more acreage than may be sub-allocated annually to the District by the Department pursuant to section (5) of rule 340-26-013.

Stat. Auth.: ORS Ch. 468
Hist: DEQ 93(Temp), f. & ef. 7-11-75 thru 11-28-75; DEQ 104, f. & ef. 12-26-75; DEQ 114, f. 6-4-76; DEQ 138, f. & ef. 6-30-77; DEQ 140(Temp), f. & ef. 7-27-77 thru 11-23-77; DEQ 6-1978, f. & ef. 4-18-78; DEQ 8-1978(Temp), f. & ef. 6-8-78 thru 10-5-78; DEQ 2-1980, f. & ef. 1-21-80; DEQ 12-1980, f. & ef. 4-21-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Limitation and Allocation of Acreage to Be Open Burned

340-26-013 (1) Except for acreage to be burned under 340-26-013(6) and (7), the maximum acreage to be open burned under these rules shall not exceed 250,000 acres.

(2) Any revisions to the maximum acreage to be burned, allocation procedures, permit issuing procedures, or any other substantive changes to these rules affecting the open field burning program for any year shall be made prior to June 1 of that year. In making these rule changes, the Commission shall consult with Oregon State University (OSU) and may consult with other interested agencies.

(3) Acres burned on any day by approved alternative methods shall not be applied to open field burning acreage allocations or quotas, and such operations may be conducted under either marginal or prohibition conditions.

(4) In the event that total registration is less than or equal to the acreage allowed to be open burned under section (1) of this rule, all registrants shall be allocated 100 percent of their registered acres.

(5) In the event that total registration exceeds the acreage allowed to be open burned under section (1) of this rule, the Department may issue acreage allocations to growers totaling not more than 110 percent of the acreage allowed under section (1) of this rule. The Department shall monitor burning and shall cease to issue burning quotas when the total acreage reported burned equals the maximum acreage allowed under section (1) of this rule:

(a) Each year the Department shall sub-allocate 110 percent of the total acre allocation established by the Commission, as specified in section (1) of this rule, to the respective growers on a pro rata share basis of the individual acreage registered as of April 1 to the total acreage registered as of April 1.

(b) The Department shall sub-allocate the total acre allocation established by the Commission, as specified in section (1) of this rule, to the respective fire permit issuing agencies on a pro rata share basis of the acreage registered within each fire permit issuing agency's jurisdiction as of April 1 to the total acreage registered as of April 1.

(c) In an effort to insure that permits are available in areas of greatest need, to coordinate completion of burning, and to achieve the greatest possible permit utilization, the Department may adjust, in cooperation with the fire districts, allocations of the maximum acreage allowed in section (1) of this rule.

(d) Transfer of allocations for farm management purposes may be made within and between fire districts on a one-in/one-out basis under the supervision of the Department. Transfer of allocations between growers are not permitted after the maximum acres specified in section (1) of this rule have been burned within the Valley.

(e) Except for additional acreage allowed to be burned by the Commission as provided for in sections (6) and (7) of this rule, no fire district shall allow acreage to be burned in excess of their allocations assigned pursuant to subsections (5)(b), (c), and (d) of this rule.

(6) Notwithstanding the acreage limitations under section (1) of this rule, the Department may allow experimental open burning pursuant to ORS 468.490. Such experimental open burning shall be conducted only as may be specifically authorized by the Department and will be conducted for gathering of scientific data, or training of personnel or demonstrating specific practices. The Department shall maintain a record of each experimental burn and may require a report from any person conducting an experimental burn stating factors such as:

(a) Date, time, and acreage of burn.

(b) Purpose of burn.

(c) Results of burn compared to purpose.

(d) Measurements used, if any.

(e) Future application of results of principles featured:

(A) Experimental open burning, exclusive of that acreage burned by experimental open field sanitizers, shall not exceed 7500 acres annually.

(B) For experimental open burning, the Department may assess an acreage fee equal to that charged for open burning of regular acres. Such fees shall be segregated from other funds and dedicated to the support of smoke management research to study variations of smoke impact resulting from differing and various burning practices and methods. The Department may contract with research organizations such as academic institutions to accomplish such smoke management research.

(7) Pursuant to ORS 468.475, the Commission may permit the emergency open burning under the following procedures:

(a) A grower must submit to the Department an application form for emergency field burning requesting emergency burning for one of the following reasons:

(A) Extreme hardship documented by: an analysis and signed statement from a CPA, public account, or other recognized financial expert which establishes that failure to allow emergency open burning as requested will result in extreme financial hardship above and beyond mere loss of revenue that would ordinarily accrue due to inability to open burn the particular acreage for which emergency open burning is requested. The analysis shall include an itemized statement of the applicant's net worth and include a discussion of potential alternatives and probable related consequences of not burning.

(B) Disease outbreak, documented by: an affidavit or signed statement from the county agent, State Department of Agriculture, or other public agricultural expert authority that, based on his personal investigation, a true emergency exists due to a disease outbreak that can only be dealt with effectively and practically by open burning. The statement must also include at least the following:

(i) Time field investigation was made;
(ii) Location and description of field;
(iii) Crop;
(iv) Infesting disease;
(v) Extent of infestation (compared to normal);
(vi) Necessity and urgency to control;
(vii) Availability, efficacy, and practicability of alternative control procedures;
(viii) Probable damages or consequences of non-control.

(C) Insect infestation, documented by: affidavit or signed statement from the county agent, State Department of Agriculture, or other public agricultural expert authority that, based on his personal investigation, a true emergency exists due to an insect infestation that can only be dealt with effectively and practicably by open burning. The statement must also include at least the following:

(i) Time field investigation was made;
(ii) Location and description of field;
(iii) Crop;
(iv) Infesting insect;
(v) Extent of infestation (compared to normal);
(vi) Necessity and urgency to control;
(vii) Availability, efficacy, and practicability of alternative control procedures;
(viii) Probable damages or consequences of non-control.

(D) Irreparable damage to the land documented by: an affidavit or signed statement from the county agent, State Department of Agriculture, or other public agricultural expert authority that, based on his personal investigation, a true emergency exists which threatens irreparable damage to the land and which can only be dealt with effectively and practically by open burning. The statement must also include at least the following:

(i) Time of field investigation;
(ii) Location and description of field;
(iii) Crop;
(iv) Type and characteristics of soil;
(v) Slope and drainage characteristics of field;
(vi) Necessity and urgency to control;
(vii) Availability, efficacy, and practicability of alternative control procedures;
(viii) Probable damages or consequences of non-control.

(b) Upon receipt of a properly completed application form and supporting documentation, the Commission shall within 10 days, return to the grower its decision.

(c) An open field burning permit, to be validated subject to daily quota releases and payment of the required fees, shall be promptly issued by the Department for that portion of the requested acreage which the Commission has approved.

(d) Application forms for emergency open field burning provided by the Department must be used and may be obtained from the Department either in person, by letter, or by telephone request.

(8) The Department shall act, pursuant to this section, on any application for a permit to open burn under these rules within 60 days of registration and receipt of the fee provided in ORS 468.480.

(9) The Department may, on a fire district by fire district basis, issue limitations more restrictive than those contained in these rules when in their judgment it is necessary to attain and maintain air quality.

Stat. Auth.: ORS Ch. 468
Hist: DEQ 93(Temp), f. & ef. 7-11-75 thru 11-28-75; DEQ 104, f. & ef. 12-26-75; DEQ 114, f. & ef. 6-4-76; DEQ 138, f. & ef. 6-30-77; DEQ 140(Temp), f. & ef. 7-27-77 thru 11-23-77; DEQ 6-1978, f. & ef. 4-18-78; DEQ 8-1978(Temp), f. & ef. 6-8-78 thru 10-5-78; DEQ 22-1978, f. & ef. 12-28-78; DEQ 13-1979, f. & ef. 6-8-79; DEQ 30-1979, f. & ef. 9-27-79; DEQ 2-1980, f. & ef. 1-21-80; DEQ 12-1980, f. & ef. 4-21-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Willamette Valley Summer Burning Season Regulations

340-26-015 As part of the smoke management program provided for in ORS 468.470 the Department shall schedule the times, places, and amounts of open field burning according to the following provisions:

(1) As provided for in ORS 468.450, atmospheric conditions will be classified as marginal or prohibition conditions under the following criteria:

(a) Marginal Class N conditions: Forecast northerly winds and a ventilation index greater than 12.5.

(b) Marginal Class S conditions: Forecast southerly winds and a ventilation index greater than 12.5.

(c) Prohibition conditions: A ventilation index of 12.5 or less.

(2) Limitations on burning hours:

(a) Burning hours shall be limited to those specifically authorized by the Department each day.

(b) Unless otherwise specifically limited by the Department, burning hours may begin at 9:30 a.m. PDT, under marginal conditions but no open field burning may be started later than one-half hour before sunset or be allowed to continue burning later than one-half hour after sunset.

(c) The Department may alter burning hours according to atmospheric ventilation conditions when necessary to attain and maintain air quality.

(d) Burning hours may be reduced by the fire chief or his deputy when necessary to protect from danger by fire.

(3) Limitations on locations and amounts of field burning emissions:

(a) Use of acreage quotas:

(A) In order to assure a timely and equitable distribution of burning, authorizations of acreages shall be issued in terms of single, multiple, or fractional basic quotas or priority area quotas as listed in Table 1, and incorporated by reference into this regulation and schedule.

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

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

(b) Distribution and limitation of burning under various classifications of atmospheric conditions:

(A) Prohibition. Under prohibition conditions, no fire permits or validation numbers for agricultural open burning shall be issued and no burning shall be conducted, except where an auxiliary liquid or gaseous fuel is used such that combustion is essentially completed, an approved field sanitizer is used, or when burning is specifically authorized by the Department for determining atmospheric dispersion conditions or for experimental burning pursuant to section 340-26-013(6).

(B) Marginal Class N conditions. Unless specifically authorized by the Department, on days classified as marginal Class N burning shall be limited to the following:

(i) North Valley: One basic quota may be issued in accordance with Table 1 except that no acreage located within the permit jurisdictions of Aumsville, Drakes Crossing, Marion County District 1, Silverton, Stayton, Sublimity, and the Marion County portions of the Clackamas-Marion Forest Protection District shall be burned upwind of the Eugene-Springfield non-attainment area.

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

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

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

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

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

(c) Restrictions on burning based upon air quality:

(A) The Department shall establish the minimum allowable effective mixing height required for burning based upon cumulative hours of smoke intrusions in the Eugene-Springfield area as follows:

(i) Except as provided in (ii) of this subsection, burning shall not be permitted on a marginal day whenever the effective mixing height is less than the minimum allowable height specified in Table 2, and incorporated by reference into this regulation.

(ii) Not withstanding the effective mixing height restrictions of (i) above, the Department may authorize up to 1000 acres total for the Willamette Valley, each marginal day on a field-by-field or area-by-area basis.

(B) The total acreage burned in the south Valley under southerly winds shall not exceed, on a single day, 46,934 acres.

(C) The Department shall prohibit burning if, based upon real-time monitoring, a violation of federal or state air quality standards is projected to occur.

(D) The Department may on a field-by-field or area-by-area basis prohibit the burning of fields which result in excessive low-level smoke.

(d) Special restrictions on priority area burning:

(A) No priority acreage may be burned on the upwind side of any city, airport, or highway within the same priority areas.

(B) No south priority acreage shall be burned upwind of the Eugene-Springfield non-attainment area.

(e) Restrictions on burning techniques:

(A) The Department shall require the use of into-the-wind strip-lighting on annual grass seed and cereal crop fields when fuel conditions or atmospheric conditions are such that use of into-the-wind strip-lighting as determined by observation of test fires or prior general burning would reduce ground level smoke concentrations and specifically, except under conditions when wind directions are between 20 degrees and 90 degrees, the Department shall require such use when it is estimated that an effective mixing height over 3500 feet will not occur.

(B) The Department shall require the use of perimeter burning on all fields where no severe fire hazard conditions exist and where strip-lighting is not required. "Severe fire hazards" for purposes of this subsection means where adjacent and vulnerable timber, brush, or buildings exist next to the field to be burned.

(C) The Department shall require regular headfire burning on all fields where a severe fire hazard exists.

(f) Restrictions on burning due to rainfall and relative humidity:

(A) Burning shall not be permitted in an area for one drying day for each 0.10 inch of rainfall received at the nearest measuring station up to a maximum of four consecutive drying days.

(B) The Department may on a field-by-field or area-by-area basis waive the restrictions of paragraph (A) above when dry fields are available through special preparation or unusual rainfall patterns and wind direction and dispersion conditions are appropriate for burning with minimum smoke impact.

(C) Burning shall not be permitted in an area when relative humidity at the nearest measuring station exceeds 50 percent under forecast northerly winds or 65 percent under forecast southerly winds.

Stat. Auth.: ORS Ch. 468
Hist: DEQ 29, f. 6-12-71, ef. 7-12-71; DEQ 93(Temp), f. & ef. 7-11-75 thru 11-28-75; DEQ 104, f. & ef. 12-26-75; DEQ 114, f. & ef. 6-4-76; DEQ 138, f. 6-30-77; DEQ 6-1978, f. & ef. 4-18-78; DEQ 8-1978(Temp), f. & ef. 6-8-78 thru 10-5-78; DEQ 22-1978, f. & ef. 12-28-78; DEQ 24-1979(Temp), f. & ef. 7-5-79; DEQ 28-1979, f. & ef. 9-13-79; DEQ 30-1979, f. & ef. 9-27-79; DEQ 2-1980, f. & ef. 1-21-80; DEQ 12-1980, f. & ef. 4-21-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Winter Burning Season Regulations

340-26-020 (1) Classification of atmospheric conditions:

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

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

(2) Extent and type of burning:

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

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

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

Stat. Auth.: ORS Ch. 468
Hist: DEQ 29, f. 6-12-71, ef. 7-12-71; DEQ 93(Temp), f. & ef 7-11-75 thru 11-28-75; DEQ 104, f. & ef. 12-26-75; DEQ 114, f. 6-4-76; DEQ 138, f. 6-30-77; DEQ 6-1978, f. 4-18-78; DEQ 8-1978(Temp), f. & ef. 6-8-78 thru 10-5-78; DEQ 2-1980, f. & ef. 1-21-80; DEQ 12-1980, f. & ef. 4-21-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Civil Penalties

340-26-025 In addition to any other penalty provided by law:

(1) Any person who intentionally or negligently causes or permits open field burning contrary to the provisions of ORS 468.450, 468.455 to 468.480, 476.380, and 478.960 shall be assessed by the Department a civil penalty of at least $20, but not more than $40 for each acre so burned.

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

(3) Any person who violates any requirements of these rules shall be assessed a civil penalty pursuant to OAR Chapter 340, Division 12, Civil Penalties.

Stat. Auth.: ORS Ch. 468
Hist: DEQ 93(Temp), f. & ef. 7-11-75 thru 11-28-75; DEQ 104, f. & ef. 12-26-75; DEQ 114, f. 6-4-76; DEQ 1, f. 6-30-77; DEQ 6-1978, f. & ef. 4-18-78; DEQ 8-1978(Temp), f. & ef. 6-8-78 thru 10-5-78; DEQ 2-1980, f. & ef. 1-21-80; DEQ 12-1980, f. & ef. 4-21-80

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Tax Credits for Approved Alternative Methods, Approved Interim Alternative Methods, or Approved Alternative Facilities

340-26-030 (1) As provided in ORS 468.150, approved alternative methods or approved alternative facilities are eligible for tax credit as pollution control facilities as described in ORS 468.155 through 468.190.

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

(a) Mobile equipment including, but not limited to:

(A) Straw gathering, densifying, and handling equipment.

(B) Tractors and other sources of motive power.

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

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

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

(F) Special straw incorporation equipment.

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

(A) Straw loading and unloading facilities.

(B) Straw storage structures.

(C) Straw processing and in-plant transport equipment.

(D) Land associated with stationary straw processing facilities.

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

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

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

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

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

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

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

(iii) Description of alternative method to be used;

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

(I) Date or estimated future date of purchase;

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

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

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

(b) Certification for pollution control facility tax credit:

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

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

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

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

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

(I) Type and general description of each piece of mobile equipment;

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

(III) Date of purchase or initial operation;

(IV) Cost when purchased or constructed and current value;

(V) General use as applied to approved alternative methods and approved interim alternative methods;

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

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

(5) Certification for tax credits of equipment or facilities not covered in sections (1) through (4) of this rule shall be processed pursuant to the provisions of ORS 468.165 through 468.185.

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

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

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

Stat. Auth.: ORS Ch. 468
Hist: DEQ 114, f. & ef. 6-4-76; DEQ 138, f. 6-30-77; DEQ 6-1978, f. & ef. 4-18-78; DEQ 8-1978(Temp), f. & ef. 6-8-78 thru 10-5-78; DEQ 2-1980, f. & ef. 1-21-80; DEQ 12-1980, f. & ef. 4-21-80

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Table 1
(340-26-015)

FIELD BURNING ACREAGE QUOTAS

North Valley Areas

County/Fire District	Quota	
North Valley Counties	Basic	Priority
Clackamas County		
Canby RFPD	50	0
Clackamas County #54	50	0
Clackamas-Marion FPA	100	0
Estacada RFPD	75	0
Molalla RFPD	50	0
Monitor RFPD	50	0
Scotts Mills RFPD	50	0
Total	425	0
Marion County		
Aumsville RFPD	100	0
Aurora-Donald RFPD	50	50
Drakes Crossing RFPD	100	0
Hubbard RFPD	50	0
Jefferson RFPD	225	50
Marion County #1	200	50
Marion County Unprotected	50	50
Mt. Angel RFPD	50	0
St. Paul RFPD	125	0
Salem City	50	50
Silverton RFPD	600	0
Stayton RFPD	300	0
Sublimity RFPD	500	0
Turner RFPD	50	50
Woodburn RFPD	125	50
Total	2575	350

Table 1 (continued)
(340-26-015)

County/Fire Districts	Quota	
North Valley Counties (Cont.)	Basic	Priority
Polk County		
Spring Valley RFPD	50	0
Southeast Rural Polk	400	50
Southwest Rural Polk	125	50
Total	575	100
Washington County		
Cornelius RFPD	50	0
Forest Grove RFPD	50	0
Forest Grove, State Forestry	50	0
Hillsboro	50	50
Washington County FPD #1	50	50
Washington County FPD #2	50	50
Total	300	150
Yamhill County		
Amity #1 RFPD	125	50
Carlton RFPD	50	0
Dayton RFPD	50	50
Dundee RFPD	50	0
McMinnville RFPD	150	75
Newberg RFPD	50	50
Sheridan RFPD	75	50
Yamhill RFPD	50	50
Total	600	325
North Valley Total	4475	925

Table 1 (Continued)
(340-26-015)

FIELD BURNING ACREAGE QUOTAS

South Valley Areas

County/Fire District	Quota	
South Valley Counties	Basic	Priority
Benton County		
County Non-District and Adair	350	175
Corvallis RFPD	175	125
Monroe RFPD	325	50
Philomath RFPD	125	100
Western Oregon FPD	100	50
Total	1075	500
Lane County		
Coburg RFPD	175	50
Creswell RFPD	75	100
Eugene RFPD (Zumwalt RFPD)	50	50
Junction City RFPD	325	50
Lane County Non-District	100	50
Lane County RFPD #1	350	150
Santa Clara RFPD	50	50
Thurston-Walterville	50	50
West Lane FPD	50	0
Total	1225	550
Linn County		
Albany RFPD (inc. N. Albany, Palestine, Co. Unprotected Areas)	625	125
Brownsville RFPD	750	100
Halsey-Shedd RFPD	2050	200
Harrisburg RFPD	1350	50
Lebanon RFPD	325	325
Lyons RFPD	50	0
Scio RFPD	175	50
Tangent RFPD	925	325
Total	6250	1225
South Valley Total	8550	2275

Table 2
(340-26-015)

MINIMUM ALLOWABLE EFFECTIVE MIXING HEIGHT
REQUIRED FOR BURNING BASED UPON THE CUMULATIVE HOURS
OF SMOKE INTRUSION IN THE EUGENE-SPRINGFIELD AREA

Cumulative Hours of Smoke Intrusion In the Eugene-Springfield Area	Minimum Allowable Effective Mixing Height (feet)
0 - 14	No minimum height
15 - 19	4,000
20 - 24	4,500
25 and greater	5,500

Appendix 4.6.6--8

Oregon Department of Forestry Smoke Management Plan

SMOKE MANAGEMENT PLAN

Approved by Oregon State Board of Forestry, January 5, 1972

Approved by Environmental Quality Commission, January 24, 1972

OBJECTIVE:

To keep smoke resulting from burning on forest lands from being carried to or accumulating in designated areas (Exhibit 1) or other areas sensitive to smoke.

DEFINITIONS:

Deep mixed layer - extends from the surface to 1,000 feet or more above the designated area ceiling.

Smoke drift away - occurs where projected smoke plume will not intersect a designated area boundary downwind from the fire.

Smoke drift toward - occurs when the projected smoke plume will intersect a designated area boundary downwind from the fire or when wind direction is indeterminate due to wind speed less than 5 mph at smoke vent height.

Smoke vent height - level, in the vicinity of the fire, at which the smoke ceases to rise and moves horizontally with the wind at that level.

Stable layer of air - a layer of air having a temperature lapse rate of less than dry adiabatic (approximately 5.5 degrees F per 1,000 feet) thereby retarding either upward or downward mixing of smoke.

Tons available fuel - an estimate of the tons of fuel that will be consumed by fire at the given time and place. Low volume is less than 75 tons per acre, medium volume 75 to 150 tons per acre, and high volume over 150 tons per acre.

Residual smoke - smoke produced after the initial fire has passed through the fuel.

Field administrator - a forest officer who has the direct responsibility for administering burning permits on a unit of forest land within the boundaries of an official fire district.

Restricted area - that area delineated in Exhibit 1 for which permits to burn on forest land are required year round, pursuant to Rule OAR 43-041.

Designated area - those areas delineated in Exhibit 1 as principal population centers.

Heavy use - unusual concentrations of people using forest land for recreational purposes during holidays, special events, etc.

Major recreation area - areas of the state subjected to concentrations of people for recreational purposes.

CONTROL:

The State Forester is responsible for the coordination and control of the smoke management plan. The plan applies state-wide with full inter-agency cooperation with the U. S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, private forest industry and the Department of Environmental Quality.

Certain "designated areas" are established in consultation with the Environmental Quality Commission. The major objective of smoke control efforts will be to keep smoke from forest land burning out of these designated areas (Exhibit 1).

During periods of heavy use, major recreation areas in the State shall be provided the same consideration as "designated areas".

ADMINISTRATION:

Each Field Administrator issuing burning permits under this plan will manage the prescribed burning on forest land in connection with the management of other aspects of the environment in order to maintain a satisfactory atmospheric environment in designated areas (Exhibit 1). Likewise this effort may be applied in special situations where local conditions warrant and that are not defined as designated areas but nevertheless are sensitive to smoke. Accomplishment will entail a consideration of weather forecasts, acreages involved, amounts of material to be burned, evaluation of potential smoke column vent height, direction and speed of smoke drift, residual smoke, mixing characteristics of the atmosphere, and distance from the designated area of each burning operation. Designated areas are outlined and vertical extents or ceilings are indicated in Exhibit 1.

Each Field Administrator will evaluate down-wind conditions prior to implementation of burning plans. When a field administrator determines that visibility in a designated area, or other area sensitive to smoke is already seriously reduced or would likely become so with additional burning, or upon notice from the State Forester through the Division of Fire Control, or upon notice from the State Forester following consultation with the Department of Environmental Quality that air in the entire state or portion thereof is, or would likely become adversely affected by smoke, the affected field administrator will terminate burning. Upon termination, any burning already under way will be completed, residual burning will be mopped up as soon as practical, and no additional burning will be attempted until approval has been received from the State Forester.

REPORTS:

Field Administrators will report daily at such times and in such manner as required by the State Forester covering their daily burning operations. Any wildfire that has the potential for smoke input into a designated area will be reported immediately to the State Forester's office.

KEY TO SMOKE DRIFT RESTRICTIONS:

1. Smoke drift away from designated area

   a. No specific acreage limitation will be placed on prescribed burning when smoke drift is away from designated area. Burning should be done to best accomplish maximum vent height and to minimize nuisance effect on any segment of the public.

2. Smoke drift toward designated area

   a. Smoke plume height below designated area ceiling. Includes smoke that for reasons of fire intensity, location, or weather, will remain below the designated area ceiling. Also included are fires that vent into layers of air, regardless of elevation, that provide a downslope trajectory into a designated area.

      (1) Upwind distance less than 10 miles outside designated areas. No new prescribed fires will be ignited.

      (2) Upwind distance 10-30 miles outside designated area boundary. Burning limited to 1,500 tons per 150,000 acres on any one day.

      (3) Upwind distances 30-60 miles outside designated area boundary. Burning limited to 3,000 tons per 150,000 acres on any one day.

      (4) Upwind distances more than 60 miles beyond designated area boundary. No acreage restriction unless otherwise advised by the Forester.

b. Smoke will be mixed through deep layer at designated area. This section includes smoke that will be dispersed from the surface through a deep mixed layer when it reaches the designated area boundary.

(1) Upwind distance less than 10 miles from designated area boundary. Burning limited to 3,000 tons per 150,000 acres on any one day.

(2) Upwind distance 10-30 miles from designated area boundary. Burning limited to 4,500 tons per 150,000 acres on any one day.

(3) Upwind distances 30-60 miles outside designated area boundary. Burning limited to 9,000 tons per 150,000 acres on any one day.

(4) Upwind distances more than 60 miles beyond designated area boundary. No acreage restriction unless otherwise advised by the forester.

c. Smoke above a stable layer over the designated area. Smoke in this group will remain above the designated area, separated from it by a stable layer of air.

(1) Upwind distance less than 10 miles outside designated area. Burning limited to 6,000 tons per 150,000 acres on any one day.

(2) Upwind distance 10-30 miles outside designated area. Burning limited to 9,000 tons per 150,000 acres on any one day.

(3) Upwind distances 30-60 miles outside designated area. Burning limited to 18,000 tons per 150,000 acres on any one day.

(4) Upwind distances more than 60 miles beyond designated area boundary. No acreage restriction unless otherwise advised by the forester.

d. Smoke vented into precipitation cloud system. When smoke can be vented to a height above the cloud base from which precipitation is falling, there will be no restrictions to burning.

3. Changing conditions

When changing weather conditions, adverse to the Smoke Management objective, occur during burning operations, aggressive mop-up will be initiated as soon as practical.

ANALYSIS AND EVALUATION:

The State Forester will be responsible for the annual analysis and evaluati of state-wide burning operations under this Plan. Copies of the summaries will be provided to all interested parties.

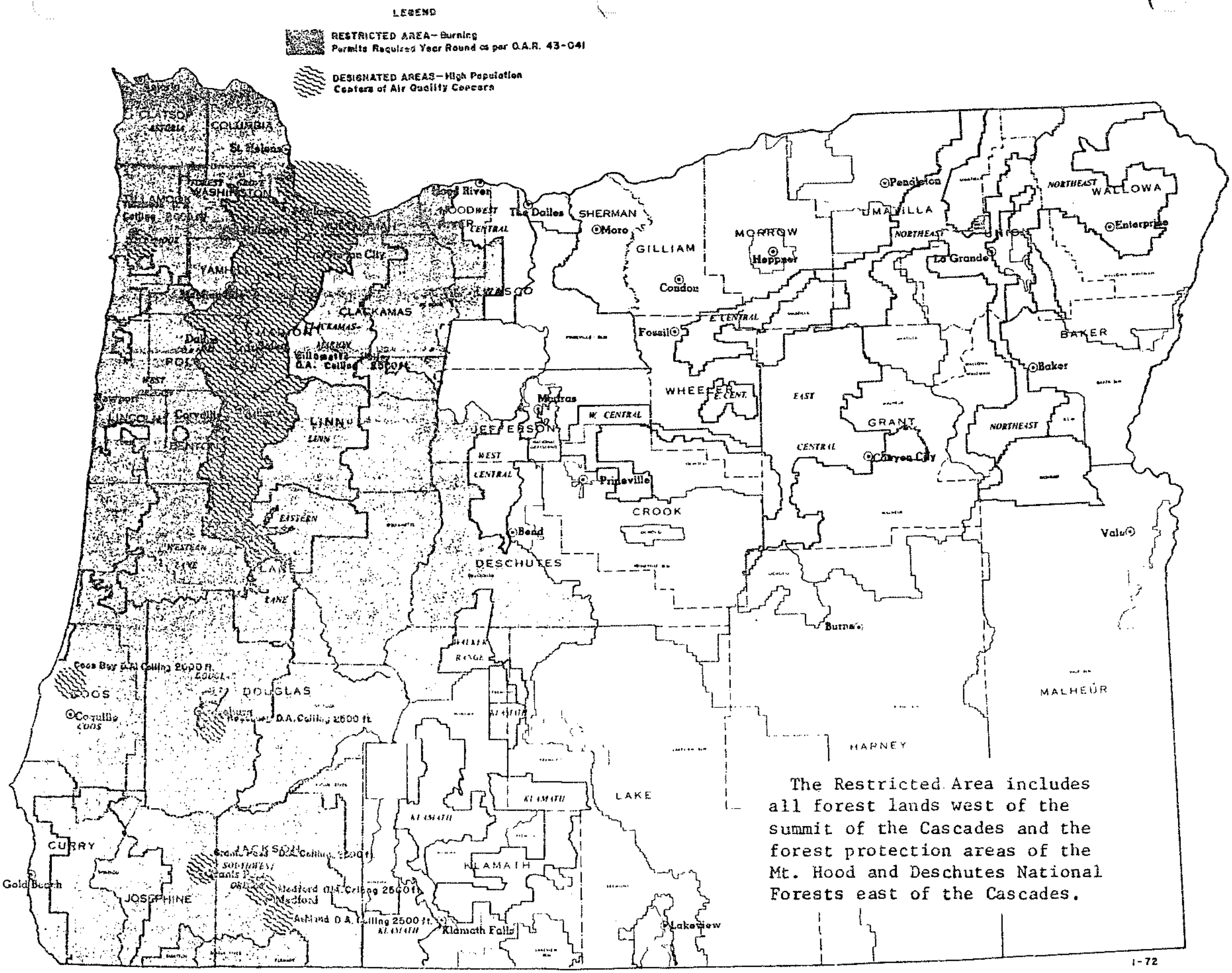

LEGEND
RESTRICTED AREA—Burning Permits Required Year Round as per O.A.R. 43-041
DESIGNATED AREAS—High Population Centers of Air Quality Concern
CLATSOP
COLUMBIA
St. Helens
TILLAMOOK
WASHINGTON
YAMHILL
CLACKAMAS
Oregon City
Hood River
The Dalles
SHERMAN
Moro
GILLIAM
Condon
MORROW
Heppner
UMATILLA
Pendleton
La Grande
WALLOWA
Enterprise
NORTHEAST
BAKER
Baker
Fossil
WHEELER
E. CENT.
E. CENTRAL
EAST
CENTRAL
GRANT
Canyon City
MARION
Willamette Valley D.A. Ceiling 2500 ft.
POLK
Dallas
Newport
LINCOLN
Corvallis
BENTON
LINN
JEFFERSON
Madras
W. CENTRAL
WEST
CENTRAL
Prineville
CROOK
Bend
DESCHUTES
EASTERN
WESTERN
LANE
WALKER RANGE
Vale
MALHEUR
Burns
HARNEY
Coos Bay D.A. Ceiling 2000 ft.
COOS
Coquille
DOUGLAS
Roseburg D.A. Ceiling 2500 ft.
LAKE
KLAMATH
Klamath Falls
Lakeview
CURRY
Gold Beach
JOSEPHINE
JACKSON
SOUTHWEST
Medford D.A. Ceiling 2500 ft.
Medford
Ashland D.A. Ceiling 2500 ft.
The Restricted Area includes all forest lands west of the summit of the Cascades and the forest protection areas of the Mt. Hood and Deschutes National Forests east of the Cascades.
1-72

EXHIBIT I

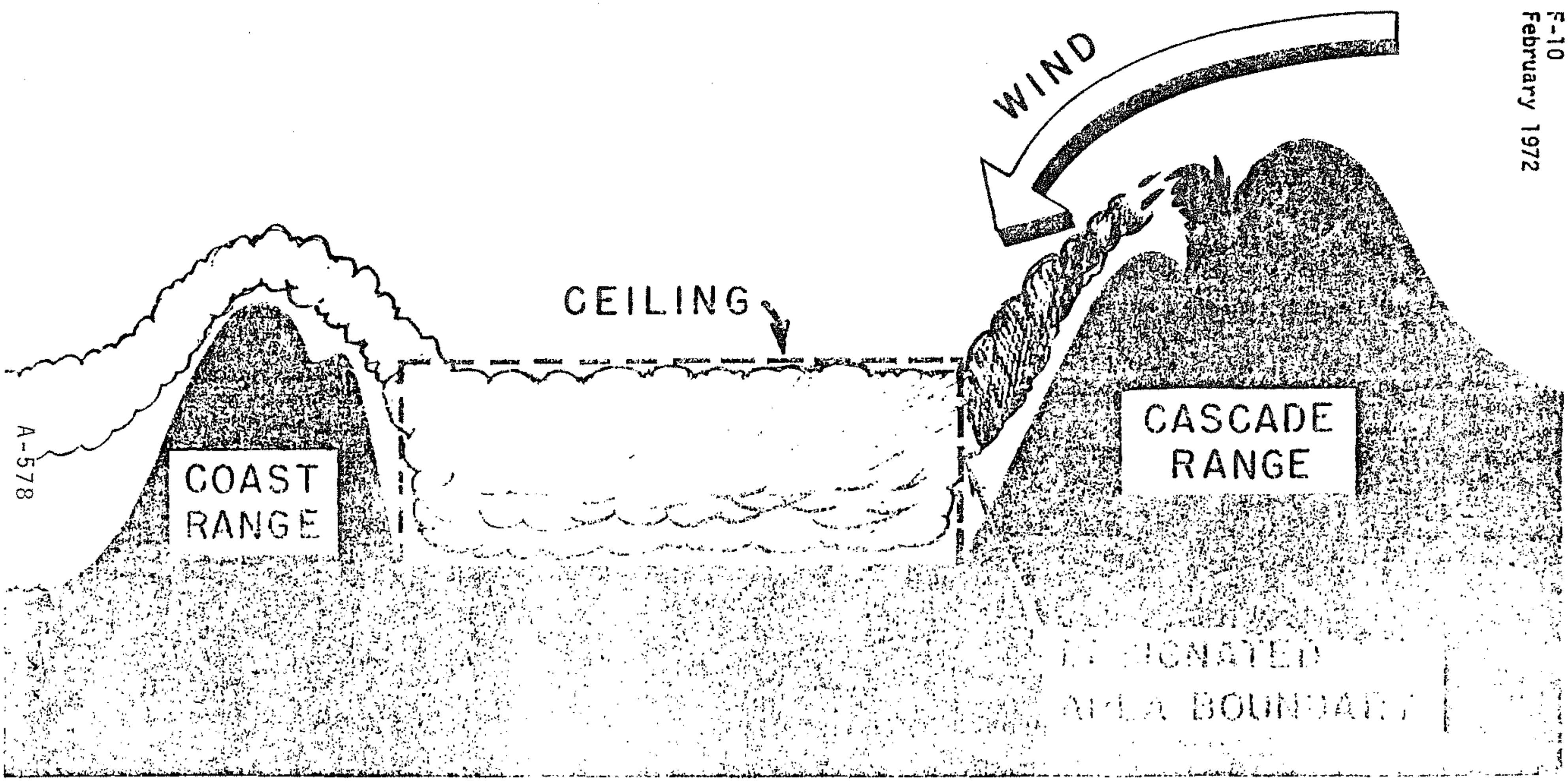


EXHIBIT 2. SMOKE WILL REMAIN BELOW DESIGNATED AREA CEILING .... EAST WIND

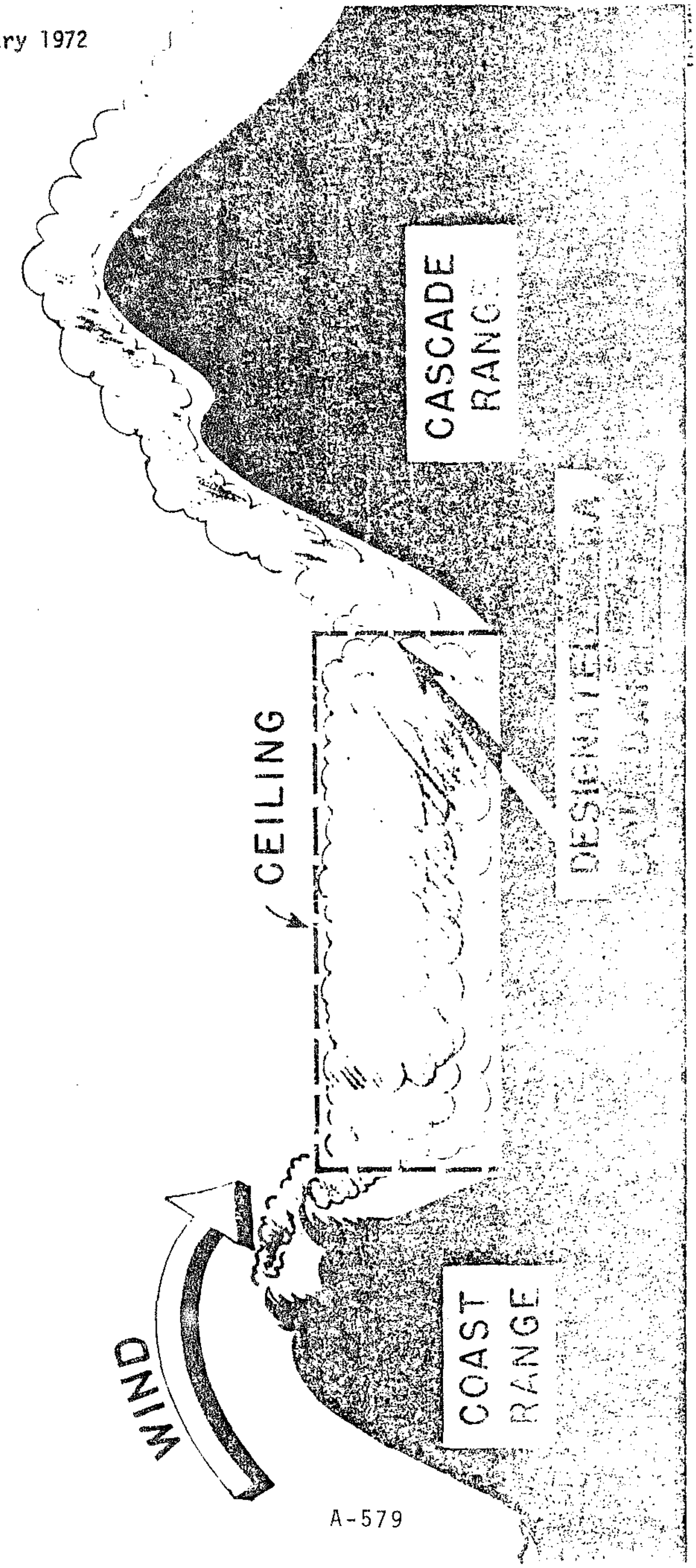


EXHIBIT 2. SMOKE WILL REMAIN BELOW DESIGNATED AREA CEILING ...... WEST WIND

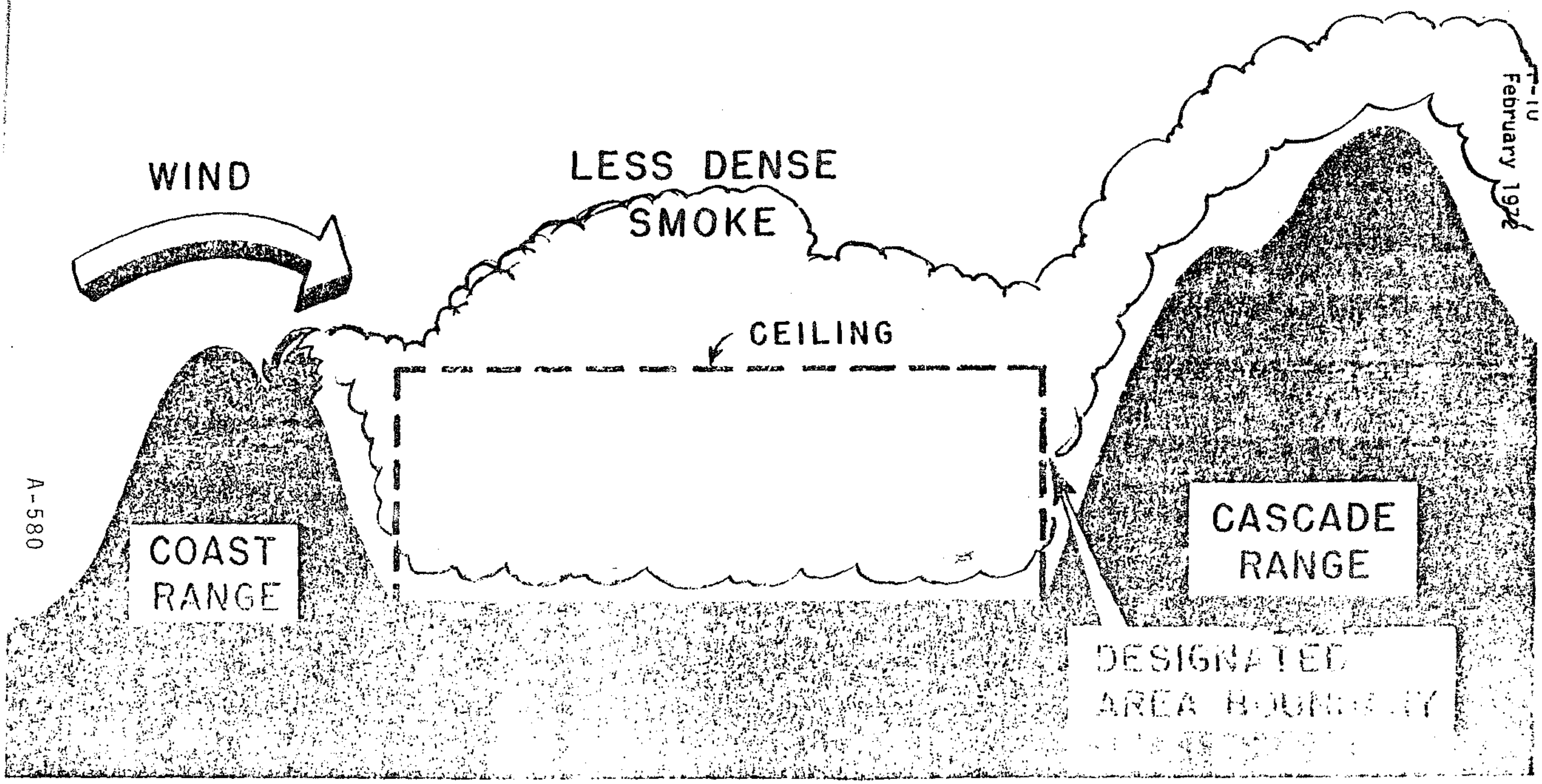


EXHIBIT 3. SMOKE MIXED THROUGH DEEP LAYER AT DESIGNATED AREA.

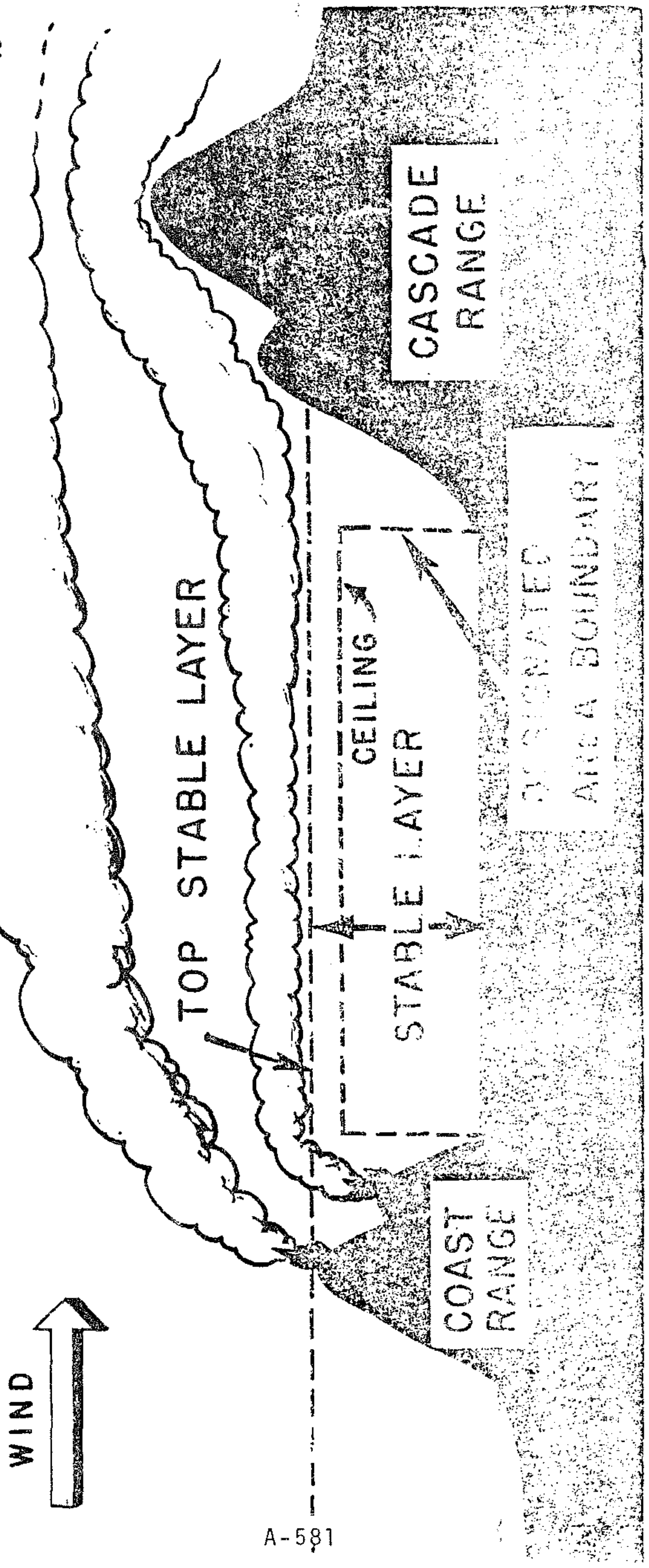


EXHIBIT 4. SMOKE REMAINS ABOVE A STABLE LAYER OVER DESIGNATED AREA.

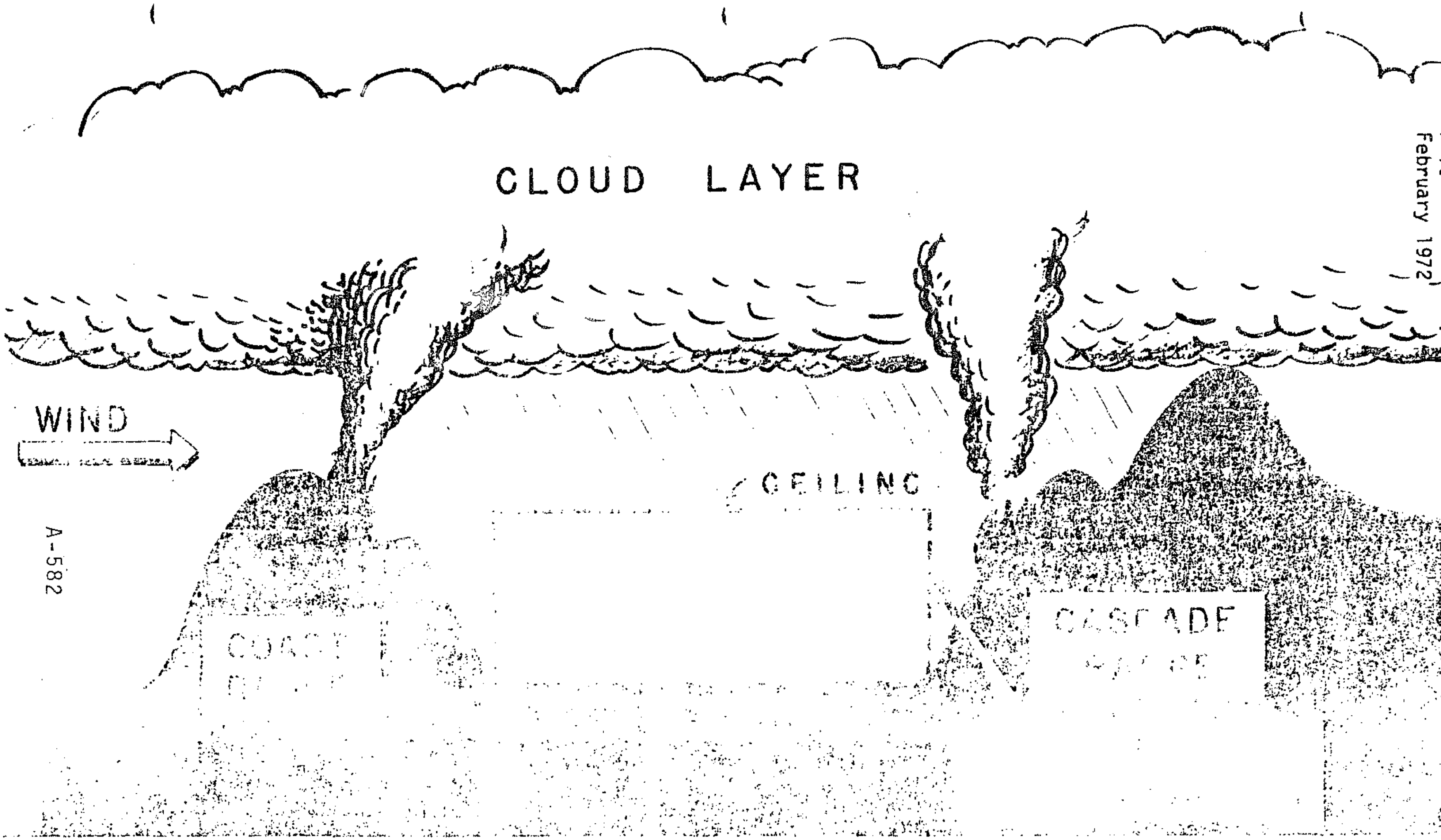
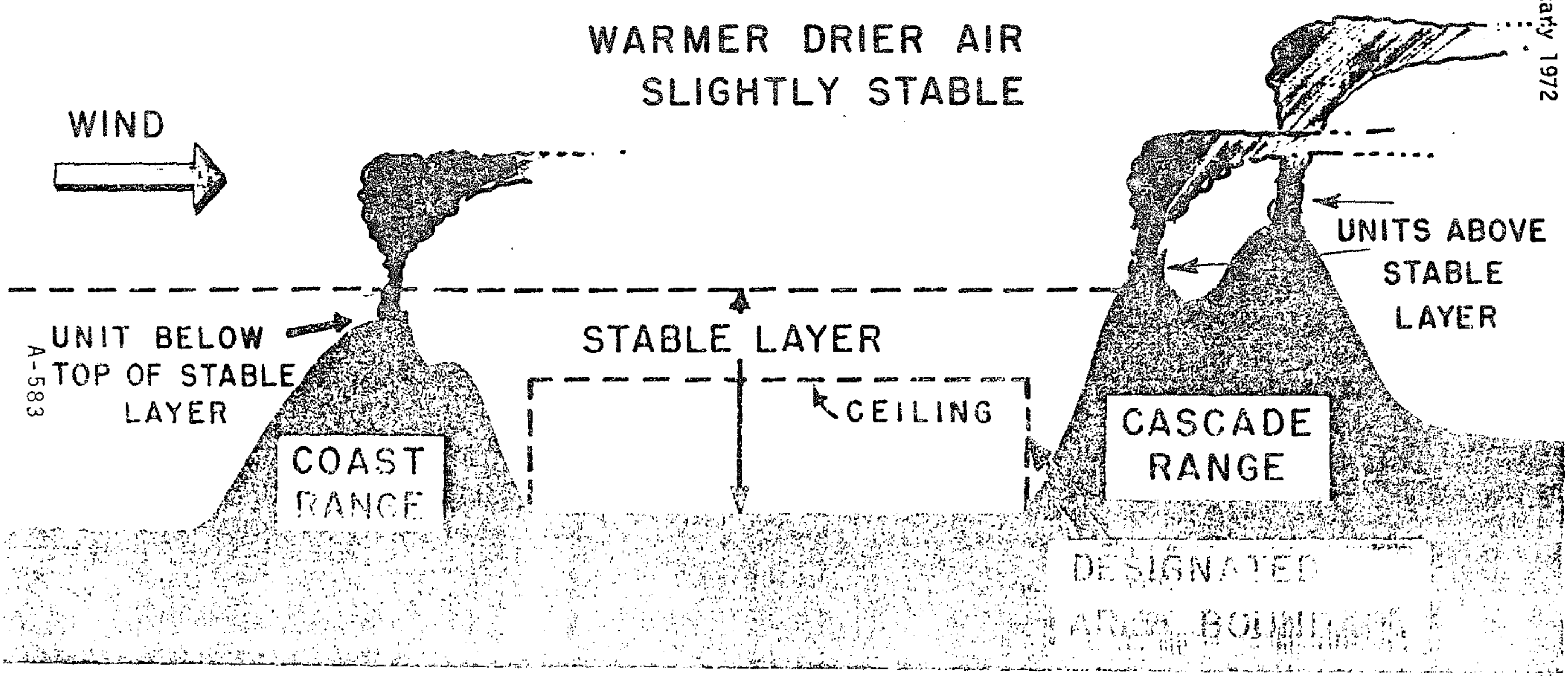
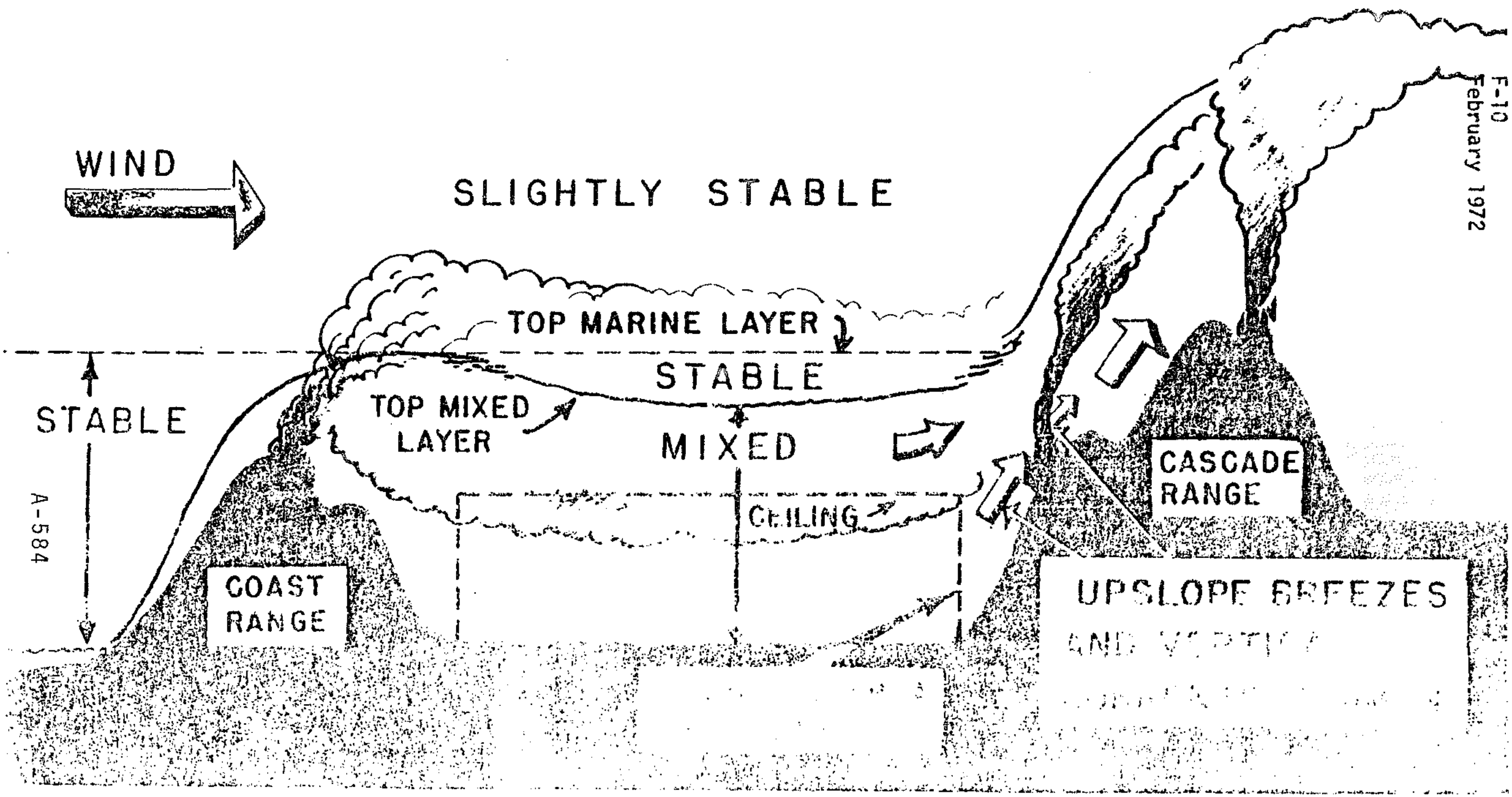


EXHIBIT 5. UNRESTRICTED BURNING WHEN SMOKE VENTED ABOVE CLOUD BASE FROM WHICH PRECIPITATION IS FALLING.



A-583

EXHIBIT 6. NIGHT AND EARLY MORNING
ATMOSPHERIC CONDITION



A-584

EXHIBIT 7. LATE SUMMER AFTERNOON HEATED UNSTABLE LAYER NEAR EARTH'S SURFACE.

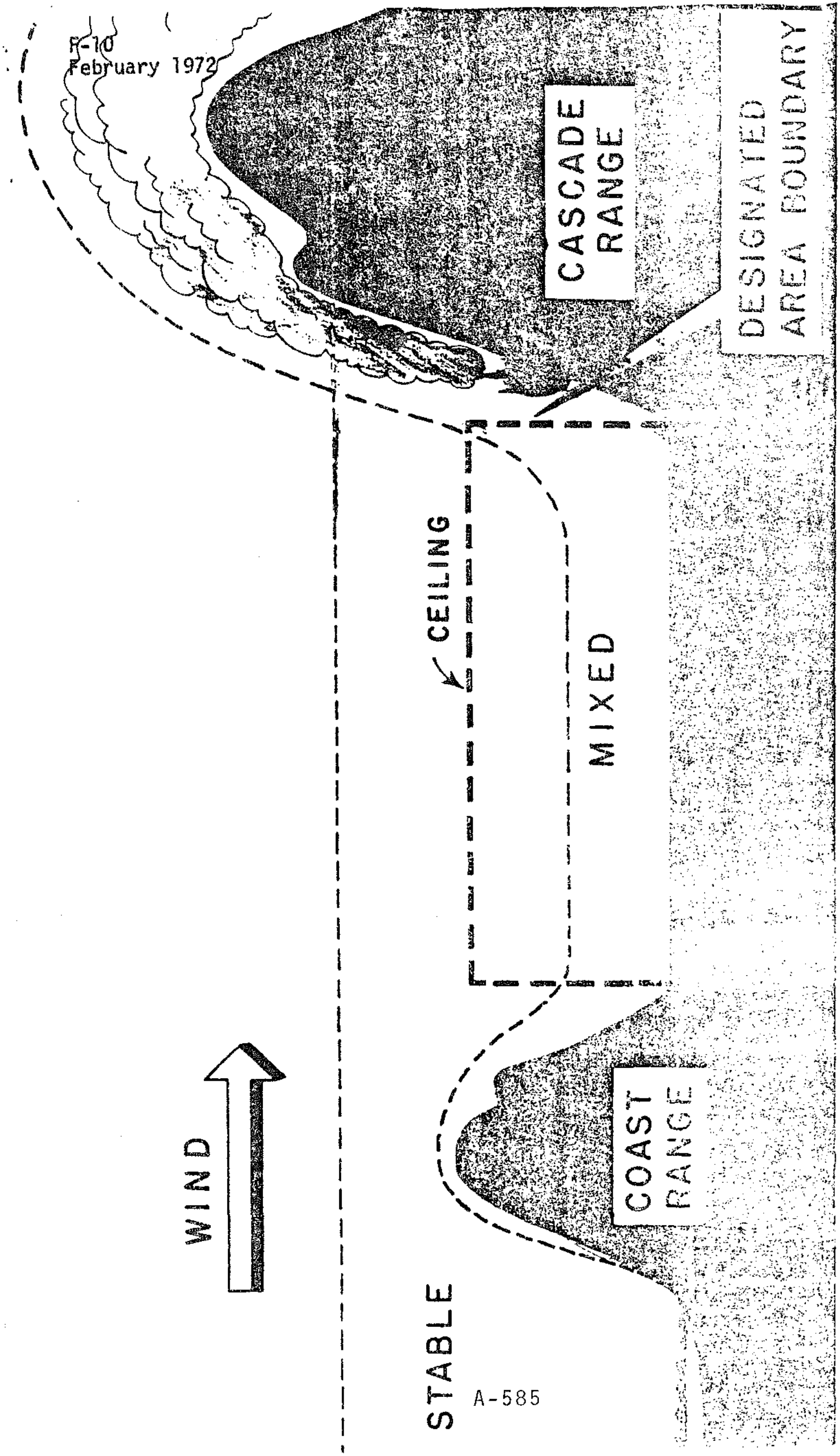
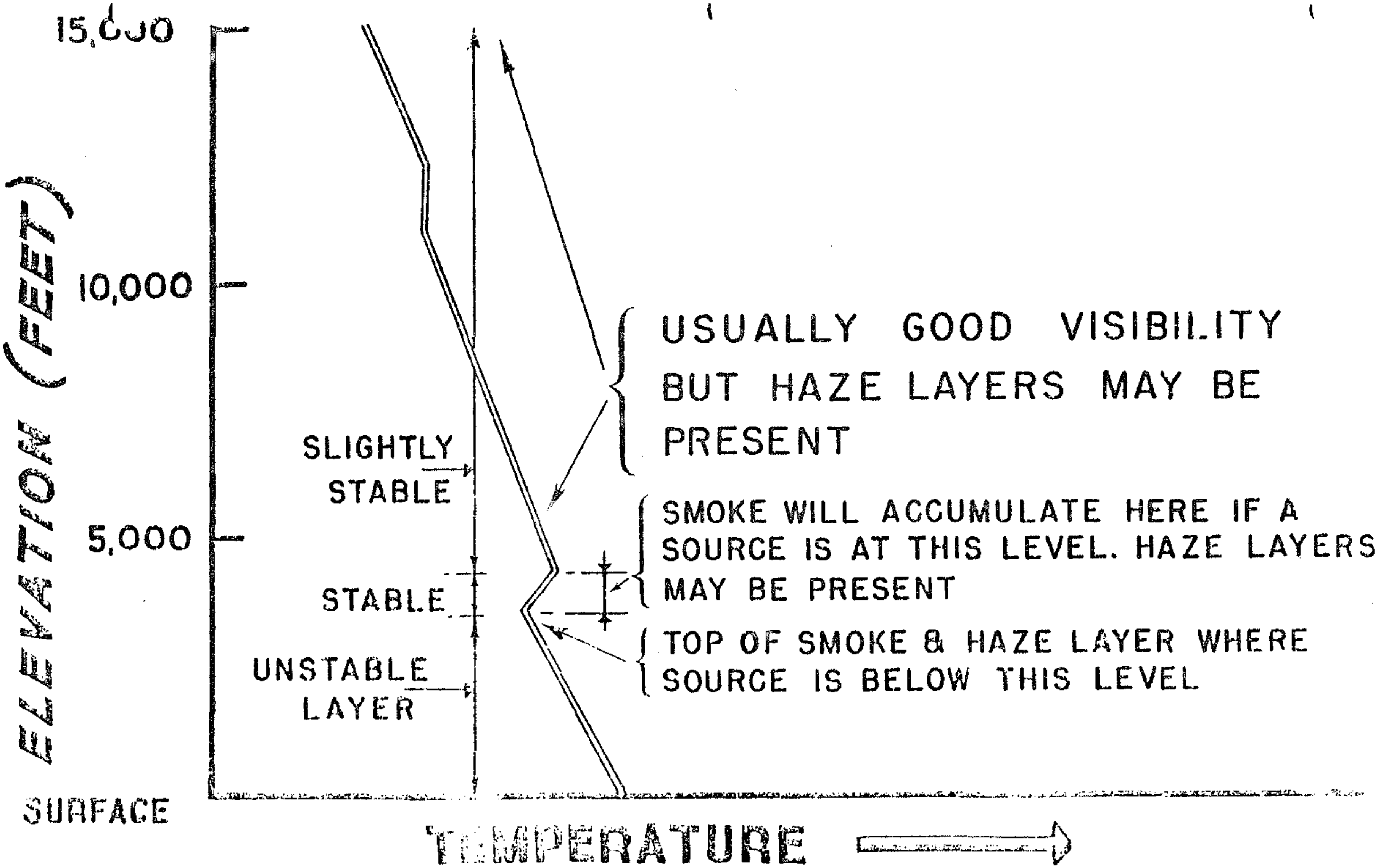


EXHIBIT 8. FALL SEASON....USUAL SUNNY AFTERNOON ATMOSPHERIC CONDITIONS



ATMOSPHERIC TEMPERATURE - ELEVATION VARIATION

EXHIBIT 9. A HAZE LAYER INDICATES THE PRESENCE OF A STABLE LAYER---USUALLY THE LEVEL OF THE BASE.

Appendix 4.6.10.1--1

DEQ - LRAPA Agreement

EUGENE-SPRINGFIELD AQMA WORK PROGRAM AGREEMENT
Between
LANE REGIONAL AIR POLLUTION AUTHORITY
AND
DEPARTMENT OF ENVIRONMENTAL QUALITY

WHEREAS, the Department of Environmental Quality is the lead agency to protect and enhance Oregon air quality, and

WHEREAS, Lane Regional Air Pollution Authority is the air pollution authority with local knowledge and jurisdiction over the Eugene-Springfield AQMA, the following work agreement is entered into by the DEQ and LRAPA so that Eugene-Springfield AQMA attainment and maintenance planning can be efficiently coordinated with primary responsibilities specified and agreed upon by both agencies. It is the expressed goal of both parties to develop the AQMA attainment strategy by July, 1978, the AQMA evaluation by January, 1979, and an AQMA maintenance strategy by July, 1979.

I. <u>General Responsibilities</u>

A. The DEQ will undertake management of the overall attainment and maintenance planning process and shall be responsible for:

1. Overall development of the attainment and control strategy, the AQMA evaluation, AQMA control strategy development and associated administrative procedures including appointment of an advisory committee, public hearings, rule adoption, implementation plan revisions and approval by the Environmental Protection Agency.

2. Technical management of consultant contracts to ensure that the work undertaken will be performed as intended.

3. Coordinating the work elements such that the AQMA attainment and maintenance plans are completed as scheduled (see Attachment A).

4. Preparing monthly summaries of activity by the first working day of each month.

B. The LRAPA agrees to:

1. Advise the DEQ on matters of program direction and to review consultant work relating to the Eugene-Springfield AQMA regarding its technical content.

2. Provide the staff assistance and resources as needed to carry out the local field work necessary for the attainment and maintenance program development in accordance with the agreed schedule (see Attachment A).

3. Prepare monthly summaries of activities by the 28th of each calendar month.

4. Provide public information services related to development of attainment and maintenance plans for the Eugene-Springfield area.

II. Specific Work Tasks

A. Special monitoring tasks (additional HV, impactor and surface meteorological data collection).

1. DEQ agrees to provide the necessary major capital outlay for the additional monitoring equipment, to provide technical assistance, to evaluate the data and prepare a report on findings by December, 1978.

2. LRAPA agrees to provide the technical personnel, staff time and operating resources to operate the special monitoring work and to perform the data reduction necessary to transform all data into standard DEQ format.

a. Responsibility for the operation, maintenance, repair and calibration of:

(1) Special AQ monitoring instruments (dichotomus impactor, cascade impactor and hi-volume sampler) located at the Springfield Library site, the Eugene Airport or Creswell Airport site and one Springfield Industrial site.

(2) Special surface meteorological wind speed and direction instruments located at the following sites: Oakway Mall, Coburg, Amazon, Creswell Airport, Springfield Library and Westmoreland School.

b. Staff time required to:

(1) Transcribe the data into standard DEQ format (see II B).

(2) Locate the preliminary sites for the special air quality and surface meteorological monitoring equipment, subject to final approval by DEQ.

(3) Install the special monitoring equipment described in section II A, 2 a.

(4) Assess and insure the quality of all data collected from the special monitoring network prior to submission to DEQ.

c. Operating resources:

(1) For the special AQ monitoring instruments, described in section II A, 2 a, LRAPA agrees to supply all filters and to be responsible for electric power costs, repair and maintenance costs and costs associated with instrument calibration.

(2) For the special surface meteorological monitoring equipment, LRAPA agrees to supply strip chart paper and recorder inks and to be responsible for electric power costs, repair and maintenance costs and costs associated with instrument calibration.

(3) LRAPA agrees to be responsible for all equipment housing costs except for the Coburg site.

B. Data Digitizing.

LRAPA agrees to digitize historical and current meteorological and air quality monitoring data for submission to DEQ in card deck format. New monthly data will be submitted within 45 days from the end of the month of collection.

C. Consultant Contract Assistance.

1. Seton, Johnson and Odell Emission Inventory Contract:

a. DEQ agrees to provide:

(1) Funding for the contract.

(2) Technical assistance to the contractor and to manage the contract as the work is performed.

(3) Provide new emission inventory data base deck outputs to LRAPA for verification.

(4) Conduct bi-weekly meetings with the contractor and provide meeting minutes.

b. LRAPA agrees to:

(1) Code existing TSP point source locations on a 2x2 km grid basis by no later than July 11, 1977.

(2) Conduct local phone surveys regarding residential wood fuel usage and commercial boiler fuel usage by July 1, 1977.

(3) Prepare the link coding necessary as an input to ODOT's SAPOLLUTE models by no later than July 15, 1977.

(4) Validate each Eugene-Springfield AQMA emission inventory developed by SJO. For the years 1974, 1976, 1980, 1985, 1990 and 1995 worst case and to comment in writing within 15 days of receipt of each data base.

(5) Provide staff to conduct sampling and analysis programs for paved road dust and unpaved road dust in conformance with the sampling design specified by the contractor by no later than 15 days following contractors request.

(6) Provide coordination between the contractor and local information sources which the contractor needs to contact.

2. Science Applications, Inc., Meteorological Contract.

a. DEQ agrees to:

(1) Provide funding for the contract, provide technical assistance to the contractor and to manage the contract as the work is performed.

(2) Submit the LRAPA meteorological data to the contractor on magnetic tape file within 15 days of award of contract.

b. LRAPA agrees to provide the technical personnel and operating resources required for the surface meteorological sampling (as specified in section II A, 2) and to review the contractor report and submit critical comments to DEQ within 15 days of receipt of the Phase 1 and Phase 2 reports.

3. Rockwell International, Inc. Field/Slash Burning Contract.

a. DEQ agrees to provide funding for the contract, to provide technical assistance to the contractor and to manage the contract as the work is performed.

b. LRAPA agrees to review the contractor report, submit critical comments to DEQ within 15 days of recepit of the contractor report.

D. Eugene-Springfield AQMA Profile Report as Required by U. S. EPA.

1. LRAPA agrees to prepare, by August 31, 1977, the AQMA Profile Report such that it meets DEQ specifications as described in earlier correspondence.

2. DEQ agrees to provide technical assistance to LRAPA in preparing the revised AQMA profile such that it meets EPA specifications by September 31, 1977.

III. Eugene-Springfield AQMA Control Strategy Development and Plan Development

A. Advisory Committee.

1. LRAPA agrees to:

a. Assist in coordinating the initial selection of the Advisory Committee in accordance with AQMA guidelines adopted by EPA. The committee structure, members and goals are intended to be a product of local/DEQ joint input and formal action.

b. Provide needed [redacted], [redacted] coordination, agenda development and meeting minutes.

2. DEQ will:

a. Assume responsibility for [redacted] between local jurisdiction and the [redacted] concerning preparation of [redacted] between local jurisdictions and DEQ formally establishing the committee, its goals and term of appointment.

b. [redacted] as the Department representative and [redacted] and to receive and insure action [redacted].

B. Attainment Control Strategy Development.

1. DEQ will provide the AQMA dispersion modeling to evaluate alternative control strategies and will submit the modeling analysis of alternative strategies to LRAPA by December, 1977 for comment and guidance.

2. LRAPA will submit critical review of the modeling analysis within 15 days of receipt.

3. LRAPA and DEQ will cooperatively select the most viable alternatives for cost benefit analysis by the Department. LRAPA will then draft for DEQ review a document describing the alternative strategies, the strategy evaluation of cost, energy and effectiveness and the strategy recommended for adoption by March, 1978.

4. LRAPA will be responsible for submission of attainment strategy alternatives to the Advisory Committee for comment and guidance.

5. Based on the Advisory Committee's and joint DEQ/LRAPA strategy selection, LRAPA and the DEQ will prepare rules required to adopt and implement the attainment strategy by March, 1978 and submit them to the EQC and the LRAPA Board for approval. Consideration will be given to joint EQC-LRAPA Board Public Hearings required prior to rule adoption.

6. LRAPA will present the proposed rules to the their Board of Directors for adoption no later than July, 1978.

7. DEQ will submit these rules and SIP revisions to the U. S. EPA for their approval by October, 1978.

8. LRAPA will be responsible for implementing and managing the attainment strategy as adopted by LRAPA and submitted to DEQ and EPA.

C. AQMA Evaluation Report.

1. DEQ is responsible for providing dispersion modeling analysis as input to the evaluation report, will draft the evaluation report by January 1, 1979 and will submit the report to LRAPA for critical review and comment by that date.

2. LRAPA will submit critical analysis of the AQMA evaluation report draft by January 15, 1979.

3. DEQ will submit the AQMA evaluation report to EPA for comment and final approval.

4. Based on the results of the evaluation, DEQ will be responsible for the final decision regarding de-designation of the AQMA (if indicated) and required action with EPA.

D. AQMA Plan Development and Adoption.

1. DEQ will provide the AQMA dispersion modeling (by July, 1978) to evaluate the alternative control strategies developed as part of the AQMA Control Strategy.

2. DEQ will prepare alternative control strategies, modeling to LRAPA based on agreed upon alternatives for analysis.

3. LRAPA and DEQ will cooperatively select the most viable alternatives for cost benefit analysis by the Department.

4. LRAPA will be responsible for submission of selected strategies to the AQMA Advisory Committee for comment and guidance.

5. Based on the Advisory Committee and joint DEQ/LRAPA strategy selection, LRAPA and DEQ will prepare rules and develop land-use agreements required to adopt and implement the Maintenance Control Strategy by May, 1979 and submit them to the EQC and LRAPA Board for approval. Consideration will be given to joint EQC-LRAPA Board Public Hearings required prior to rule adoption.

6. LRAPA will present the proposed rules to their Board of Directors for adoption no later than July 1, 1979.

7. DEQ will submit these rules and SIP revisons to the U. S. EPA for their approval by October, 1979.

8. LRAPA will be responsible for implementing and managing the AQMA strategy as adopted by LRAPA and submitted to DEQ and EPA.

IV. Public Information

A. LRAPA agrees to serve as the primary source of public information support services in matters related to development of attainment and maintenance plans for the Eugene-Springfield AQMA. LRAPA will advise the DEQ AQMA coordination and DEQ public information staff of all public information activities as they occur.

B. DEQ agrees to provide technical assistance to LRAPA concerning matters of program content.

Lane Regional Air Pollution Authority and the Department of Environmental Quality jointly agree to furnish their best efforts to meet the responsibilities and schedule described above. Should either agency be unable to meet the obligations or schedules described, it shall notify the other agency in a timely manner to avoid further schedule delays.

The above work agreement is jointly agreed upon by the undersigned:

For Lane Regional Air Pollution Agency	For Department of Environmental Quality
/s/ Verner J. Adkison Verner Adkison, Director	/s/ William H. Young William H. Young, Director
Date 7-1-77	Date 7-5-77
/s/ Joseph S. Lassiter Joe Lassiter, Manager	
Date 7-1-77	

ATTACHMENT A

ACTIVITY SCHEDULE - EUGENE-SPRINGFIELD AQMA

(Revised 6/22/77)

	1977												1978												1979											
Activity	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
1. Particulate Sampling Network						x	x	x	x	x	x	x	x	x	x	x	x	x	x																	
2. Met Network Operation (Analysis Period)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																	
3. EI Contract (Seaton, Johnson, Odell)						x	x	x	x	x																										
4. Met Contract, Part 1							x	x	x	x																										
5. Field/Slash Tracer Contract							x	x	x	x	x	x	x																							
6. 24-Hour Model Simulations for Attainment Strategy											x	x																								
7. Attainment Strategy Development													x	x	x																					
8. Attainment Strategy Adoption																			x																	
9. Met Contract, Part 2																x	x	x	x																	
10. Annual Model Simulation (AQMA Evaluation)																				x	x	x														
11. AQMA Evaluation Completion																							x	x	x											
12. AQMA Plan Development																										x	x	x	x	x						
13. AQMA Plan Adoption																															x					

PROFESSIONAL SERVICES CONTRACT ADDENDUM

This contract addendum is between the Department of Environmental Quality, Air Quality Division, Program Planning and Development Section and Lane Regional Air Pollution Authority, hereafter called Contractor.

Whereas, the Department requires the assistance of the Contractor to provide reproduction services and reading materials to local citizens and members of the Advisory Committee of the Eugene/Springfield Air Quality maintenance Area as part of the State Implementation Plan development process, the existing professional services contract executed on November 5th, 1979 is hereby amended to extend the contract period to December 31, 1980, and to increase the total amount of payment for the above services to the sum of $2200.

The Department and the Contractor agree as follows:

1. <u>Revised Statement of Work</u>

   a. The Department shall extend the work schedule to December 31, 1980. This alters the July 1, 1980 time schedule in part 1.b. and c. of the existing Professional Services Contract

   b. The Department shall increase the amount paid to the Contractor for reproduction services up to but not exceeding $700. This alters the original sum of $1500 as agreed upon in part 2.a. of the existing Professional Services Contract to an increase in the total amount to a sum of $2,200.

2. <u>Additional Considerations</u>

   No additional considerations shall be provided except as noted in item 1.a. and b. above.

3. <u>Original Contract</u>

   Nothing in this addendum shall be interpreted to change or otherwise affect any other section of the Contract not changed by Section 1.

4. <u>Executive Department Approval</u>

   The contract addendum will not be effected until approved by the Executive Department.

5. Contractor Data

Lane Regional Air Pollution Authority
16 Oakway Mall
Eugene, OR 97401

Contractor Code: 4 9995

6. Department Address

Department of Environmental Quality
522 Southwest 5th Avenue
Box 1760
Portland, OR 97207

Barbara Tombleson, Project Officer
(503) 229-5177

7. Signatures

Donald R. Arkell _____________________ 11/16/82
Contractor   Date

_____________________ _________
Division Administrator   Date

_____________________ _________
Department Director or Delegate   Date

_____________________ _________
Executive Department Director or Delegate   Date

BT:i
AM522

Appendix 4.6.10.2--1

Joint Resolution

Eugene, Springfield, Lane County and DEQ Director

BEFORE THE BOARD OF COUNTY COMMISSIONERS OF THE
STATE OF OREGON, COUNTY OF LANE,
CITY COUNCIL OF EUGENE,
CITY COUNCIL OF SPRINGFIELD
AND THE
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

IN THE MATTER OF CREATING)
THE EUGENE-SPRINGFIELD)
AIR QUALITY MAINTENANCE)
AREA ADVISORY COMMITTEE)

O R D E R 78-2-21-11

The Board of Lane County Commissioners, the City Council of Eugene, the City Council of Springfield and the Department of Environmental Quality have determined that there exists a need to establish a committee of local residents, representatives of both specific interests and the public-at-large, to provide assistance to the Department and to the Lane Regional Air Pollution Authority in the preparation of an Air Quality Attainment and Maintenance Plan for the Eugene-Springfield area. The responsibility of this committee will be to advise the Department and the Lane Regional Air Pollution Authority of the most acceptable emission control strategies to attain and maintain compliance with State and Federal air quality standards for Total Suspended Particulate.

ORDERED that the following persons willing to serve on this committee, are hereby appointed to the Eugene-Springfield Air Quality Maintenance Area Advisory Committee effective this date. The committee will serve for a period of fifteen (15) months.

NAME AND ADDRESS	REPRESENTING
George Mayer 2850 Spring Blvd. Eugene, Oregon 97403	Public-at-Large
Cynthia Forrester 850 Waverly Eugene, Oregon 97401	Public-at-Large
Brian Bauske P.O. Box 3567 Eugene, Oregon 97403	Public-at-Large
R.W. McDuffie 749 Summit Blvd. Springfield, Oregon 97477	Public-at-Large
Ellis Jones 2193 East 15th. Eugene, Oregon 97403	Oregon Department of Transportation

APPROVED AS TO FORM
DATE 2/21/78 lane county

Oliver Snowden Lane Council of Governments North Plaza Level-PSB Eugene, Oregon 97401	Lane Council of Governments
Gary Darnielle Lane Council of Governments North Plaza Level-PSB Eugene, Oregon 97401	Lane Council of Governments
Jack Delay 1708 Alder St. Eugene, Oregon 97401	City of Eugene
Bob Adams P.O. Box 206 Springfield, Oregon 97477	City of Springfield
Richard Owings Dir., Dept. of Environmental Management Lane County Public Service Bldg. Eugene, Oregon 97401	Lane County
Alice Northway 3750 Key Court Eugene, Oregon 97405	Central Lane League of Women Voters
V.C. Vitums, M.D. 1180 Patterson Eugene, Oregon 97401	Oregon Lung Association
Nancy Hayward 2606 Spring Blvd. Eugene, Oregon 97403	Clean Air Committee
Darrel Spiesschaert P.O. Box 157 Veneta, Oregon 97487	State Dept. of Forestry/ Western Lane District
Lloyd Beebe Eugene City Hall-Fire Department Eugene, Oregon 97401	Fire Chief's Association of Lane County
Irv Fletcher Room 111, Labor Center 2300 Oakmont Way Eugene, Oregon 97401	Lane County Labor Council
Tom Hunton 92194 Purkerson Road Junction City, Oregon 97448	Oregon Seed Council

Roy Sampson College of Business Administration University of Oregon Eugene, Oregon 97403	University of Oregon
Julia Friedman 60 West 36th Eugene, Oregon 97405	Economics Dept./U of O
Richard Mallris National Metallurgical 1801 South A Street Springfield, Oregon 97477	Eugene/Springfield Chambers of Commerce
Jerry Bollen Weyerhaeuser Company P.O. Box 275 Springfield, Oregon 97477	Wood Products Industry
Mitch Steffensen Georgia-Pacific Corporation 410 South 14th Street Springfield, Oregon 97477	Wood Products Industry
Nate Coleman Lane Plywood, Inc. 55 North Bertelsen Road Eugene, Oregon 97402	Wood Products Industry
Bob Crissman % Morse Bros., Inc. P.O. Box 251 Tangent, Oregon 97389	Aggregate & Paving Industry
Owen Brown Eugene Water & Electric Board 500 East 4th. Eugene, Oregon 97401	Utility/Chemical/Metal Industries

Dated this 27th day of February, 1978 at Portland, Oregon.

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Michael Downs for

DIRECTOR, WILLIAM H. YOUNG

ATTEST:

George Simison

City Recorder

Dated this 21st day of February 1978 at Eugene, Oregon.

BOARD OF LANE COUNTY COMMISSIONERS

Jerry Rust

JERRY RUST, CHAIRMAN

Dated this 22nd day of February 1978 at Eugene, Oregon.

CITY OF EUGENE

G. Gus Keller

GUS KELLER, MAYOR

Dated this 20th day of February 1978 at Springfield, Oregon.

Vern Meyer

VERN MEYER, MAYOR

Appendix 4.6.11.1

Notice of Public Hearing

YOUR OPPORTUNITY TO COMMENT ON PROPOSED PLAN TO ATTAIN AND MAINTAIN AIR QUALITY STANDARDS FOR PARTICULATE MATTER IN THE EUGENE/SPRINGFIELD AIR QUALITY MAINTENANCE AREA

The proposed plan, which provides strategies to reduce particulate matter emissions, will be a revision of the Oregon Revised Clean Air Act Implementation Plan.

Plan to attend a
7:30 P.M. PUBLIC HEARING — NOVEMBER 6, 1980
Eugene City Hall Council Chambers
777 Pearl Street — Eugene, Oregon

Copies of the proposed plan are available for your study and comment by contacting the Lane Regional Air Pollution Authority at 16 Oakway Mall, Eugene, Oregon or calling 686-7618.

Written comment may be submitted until November 5, 1980 to the above LRAPA address.

L-COG Lane Council of Governments
NORTH PLAZA LEVEL PSB / 125 EIGHTH AVENUE EAST / EUGENE, OREGON 97401

L-COG Referral # 0E133
State PNRS # 8009-2-500
Type of Referral A-95

REGIONAL CLEARINGHOUSE REVIEW AND COMMENT CONCLUSIONS

Telephone: 687-4283

Applicant L-RAPA
16 Oakway Mall
Eugene, OR 97401

By: Galen Howard
Clearinghouse Coordinator

Project Title: Revision of Oregon's Clean Air Act. Imp. Plan

Date: October 29, 1980

___ PNRS SUMMARY   X FORMAL APPLICATION   ___ OTHER

The L-COG Regional Clearinghouse has reviewed the proposed project for its relationship to existing plans, goals, or policies of this agency and finds the proposal to be:

- [X] It is consistent with or contributes to areawide planning.
- [ ] Consistent, pending resolution of concerns noted in comments included.
- [ ] It is inconsistent with areawide planning.
- [ ] Request the opportunity to review the full application.
- [ ] No comment.
- [ ] Professional comments are included.

For A-95 Reviews Only:

- [X] Recommend approval.
- [ ] Do not recommend approval.
- [ ] Recommend approval, conditional on resolution of concerns included.
- [ ] No comment.

For Environmental Assessment (if attached):

- [ ] Negative declaration is consistent with information presented.
- [ ] Environmental assessment is adequate.
- [ ] Environmental assessment is not adequate for the following reasons.
- [ ] Impacts exceed established environmental standards referenced.

L-COG REVIEW COMMENTS

L-COG recommends support but comments that weatherization financing should be designed so that the mandatory standards do not adversely affect the supply, quality or cost of rental housing.

Note: L-COG has received review comments from the following local agencies which have been incorporated into this summary: Springfield, Lane County

A-95 review comments should not be considered as a substitute of required permit or license procedures necessary for projects or programs. Nor does this review system waive regularly required performances standard reviews.

Copy to: Kay Wilcox

RECEIVED
OCT 30 1980
20386

OREGON PROJECT NOTIFICATION AND REVIEW SYSTEM

STATE CLEARINGHOUSE

~~DRA~~
AQWA
File.

Intergovernmental Relations Division
155 Cottage ST . S.E.
Salem, Oregon 97310, Phone 378-3732
Toll Free Number - 1-800-452-7813

APPLICANT: Lane Regional Air Pollution Authority

PROJECT TITLE: State Clean Air Act Implementation Plan Revision

DATE: 10/30/80

The state has reviewed your project and reached the following conclusions:

- [X] No significant conflict with the plans, policies or programs of state government have been identified and your proposal is endorsed as presented.
- [ ] Relevant comments of state agencies are attached and should be considered in the final design of your proposal.
- [ ] Potential conflicts with the plans and programs of the state agency(s) have been satisfactorily resolved. No significant issues remain.
- [ ] Significant conflicts with the plans, policies or programs of state government have been identified and remain unresolved. The final proposal has been reviewed and the final comments and recommendations of the state are attached.

RECEIVED
NOV 03 1980
LANE REGIONAL AIR POLLUTION AUTHORITY
30394

NOTICE TO FEDERAL AGENCY

The following is the officially assigned State Identifier Number:

8007 6 -06

This number should be used on all correspondence and particularly on SF 242 as required by OMB A-95.

A copy of this notification and attachments, if any, must accompany your application to the federal agency as required by OMB A-95. Comments of the appropriate local reviewing agencies will be submitted to you separately and must also be included.

A-603

PNRS #2

OREGON PROJECT NOTIFICATION AND REVIEW SYSTEM

STATE CLEARINGHOUSE

DRA
AQMA

Intergovernmental Relations Division
155 Cottage ST . S.E.
Salem, Oregon 97310, Phone 378-3732
Toll Free Number - 1-800-452-7813

APPLICANT: Lane Regional Air Pollution Authority

PROJECT TITLE: State Clean Air Act Implementation Plan Revision

DATE: 10/30/80

The state has reviewed your project and reached the following conclusions:

- [X] No significant conflict with the plans, policies or programs of state government have been identified and your proposal is endorsed as presented.
- [ ] Relevant comments of state agencies are attached and should be considered in the final design of your proposal.
- [ ] Potential conflicts with the plans and programs of the state agency(s) have been satisfactorily resolved. No significant issues remain.
- [ ] Significant conflicts with the plans, policies or programs of state government have been identified and remain unresolved. The final proposal has been reviewed and the final comments and recommendations of the state are attached.

RECEIVED
NOV 0 3 1980
LANE REGIONAL AIR POLLUTION AUTHORITY
30394

NOTICE TO FEDERAL AGENCY

The following is the officially assigned State Identifier Number:

[illegible]

This number should be used on all correspondence and particularly on SF 242 as required by OMB A-95.

A copy of this notification and attachments, if any, must accompany your application to the federal agency as required by OMB A-95. Comments of the appropriate local reviewing agencies will be submitted to you separately and must also be included.

Appendix 4.6.11.2

Newspaper Coverage: Eugene-Springfield AQMA CAC

A-605

2 council members express concern

Delay named to air quality committee

By DON NELSON
Of the Register-Guard

Eugene City Councilman Jack Delay has been appointed to a regional air pollution advisory committee despite other council members' fears that Delay's views on Eugene's growth will affect his views on controlling air quality.

Mayor Gus Keller appointed Delay to the committee during Wednesday's council meeting after he and two other council members expressed concerns about the appointment.

Delay said the concerns are unfounded, that his major interest is in maintaining the area's air quality.

The advisory committee will help determine ways to reduce air pollution in the southern Willamette Valley. Selection of representatives from Eugene, Springfield and Lane County is the starting point for formation of the advisory committee.

Those three representatives will, in turn, recommend appointment of other committee members. Final appointment of committee members will be by joint resolution of the city councils, by the county commissioners and by the state Department of Enviromental Quality (DEQ).

The Lane County commissioners appointed Richard Owings, director of the county Environmental Management Department, to the committee during their Wednesday meeting. Springfield has yet to appoint a representative.

Formation of the committee is part of a $70,000 air quality study being conducted by the Lane Regional Air Pollution Authority (LRAPA) and by the DEQ to determine sources of air pollution in the Eugene-Springfield area.

The study, financed by the federal Environmental Protection Agency, is required by the EPA because the southern Willamette Valley is one of three Oregon "air quality maintenance areas" violating federal air pollution standards.

LRAPA and the DEQ are required to identify pollution sources, to predict their future impact and to develop strategies for bringing the area into compliance with air pollution control requirements. Similar studies are under way in the state's other two problem areas — the Portland metropolitan area and the Medford-Ashland area.

After the pollution sources are identified, the advisory committee and LRAPA will attempt to develop strategies to control pollution.

In a letter to the Eugene council, LRAPA Director Vern Adkison said, "It is important to the DEQ and the LRAPA that the advisory committee be balanced, representing all segments of the community."

Councilman Tom Williams said Wednesday he's not convinced that Delay will provide "balanced" representation. Williams said the committee could have a major impact on pollution control techniques, including controls on growth. He questioned whether it is in the city's best interests to appoint someone who is "polarized on that issue (growth)."

Delay has consistently supported controls on Eugene's growth, while Williams has objected to stringent controls. Williams suggested appointing someone not on the council "who has not staked out so strong a position."

Williams said he thinks Delay will use the air pollution advisory committee as a means of implementing growth-control methods.

Delay said Williams' implication was "really unfair and unfounded." He said the real question is not controlling growth but controlling air pollution. "You need somebody on this committee who is willing to be objective and hard working," Delay said. "I am."

Councilman Scott Lieuallen supported Delay's appointment. Lieuallen said Delay "knows more than any two or three of us about the issue." He said unless ways are found to control pollution, growth will be stifled.

Keller and Councilman Brian Obie said they share Williams' concerns. Keller said he discussed the concerns with Delay when Delay asked to be appointed to the committee. "I think a no-growth position in our community would be a disaster," Keller said.

Delay said the committee "has a fairly well-defined task in front of it" and there "are no pre-conclusions in this process."

The DEQ schedule calls for development of a preliminary pollution control strategy by late in 1978, with a final plan to be adopted in 1979.

12/18/77

REGISTER-GUARD, Eugene, Ore., Sunday, I

County seeks environment-oriented persons

Lane County residents interested in serving on an environment-oriented advisory committee are being sought by the county commissioners.

Applications will be accepted until Jan. 3 for the county's representative on an air quality control advisory committee and for membership on the county resource recovery advisory committee.

The air quality committee will be responsible for studying and recommending to the State Department of Environmental Quality alternatives designed to bring the metropolitan area into compliance with federal air standards.

Other members of that committee will represent Eugene, Springfield, transportation and planning agencies, the Metropolitan Wastewater Management Commission and various community agencies and organizations.

The county's 17-member resource recovery committee has one vacancy. The committee is responsible for providing advice to the commissioners on development of a master plan for resource recovery. In addition, the group is investigating alternatives for garbage disposal and recycling and ways to better inform the public about those alternatives.

Application forms for membership on the committees are available from the county's community relations office in the Public Service Building, 125 E. Eighth Ave., Eugene.

A-606

Springfield News 12/24/77

Cleaner air goal of group

By RICK BELLA
News Staff Writer

A new, federally required committee will soon decide how you will breathe.

Relax. Lungs are still in style and the committee is sure to leave gills to the fish.

But the federal Environmental Protection Agency (EPA) has said the Springfield-Eugene area must improve its air quality and the new committee will recommend ways to meet federal air pollution limits.

Right now, air in the metro area does not make the grade. According to tests done by the Lane Regional Air Pollution Authority (LRAPA), our air contains too many small, solid particles to meet federal health standards.

What can we do? Industries have already spent millions of dollars to eliminate pollution and new answers won't be easy to find. But that's the job of the committee members: Find answers which will help solve the current pollution problem without causing any undue hardship.

They have to hurry. The EPA says the committee must recommend its strategies for reaching – and keeping – clean air standards by Jan. 1, 1979.

When the committee comes up with some strategies, they will be forwarded to the state Department of Environmental Quality (DEQ) for review. With the DEQ's blessing, the strategies will go to the governor for his signature and they will become, more or less, law.

So far, the committee has a nucleus of three members. Bob Adams, a Springfield city councilman and LRAPA board chairman, was tabbed by the council to represent the city. Jack Delay, a Eugene city councilman and a LRAPA board member, will represent Eugene. The third member, Rich Owings, is the director of the Lane County Environmental Management Department and was appointed by the county commissioners.

(See AIR, Page 3A)

Air . . . (Continued from Page 1A)

Together, the three members will appoint the rest of the committee – up to 24 members in all.

By federal guidelines, the other committee members will include representatives from the Oregon Department of Transportation, the state Land Conservation and Development Commission and the agencies which administer federal housing, water pollution control and transportation programs.

The makeup of the rest of the committee is up to the "nucleus of three."

Adams said Thursday he is interested in seeing industry well-represented on the committee. He said those members will be able to present technical information on the costs of pollution controls and that several Springfield industrialists have already asked to be appointed.

"Our problem is we're the dirty city," said Adams. "Our pollution is probably more than Eugene and Lane County put together. Just about every polluter has called me up to be on the committee."

But, that's logical, said Adams.

"After all," he said, "industry's the one who will be jeopardized if we can't comply with the standards."

Apparently, the area doesn't have too far to go before the air quality does comply with the federal pollution limits.

Right now, LRAPA strains air through fine filters and weighs the particles collected. The testing is done at 10 stations in the metro area and each turns in different results.

In 1976, the average cubic foot of air in downtown Springfield contained 68 micrograms of solid particles. During that same time, downtown Eugene registered 65 micrograms.

The EPA has said the annual averages must be dropped – all over – to less than 60 micrograms per cubic foot of air.

Some test stations in the metro area check out okay. Thurston High School came in at 45 micrograms in 1976 and Eugene airport registered 29.

LRAPA staff members said they must continue study of the air flows around the cities to find out why some areas register so high while others are so low.

Bill Green of the DEQ will be on hand to offer technical and moral support for the committee.

"I want you to know," said Green, "there is good faith involved here. We have every intention to adopt what the committee comes up with."

EUGENE RG 1/10/77

Adams says industry threatened

Councilman fears 'loaded' committee

By JEFFREY SMITH
Of the Register-Guard

Springfield industry may be threatened by the work of a regional air pollution advisory committee and the city must work hard to protect its interests, Springfield Councilman Bob Adams said Monday night.

"We are really concerned because we're the dirty town and (we) aren't getting represented (enough) on this committee," Adams told fellow council members during a work session.

The advisory committee will make recommendations on how to apply federal clean air standards to the Eugene-Springfield area, and those standards could drive industry away from the metropolitan area, Adams said.

Because Springfield's economy relies on industry, the city and the companies that run its factories must have strong representation during all committee sessions, Adams contended.

The committee will help determine ways to reduce air pollution in the southern Willamette Valley. Formation of the committee is part of a $70,000 air quality study being conducted by the Lane Regional Air Pollution Authority (LRAPA) and by the state Department of Environmental Quality (DEQ) to identify sources of air pollution in the Eugene-Springfield area.

After pollution sources are identified, the advisory committee and LRAPA will try to develop methods to control pollution.

Even local air control authority officials have said there may be no economically practical way for the metropolitan area to meet the federal air pollution guidelines. Adams echoed those sentiments Monday.

He told a reporter that wood products manufacturers will not be able to meet the federal standards even with millions of dollars of anti-pollution equipment.

Springfield's chances before the committee are "bleak" because the group's membership is weighted toward non-industry interests, Adams said, noting that members will include representatives of the American Lung Association, the League of Women Voters, the University of Oregon and environmental groups. Springfield has only one government representative (Adams) on the committee and only one still-to-be-appointed citizen representative, he said.

Adams said he rebuffed efforts last week to limit to one the number of representatives on the committee alloted to major industries. He said he convinced the committee Friday to give two committee slots to major industries such as the Weyerhaeuser Co. and Georgia-Pacific Corp.

"My argument was that the people who are going to pay for it (anti-pollution devices) should be represented strongly," Adams said.

City council members must decide on another person to represent Springfield by Feb. 3 and it should be someone "who has got good lungs so he can holler, because we're going to need it," Adams said. "I see no way we can come up with what . . . DEQ is expecting.

"What they want is citizen input and citizen input comes from us."

The core of the committee is formed by Jack Delay, a Eugene city councilman; Richard Owings, director of the Lane County Environmental Management Department, and Adams. Those three will recommend the appointment of other members. Final appointments will be made by joint resolution of the city councils, the county commissioners and the DEQ.

The DEQ schedule calls for the committee to develop a preliminary pollution control strategy by late this year, with a plan to be adopted in 1979.

1/12/78

Group of 24 to do study of air quality

A regional air pollution advisory committee that will make recommendations for improving the air quality in the southern Willamette Valley will have 24 members representing government, industry and other interest groups.

Eugene City Councilman Jack Delay, one of three original members of the committee, told the council Wednesday the other potential committee members will be reviewed at a Feb. 3 meeting.

Formation of the committee is part of a $70,000 air quality study being conducted by the Lane Regional Air Pollution Authority (LRAPA) and by the DEQ to determine sources of air pollution in the Eugene-Springfield area.

The study, financed by the federal Environmental Protection Agency, is required by the EPA because the southern Willamette Valley is one of three Oregon "air quality maintenance areas" violating federal air pollution standards.

LRAPA and the DEQ are required to identify pollution sources, to predict their future impact and to develop strategies for bringing the area into compliance with federal requirements. Similar studies are under way in the Portland metropolitan area and in the Medford-Ashland area.

After the pollution sources are identified, the advisory committee and LRAPA will attempt to develop a strategy to control pollution.

Delay, Springfield Councilman Bob Adams and Richard Owings, director of Lane County's Environmental Management Department, were named by their respective agencies to serve as a nominating group for the rest of the committee. They decided on the makeup of the committee at a meeting last week.

Delay said the advisory committee will include, in addition to Adams, Owings and himself, representatives from the Oregon Department of Transportation, the state Land Conservation and Development Commission, the Lane Council of Governments, the Lane County Labor Council, the League of Women Voters, the Oregon Lung Association, the Fire Chiefs Association, the Eugene-Springfield chambers of commerce, the Clean Air Committee (a local citizen group that has lobbied for limits on field burning), the University of Oregon and the U.S. Forest Service.

There also will be four members from the general public — two representing Lane County and one each representing Eugene and Springfield — three members representing the wood products industry, one representative for the agricultural industry, one for the agregate industry and one representing utilities, metals and chemical industries, Delay said.

Final appointment of committee members will be by joint resolution of the two councils, the county commissioners and the state Department of Environmental Quality (DEQ).

Springfield News 2/7/78

Air quality panel getting organized

The core of a new, federally required air quality advisory committee met last week to nominate the other members.

The core, Springfield City Councilman Bob Adams, Eugene City Councilman Jack Delay and Rick Owings, Lane County's Environmental Management Director, are now setting up ground rules for how to fight air pollution in the Springfield-Eugene area.

The ground rules are important because the federal Environmental Protection Agency has said the Springfield-Eugene area has too many suspended particles in its air and must adopt a strategy for fighting pollution.

If the area does not work out a solution on its own, the EPA has the power to step in and do the planning.

The committee must now decide how to reach the new, tougher federal standards for clean air, while protecting industries which provide jobs in the area.

The EPA says the committee must recommend its strategies for reaching and keeping those air standards by Jan. 1, 1979.

At this time, many environmentalists in the metro area believe the particles in the air come from field burning and slash burning. However, complete air movement data is not yet available and the Lane Regional Air Pollution Authority is now undertaking a thorough study of the area's weather.

Other nominees to the committee include:

Ellis Jones, Oregon Dept. of Transportation; Oliver Snowden, Lane Council of Governments; Alice Northway, Central Lane League of Women Voters; Dr. V. C. Vitums, Oregon Lung Association; Nancy Hayward, Clean Air Committee; Tom Hunton, Oregon Seed Council; Irv Fletcher, Lane County Labor Council; Lloyd Beebe, Lane County Fire Chief's Association; Darrel Spiesschaert, Western Lane District, State Dept. of Forestry.

Roy Sampson, College of Business Admin., University of Oregon; Jerry Bollen, Weyerhaeuser Co. (Wood Products Industry); Mitch Steffensen, Georgia-Pacific Corp. (Wood Products Industry); Nate Coleman, Lane Plywood, Inc. (Wood Products Industry); Bob Crissman, Morse Bros., Inc. (Aggregate & Paving Industry); Owen Brown, EWEB (Utility - Chemical - Metal Industries); Brian Bauske, Eugene-Public at Large; Richard McDuffie, Springfield-Public at Large; Cynthia Forrester, Lane County-Public at Large; George Mayer, Lane County-Public at Large.

The full committee is scheduled to meet at 7:30 p.m. Thursday, Feb. 21. The place of the meeting has not yet been announced.

All meetings are open to the public.

Springfield News 3/1/78

Air quality group meets

Oregon Department of Environmental Quality Director Bill Young will speak to the first full-member meeting of the Eugene-Springfield Air Quality Maintenance Area Citizen's Advisory Committee next week.

The meeting is scheduled for Tuesday, March 7 at 7:30 p.m. in the commissioner's Conference Room, Lane County Public Service Building.

Also addressing the group will be Vern Adkison, Lane Regional Air Pollution Authority Program Director.

The 25-member committee became "official" last week with the signing of a joint resolution creating the committee by the DEQ, the cities of Eugene and Springfield, and Lane County.

The committee will eventually be recommending to the DEQ and the LRAPA control strategy alternatives designed to bring the Eugene-Springfield area back into compliance with federal clean air standards for total suspended particulate, the amount of tiny particles in the air.

The committee is composed of local citizens, government, industry and special interest representatives. The group will serve for a period of 15 months.

All committee meetings are open to the public.

More information can be obtained by calling Marty Douglass at 686-7618.

EUGENE RG 3/8/78

Committee will study air quality

Citizens try to find causes of pollution

The new Eugene-Springfield air quality advisory committee agreed Tuesday night to begin holding weekly meetings soon to determine how the Eugene-Springfield metropolitan area can meet federal clean air standards.

The 25-member committee, meeting for the first time, began work at a somewhat slower pace, however, struggling to understand the southern Willamette Valley's complex air pollution problems.

Officially named the Eugene-Springfield Air Quality Maintenance Area Citizen's Advisory Committee for Total Suspended Particulate, the group's job is to study local sources of particulate pollution, then to develop strategies to control emissions so the Eugene-Springfield area can meet federal clean air standards by 1982.

Failure to develop clean air strategies by late 1979 will result in restrictions on local industrial development, according to Jack Weathersby, director of the state Department of Environmental Quality (DEQ) air pollution division.

"We need this committee to develop an effective pollution control plan," Weathersby said. "This committee is the link between the (air pollution control) agencies and the community."

He said the committee's recommended control strategies will be submitted to the Lane Regional Air Pollution Authority (LRAPA) and to the DEQ for public hearing and adoption as formal rules.

He said LRAPA and DEQ air pollution experts will provide committee members with an inventory of pollution sources and an assessment of the contribution of each source to the area's air pollution problems.

Sources to be examined include field and slash burning, road dust, industrial emissions and fireplace smoke, he said.

The new committee was appointed by DEQ Director Bill Young and is responsible to the DEQ, Weathersby said. However, members were recommended by the Eugene and Springfield city councils and by the Lane County Board of Commissioners.

Members represent a cross section of interests, and include officials from business, industry, education, government and environmental groups.

Pollution control program must be written by 1979

By **WANDA LAUKKANEN**
News Special Writer

A plan to control air pollution due to suspended particles must be developed by 1979 or the Eugene-Springfield area will face severe sanctions on industry, Jack Weathersbee, air quality division chief for the state Department of Environmental Quality (DEQ), told a citizen's advisory committee Tuesday night.

The group, officially named the Eugene-Springfield Air Quality Maintenance Area Citizen's Advisory Committee for Total Suspended Particulate, came together for the first time Tuesday in an organizational meeting.

The committee has until January 1979 to come up with a workable scheme for controlling air pollution, said Weathersbee. The region is under federal mandate to meet air quality standards by 1982, he added.

Until such a plan goes into effect, no further growth of possible pollution sources can take place, thus blocking industrial expansion in this region, he stated.

If the area does not come up with a control strategy for air pollution, the federal Environmental Protection Agency (EPA) will step in with its own plan.

The Eugene-Springfield area was designated an Air Quality Maintenance Area in the spring of 1974 due to violations of federal clean air standards. The latest figures released by the EPA in February showed the region below standards in three areas of air pollution -- suspended particles, carbon monoxide and light-reactive chemicals, commonly called "smog."

In drawing up a plan, the air quality committee will receive technical advice from the DEQ and the Lane Regional Air Pollution Authority (LRAPA). several months investigating pollution sources and will provide committee members with data soon. Sources include field and slash burning, industrial emissions, road dust, and fireplace smoke, he said.

In developing a pollution control strategy, Weathersbee said the group will have to look at what would be most cost effective and what kind of energy requirements the control would take.

He also stressed that the committee had a lot of work to do quickly.

"The standards have to be obtained and they have to be obtained in a fairly short period," he stated.

The problem is not an easy one, added Vern Adkison, director of LRAPA, who chaired the meeting.

He said any pollution control strategy must fit the community and take into account the local topography as well as possible social and economic impacts.

In remarks made during a question and answer period, Adkison said, "We're dealing now with a finite source. We have to face reality -- we're not meeting local, federal and state standards."

The region is now faced with the prospect of zoning or rationing the air, he said, adding that industrial needs had to balance against the reality of pollution.

Tradeoffs by industry will have to be taken into consideration. Weathersbee added, if the advisory council wanted to allow for a margin of growth in the Eugene-Springfield area.

Panel eyes air quality

By LISA STRYCKER
Valley News-Tribune

Developing a control strategy designed to attain and maintain the federal clean air standards for Total Suspended Particulate for the Eugene-Springfield area is the purpose of a new group, the Eugene-Springfield Air Quality Maintenance Area Citizen's Advisory Committee, which met for the first time last Tuesday.

The 25-member committee became official when a joint resolution creating it was signed recently by the Department of Environmental Quality, the cities of Eugene and Springfield, and Lane County.

The group, composed of local citizens, government, industry and special interest representatives, will eventually recommend to the DEQ and Lane Regional Air Pollution Authority control strategy alternatives designed to bring the Eugene-Springfield area back into compliance with federal clean air standards for TSP, according to Verner Adkison, program director for LRAPA.

The Eugene-Springfield area is currently in violation of federal clean air standards for TSP and is projected to remain in violation if present controls are maintained, according to Jack Weathersby, head of the air pollution control division of the DEQ.

As a result, the area was designated an Air Quality Maintenance Area for TSP in 1974 and must develop a control strategy designed to attain and maintain the standard by 1982 or face sanctions, Weathersby said.

Sanctions could prevent new large industries from locating in the area or disallow major expansion of an existing industry, he said.

"If a new control strategy is not in place in 1979, the result would be no growth," he said.

The committee, in cooperation with LRAPA staff, will identify sources of the pollutant, including consideration of field- and slash-burning impact, identify the contribution of these sources to the community and develop strategies aimed at particulate reduction, according to Weathersby.

"Suspended particulate (small particles of dust and other debris in the air) is difficult to attack," Adkison said. "We will receive reports of air quality studies and consider all local sources of particulate. Then we will provide a control strategy to fit the community, keeping practicality and cost in mind."

The committee's final recommendation will be made to the DEQ and LRAPA. After the controls are cast into rules, they will be submitted to EPA and implemented by state and federal governments, according to Weathersby.

A list of recommendations on procedures that could be followed by the full committee was prepared by LRAPA staff and presented for consideration by Marty Douglass, information officer for LRAPA.

Recommendations included selection of chairman, vice chairman and secretary; subcommittee development; recommendation of functional training sessions, and consideration of public input.

The air quality advisory committee will meet for the next 15 months. All committee meetings are open to the public.

EUGENE RG 3/30/78

Air quality panel elects Delay, Adams leaders

The Eugene-Springfield air quality adivsory committee took its first steps Wednesday night.

The 24-member committee — responsible for developing an air pollution control plan for the Eugene-Springfield area — first met March 7. At a second organizational meeting Wednesday night, the committee quickly elected Eugene city Councilman Jack Delay chairman and Springfield city Councilman Bob Adams vice chairman.

With similar speed, members voted to establish two subcommittees, one to develop meeting agendas and one to communicate committee activities to the public.

Then, with preliminary business complete, the members heard the first in a series of lengthy reports on air quality problems in the Eugene-Springfield area. The reports, presented by state Department of Environmental Quality and Lane Regional Air Pollution Authority officials, will prepare the committee for its real business, the selection of pollution control measures.

According to a preliminary schedule prepared by the DEQ and the LRAPA, the committee will complete its initial air quality study and will begin examination of pollution control strategies by July 1.

The committee's actual pollution control recommendations are to be presented to the DEQ by Dec. 1, incorporated in a statewide pollution plan by Jan. 1, 1979, and then submitted to the federal Environmental Portection Agency.

The EPA must eventually determine if the plan will bring Oregon into compliance with federal clean air standards by the early 1980s.

The committee agreed Wednesday night to hold its regular meetings during the day and at night. Night meetings will be scheduled for Wednesdays from 7:30 to 9:30 p.m. No specific days were chosen for daytime meetings, although the committee agreed to hold such meetings between 11:30 a.m. and 1:30 p.m.

Members said the day-night combination will give the public a chance to participate in committee activities..

SPRINGFIELD (ORE.) NEWS 5/4/78

You're breathing dirty air

Springfield citizens breathe dirty air.

That was the word from Ralph Johnston and Paul Willhite, Lane Regional Air Pollution Authority technicians in their testimony to a citizen's advisory committee on pollution Wednesday night.

Willhite and Johnston showed the committee statistics indicating that the number of pollution particles in the air, measured at the Springfield Library, is higher than other measuring stations in Lane County.

The particles are from dust, summer field burning or industrial pollution and they greatly affect the general air standards.

The committee is currently gathering information about the particles of pollution to aid recommendations to the federal Environmental Protection Agency. The government has established the maximum particle levels that must be reached by Jan. 1, 1982, and the committee must make specific recommendations by Jan. 1, 1979 on how these particle levels can be met.

The Springfield library site showed levels of particles between 63 and 90 micrograms per cubic meters of air between 1971 and 1977. The particle level must be below a standard of 75 micrograms per cubic meters by Jan. 1, 1982 deadline.

In addition, another standard of 60 micrograms of particles per cubic meter of air must be achieved as soon as possible after that deadline.

Current levels of pollution particles in the air around Springfield would fail to meet safety standards in five years, officials said. Although several other recording sites in the Lane County show particle levels over the secondary standard, only the library site and a location near industries in east Springfield show levels over the primary standard.

Because of this, Springfield residents have the most to gain from any recommendations the committee makes to the EPA, officials said.

Unsure of their scope

Air-quality advisors differ on role

By JANINE O'NEILL
Of the Register-Guard

Members of a Eugene-Springfield air quality advisory committee disagreed Wednesday on the role the the committee should play.

Specifically, members of the advisory committee differed on whether the pollution control plan they must develop by November should fit within the enforcement authority already granted to the committee or whether that authority should be expanded to enforce whatever plan they devise.

However, they agreed that the tough question will be how the plan can reduce air pollution while allowing for increased community growth.

The 25-member committee, officially named the Eugene-Springfield Air Quality Maintenance Area Citizens' Advisory Committee for Total Suspended Particulate, has until November to draft a plan for controlling particle emissions from all sources except field burning to meet federal clean air standards.

Field burning recommendations must be made by January, 1979, and the total plan ultimately approved by the federal Environmental Protection Agency (EPA).

Chairman Jack Delay, noting the wide divergence in the committee's views and short time it has to work, suggested that committee members give some thought to their role before the committee's fifth meeting June 7.

"I see the committee as a link between the regulatory process that has to reach this . . . attainment (of air standards) and the community," said Joe Lassiter, program director of the Lane Regional Air Pollution Authority (LRAPA), which is providing data for the committee.

"The real purpose is to take strategy alternatives to the people. The way you do that is talk, recommend, plead to get the authority (to carry out the strategies)."

Gary Grimes, a representative of the timber industry in the Medford-Ashland area, where a similar committee already has had its plan approved, agreed with Lassiter's assessment of the committee's power.

"The only things you're going to be able to deal with are those for which you have the statutory (enforcement) authorization. There's lots of things that the legislature has said 'hands off' on. Unless you can get the legislation, you can sit here and bat it around and you're not going to get anywhere."

Grimes said that although data showed the timber industry was responsible for 20 percent of the particulate pollution in the Medford area, and unidentified sources were responsible for over 40 percent, the committee was excessively hard on the timber industry because it had the authority to regulate it.

Committee member Richard McDuffie of Springfield had a different view of the committee's role.

"I thought we could think without considering present regulations and statutes," he said. "I feel our results should lay it out as we see it, and let regulations be altered to fit whatever plan the EPA approves. I can't see myself being bound."

Delay and Bill Greene of the Oregon Department of Environmental Quality (DEQ), which oversees the committee, agreed that that's what the committee charter says. However, Greene said after the meeting that while EPA might approve an idealistic plan, it would not give Eugene-Springfield "credit" for on-paper pollution reductions that can't be enforced.

Committee member Bob Adams, a Springfield city councilman, said an enforcement-oriented plan would discriminate against industry because LRAPA apparently has authority to control industrial polluters but not public polluters, such as cities and counties whose dusty, unpaved roads also contribute to air pollution.

"If we're not going to do anything about roads, then we're going to get on industry's backs, and that's on the wrong people's backs. I feel we're doing an injustice to industry and I don't see why industry would even want to stay here. I wouldn't."

Chairman Delay, a Eugene councilman, countered gently, "We haven't told anybody to do anything."

Adams' concern about industry also surfaced when Lassiter said the committee should reduce particulate pollution far enough below federal standards that the area has room to grow without exceeding the standards.

"It (pollution) has to come down but still you want the community to grow?" said Adams. "How you gonna do it?"

Another area of concern, expressed by committee member Richard Malliris, is how the committee's decisions about growth are going to dovetail with growth decisions made by other committees, such as those working on long-range transportation and solid waste-management plans.

For example, he said the air pollution committee might consider keeping log trucks off Sixth and Seventh avenues to control air pollution. But the proposed T-2000 plan, being considered by Eugene, Springfield and Lane County, envisions Sixth and Seventh as a major east-west corridor.

"If T-2000 is finalized, it restricts what we can do here," Malliris concluded.

A-617

Page 8A — Valley News-Tribune — Eugene, Ore. — May 23, 1978

A-618

Air quality committee ponders proper role

By MARTY DOUGLASS

The role of the Eugene/Springfield Air Quality Maintenance Area Citizen's Advisory Committee was the major item of discussion at the committee's meeting Wednesday night.

Joe Lassiter, Lane Regional Air Pollution Authority program administrator and chief staff member to the committee, told the members that the committee is the "link between the regulatory process and the community," in the area's attempt to reach compliance with federal clean air standards for suspended particulate.

Lassiter said the staff will suggest control strategy alternatives to the committee. The committee should seriously question those alternatives and not feel bound to the staff suggestions, he said. Lassiter also said that the various local jurisdictions (Lane County, Eugene and Springfield) should be consulted and urged to support whatever final control strategy recommendations are adopted by the committee.

The committee discussed road dust as a particulate source, and the fact that there has not been a proven strategy adopted or even recognized by the EPA to control this source.

Committee member Richard McDuffie said that current regulations are geared toward the "easy to get at" sources, such as industry. He said that the committee should not be locked into the existing regulations. In other words, all sources should be examined by the committee, he said.

Bob Adams expressed the same general concern, saying he fears that local industry will be called upon to bear a rollback in emissions.

"I feel we would be doing an injustice to industry, and I'm not sure they would want to participate in this process," Adams said.

Stating that all sources, including road dust, should be addressed, committee chairman Jack Delay said, "I believe we not only have the ability to make such recommendations (concerning road dust control), but the responsibility to go to the local governments and recommend measures that will help the road dust situation."

Lassiter agreed that local government resolutions supporting the committee's final recommendations would help in obtaining EPA approval of a final control strategy.

The committee's discussion followed a presentation by Bruce Shaw, a member of the Medford/Ashland AQMA Citizen Advisory Committee. Shaw said the Medford committee is now working on carbon monoxide and photochemical oxidant control strategies. The Oregon Environmental Quality Commission adopted suspended particulate control strategy rules for the Medford/Ashland AQMA in late March.

Contained in these rules are special standards pertaining to wood waste boilers, veneer dryers, air conveying systems, wood particle dryers, wigwam waste burners, charcoal producing plants and domestic open burning. Such potential sources as road dust and slash burning were not addressed in the adopted rules.

"Our biggest resistance came from the timber industry," Shaw said, since the control strategy effort was targeted toward that industry.

"We faced a lot of political resistance in banning open burning," Shaw added.

"The (Medford/Ashland) committee looked at road dust. The county and city begged off, and the committee went along with them," he said.

Asked by Alice Northway if "political expediency" was a major factor in adopting the recommendations, Shaw said, "We were under a time line . . . that was our biggest factor."

He also said that no money was available to adequately tackle the road dust situaiton. "Paved and unpaved road dust are tremendous contributors to the problem, and politically, the County Commissioners and City Council members are not ready to tackle it," Shaw said.

According to a schedule presented by Lassiter to the committee, the alternatives will be forwarded by the committee to the Lane Regional Air Pollution Authority and the Department of Environmental Quality by late November.

The committee will then consider the "non-traditional sources," such as field and slash burning. Those sources would be submitted as an update to the proposed control strategy alternatives by mid-January.

The entire proposal will then be the subject of a public hearing before the LRAPA Board of Directors and the Environmental Quality Commission, before being sent to the EPA for formal adoption as a revision in Oregon's State Implementation Plan.

The deadline for attaining the primary standard is December 31, 1982.

A-619

Air quality panel has vocabulary lesson

By WANDA LAUKKANEN
News Special Writer

It was back to school for members of the Eugene-Springfield Air Quality Maintenance Area Citizen's advisory committee Wednesday night.

The group got a lesson in the meaning of the words used in talking about air pollution control from staff members of the Lane Regional Air Pollution Authority (LRAPA) at its regular bi-monthly meeting.

Terms like "aerodynamic sizing," "point sources" and "emission factors" were explained to the citizens by Paul Wilhite, LRAPA field services supervisor, and Ralph Johnston, engineering services supervisor for the authority.

The advisory committee has until January, 1979, to come up with a workable scheme for controlling air pollution in the Eugene-Springfield area. The area has been designated an Air Quality Maintenance Area due to violations of federal clean air standards and is under federal mandate to meet air quality standards by 1982.

Johnston gave a brief overview of a study by a Portland consulting engineering firm of air pollution sources within the maintenance area to the committee. According to Johnston, after refinement and testing the figures from the study will be used in a computer modelling program.

The computer program will be able to predict what will happen to air quality when certain variables, such as air pollution controls, are adjusted. That will give the committee an idea of what the impact of suggested ways to control air pollution will be, he said.

The study, labeled, "Emission Inventory Improvements and Projections," Listed air polution data for the years 1974 and 1976 and made projections for five year intervals up to 1995.

It showed the greatest contributors to air pollution within the Air Quality Maintenance Area to be point sources, which are pollution emissions coming from specific places such as industrial smokestacks.

The next highest contributors were paved and unpaved road dust, which are known as area sources-pollution of a certain kind from a wide area rather than from a specific, identifiable place.

The study, however, only takes into account air pollution sources within the Eugene-Springfield area and does not account for sources from the outside, such as field and slash burning, said Johnston.

The next meeting of the citizen's advisory committee is scheduled for May 28.

Eugene RG 7/27/78

Outside pollution much of problem

Much of the air pollution in the Eugene-Springfield area comes from other parts of the Willamette Valley and that "intrusion" should be considered during development of pollution control plans for this area, Eugene Councilman Jack Delay said Wednesday.

Delay is chairman of the Eugene-Springfield Air Quality Maintenance Area Citizens Advisory Committee, a 25-member group that will study the area's pollution sources and will recommend strategies for meeting federal clean air standards by 1982.

The committee is concerned with "suspended particulates" such as dust, smoke and fumes. Major sources are industrial operations, dirt roads, field burning as slash burning.

The committee is charged with developing a pollution control strategy for the 90-square-mile area known as the Eugene-Springfield air quality maintenance area, approximating the area within the metropolitan urban services boundary.

However, Delay said a control strategy may be an unreasonable task because much of the area's pollution isn't produced here and thus can't be controlled locally.

The Willamette Valley airshed is "like a shoebox and we're down in the corner of the shoebox," Delay said. "We can't just clean out one corner of it. . . . We're not going to be able to do it right here, by ourselves."

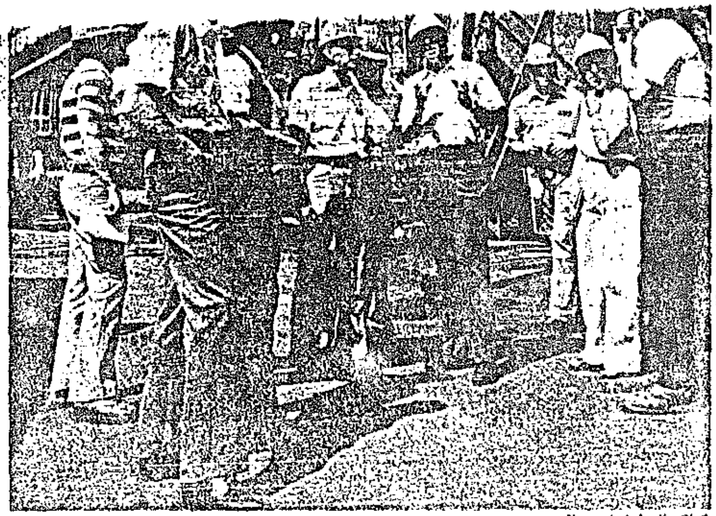
Delay said the advisory committee should be considering "the valley-wide implications of the (pollution) problem."

For instance, Delay said, the state Department of Environmental Quality (DEQ) has discouraged the advisory committee from considering slash burning controls because slash burning is under the jurisdiction of the state Forestry Department. Delay said slash burning is an element of the area's pollution problem and should be addressed by the committee.

Delay said the committee also should develop a "growth implement" to ensure that local industry won't be stifled by pollution controls.

The committee's recommended pollution control strategies will be submitted to the Lane Regional Air Pollution Authority and then to the DEQ for public hearings and adoption. The regulations will become part of the state air quality plan that must be approved by the federal Environmental Protection Agency.

In other action Wednesday, the council directed the city manager's staff to prepare a report on the potential affects of state Ballot Measure 6 on city operations. Ballot Measure 6, which will be on the Nov. 7 ballot, would limit the amount of property taxes local governments could collect.



News photo by Jim Clark

At Weyerhaeuser's Springfield facility, tour participants heard about pollution control at the particle plant

Springfield News 8/1/78

Firms cite problems in pollution control

By WANDA LAUKKANEN
News Staff Writer

Managers of industries that are sources of air pollution caused by suspended particles are aware of pollution problems and are working to solve them. But the industries are faced with problems of both cost and engineering in controlling pollution, members of a citizen's advisory group on suspended particulate pollution were told early this week.

In a tour of air pollution sites in the Springfield-Eugene area, the group saw the inside workings of three Springfield industries and were told about their problems in coping with air pollution standards by representatives of National Metallurgical, Kingsford Company and Weyerhaeuser.

The three are among several industries in the area that have been identified as "point sources" of suspended particles. A point source indicates the pollution is pinpointed as coming from a specific place while "area sources" are generalized sources of air pollution, such as road dust.

About 15 staff persons of the Lane Regional Air Pollution Authority and members of the Eugene-Springfield Air Quality Maintenance Area Citizen's Advisory Committee for Total Suspended Particulates took part in the tours.

Among the problems industry face, said Rick Mallivis of National Metallurgical, is engineering the air pollution controls. He said the high heat required in the plant's processing of silicon caused expansion and contraction of the materials used in the air pollution controls, sometimes causing leaks.

"Maintenance of the controls is a continual problem," he said.

At Weyerhaeuser, Dick Crabb, environmental specialist and Bill Perry, particle board superintendent at the plant, took the group on a tour of the paticle board production. They said that the company had spent over $1 million to reduce emissions from a level of 1,784 pounds per hour in 1972 to the 1978 level of 78 pounds per hour.

But, Perry said, "Every step of the way down, you find another problem." He said that in order to increase the plant's capacity, yet not increase the total amount of emissions calls for more stringent controls altogether or a lessening of production.

At Kingsford Company, which manufactures charcoal briquets, Tom Faber, regional manager, also told the group that engineering problems with air pollution controls were a major problem. He said the high heat of up to 2,000 degrees used in the plant's processing is a problem and that the company is working with other plants to develop more efficient controls.

"We'll come up with an answer," he said. "It'll just take us awhile."

Along the tour route, other sources of pollution such as wood industries and unpaved roads were pointed out to the members of the group.

About 51 per cent of the total suspended particulates in the Eugene-Springfield area come from point sources and the other 49 per cent are from area sources. The figures are from a report on emission inventories prepared for the State Department of Environmental Quality.

The citizens advisory committee has until January, 1979, to come up with a workable scheme for controlling air pollution. The region is under federal mandate to meet air quality standards by 1982.

The area was designated an Air Quality Maintenance Area in the spring of 1974 due to violations of federal clean air standards. Figures released by the Environmental Protection Agency in February showed the area below standards in three areas of air pollution -- suspended particulates, Carbon monoxide and light-reactive chemicals, commonly called, "smog."

Ten-station network

Monitors to check pollution sources

By STEVEN SMITH
Of the Register-Guard

A complex monitoring network spread over the Willamette Valley may provide the data air quality experts need to determine how much air pollution is produced by field and slash burning.

The 10-station network will study the types of particulate matter put into the atmosphere by field and slash burning and by other valley pollution sources, including industries. In addition, the network may be able to compare the amount of pollution produced by each source to determine which sources have the greatest impact on valley air quality.

The network was described Wednesday night by Frank Terraglio, a federal Environmental Protection Agency air quality specialist on loan to the state Department of Environmental Quality to manage the seven-month study that runs through November.

Terraglio told the Eugene-Springfield Air Quality Maintenance Area Citizen's Advisory Committee that the network primarily will focus on the pollution problems of the southern Willamette Valley. The committee is responsible for developing a strategy that will bring the Eugene-Springfield area into compliance with federal clean-air standards.

The 1977 Legislature criticized state and federal environmental agencies for not collecting adequate scientific data on the impact of field and slash burning.

The DEQ and its advisory field burning committee proposed the monitoring program and received partial funding from the Legislature's Emergency Board in January.

The initial proposal was for a 16-station network, Terraglio said. However, the Emergency Board provided funds only for a scaled-down program. The board allocated $220,000 in general state revenues and earmarked another $200,000 from grass seed grower burning fees for the study. In addition, the EPA is spending nearly $100,000 on the program, Terraglio said.

Stations containing a variety of sophisticated monitoring instruments have been placed in selected locations around the valley from Oregon City to Creswell to measure the amount and type of particulate pollution, particularly pollution caused by field and slash burning.

Over the study period, more than 1.7 million individual bits of information will be collected by the monitors for computer analysis and expert evaluation, Terraglio told the committee. Some of the information may tell experts how smoke produced from field and slash fires travels through the valley, he said.

Consultants under contract to the DEQ will also attempt to develop techniques that differentiate particles produced by field fires and particles produced by slash fires. Successful techniques could permit experts to compare, for the first time, the relative impacts of the two pollution sources.

A preliminary report of the study's findings will be available to state and local officials and to the public by Nov. 1, Terraglio said, adding that that report probably will contain an analysis of data collected through August and will focus on field burning.

Complete study results including slash burning analysis won't be available until sometime next year, he said.

In addition to the 10-station study, the EPA and the DEQ are conducting a variety of separate experiments this summer designed to better describe the characteristics of field and slash burning pollution, Terraglio said.

For example, a DEQ helicopter is attempting to track the route of field-burning smoke produced by specific fires that have been "spiked" with a traceable chemical.

The EPA has also provided a converted A-26 bomber equipped with sophisticated monitoring equipment to supplement the ground-based network. The plane will traverse the Willamette Valley daily through August while field burning is taking place and will return in November for two weeks to study slash burning pollution, Terraglio said.

A-622

Eugene RG 10/12/78

Control plan for airshed edges ahead

Despite delays in developing a computer model of the Eugene-Springfield airshed, an air quality citizens' advisory committee will still attempt to prepare a preliminary air quality strategy by Jan. 1.

The state Department of Environmental Quality has had difficulty preparing the computer model on schedule, a DEQ official told the 24-member Eugene-Springfield Air Quality Maintenance Area Citizens' Advisory Committee Wednesday night.

The model, when complete, will be used by the committee to test the effectiveness of various pollution control measures that could be imposed on pollution sources such as industries.

Bill Greene, DEQ adviser to the committee, said the DEQ has had difficulty fine-tuning the model. Because of delays, the AQMA committee had not met for nearly a month before Wednesday night's meeting.

The committee is charged with developing a pollution control strategy that will bring the Eugene-Springfield area into compliance with federal clean-air standards. The state Environmental Quality Commission is scheduled to adopt the committee's proposed strategy next spring. The plan will be included in the state's air quality strategy to be submitted later to the federal Environmental Protection Agency.

Greene said a preliminary draft of the proposed Eugene-Springfield strategy must be complete by Jan. 1. Federal clean-air laws provide for sanctions — including the loss of federal grant, project and highway assistance funds — against communities and states that fail to show reasonable progress toward developing a strategy, he said.

The committee will begin studying alternate pollution control strategies at its next regular meeting Oct. 25. Work on the plan will continue with weekly meetings through December, according to the committee schedule outlined by Greene.

EUGENE RG 11/10/75

Clean air panel faces federal dilemma

Members of a Eugene-Springfield air quality advisory committee aren't sure which way to turn to satisfy the federal Environmental Protection Agency.

The committee must submit a draft proposal for a suspended particulate control strategy before a Jan. 1 deadline, but data needed to make the decisions isn't expected until next spring.

The committee is hopeful an EPA representative will be present and will offer some guidance during its next meeting at 7:30 p.m. Wednesday in the Eugene Federal Building.

The 25-member committee's formal name is the Eugene-Springfield Air Quality Maintenance Area Citizens' Advisory Committtee for Total Suspended Particulate.

The committee was formed last spring to draft a plan for controlling particulate emissions from all sources except field burning to meet federal clean air standards.

A key part of the committee's data is supposed to come from a computer modelling project which, ideally, would show the impact of a given source on the community by taking meteorological conditions into account. However, to date the model has not worked, according to Bill Greene, State Department of Environmental Quality staff member to the committee. He said results aren't expected until spring.

Meanwhile, the Eugene-Springfield committee is supposed to have a draft of its particulate control strategy plan into the hands of the Lane Regional Air Pollution Authority and of the DEQ by Jan. 1, and a final plan adopted by March.

Marty Douglass, public affairs representative for the Lane pollution authority, said the EPA has hinted it might consider granting the committee an 18-month extension for submitting the final plan if the committee agrees to certain conditions. These conditions include adopting what's called a Reasonably Available Control Technology — or RACT — on "local point sources."

Translated, Douglass says that means: Should local industry make plans now to spend a considerable amount of dollars to further control its emissions in order to buy additional time for the committee?

A "point source" is a pollution source such as a smokestack from a plant to which the emission can be traced. This is in contrast to "area sources," such as open burning, dust, or particulates from field burning and forest slash burning that drift into the Eugene-Springfield airshed.

At a meeting Wednesday, committee Chairman Jack Delay, who is a Eugene city councilman, said adopting the "RACT" is a way to obtain additional time for overall planning. However, he said the committee must be assured the RACT can be modified if further data justifies the changes.

Jerry Bollen, a wood products representative on the committee, was critical of the RACT proposal. He said it could force industry to spend a large amount of money with no guarantees that attainment of the standards could be reached. Springfield representative Bob Adams voiced the same concern, saying the committee has no data basis for making such a decision.

The committee agreed that a decision must come soon in view of the approaching deadline for the draft plan. That decision may boil down to a choice between substantial expenditures by local industry, a risk of federal sanctions — such as a cutoff of certain federal funds — or a plan being developed without the benefit of data the committee feels it needs to make sound decisions.

A-624

5 actions proposed

Air advisory group views specific plan

After several weeks of preliminary discussion, the Eugene/Springfield air quality advisory committee examined a specific particulate pollution control strategy Wednesday night.

Richard Malliris, a committee member representing the Eugene-Springfield area chambers of commerce, proposed a five-part strategy designed to bring the metropolitan area into compliance with federal clean-air standards by 1983.

Committee members discussed Malliris' proposal but deferred action so that other strategies can be presented at future committee meetings.

Malliris' proposal calls for:

- Control of road dust in the Eugene-Springfield area by paving all unpaved roads. As an alternative to paving, the roads could be covered with a chip-rock and oil combination. The proposal would affect about 40 miles of roads in the metropolitan area and could cost up to $22 million.
- Maximum control of pollution emission from the Kingsford Co. charcoal plant in Springfield.
- Maximum control of emissions from the Weyerhaeuser Co. plant in Springfield.
- Application of state pollution emission standards for veneer dryers in the metropolitan area to produce reduce pollution emissions.
- Tightened pollution emissions from hogged-fuel boilers, but only if federal clean-air standards are not met by 1983.

The proposed strategy would bring the metropolitan area into compliance with federal standards, according to Marty Douglass of the Lane Regional Air Pollution Authority. However, there would be little room for additional industrial growth under the strategy if standards are to be maintained, he said.

Douglass said the advisory committee will hear cost estimates associated with the strategy at a meeting Wednesday night.

Springfield News 11/30/78

Industry offers a pollution plan

By LIZ PEEPLES
News Staff Writer

A proposal that goes easier on local industry but says the public sector should be footing some of the bill to clean up the air in the Springfield/Eugene metropolitan area was presented at an air pollution advisory committee meeting Wednesday night.

The proposal is the second one now before the Springfield/Eugene Air Quality Maintenance Area Citizen's Advisory Committee, the group charged with recommending control strategies to bring the area into compliance with the Environmental Protection Agency's clean air standards.

The proposal forwarded by committee member Rick Malliris of National Metallurgical in Springfield, would put less of the anti-pollution burden on local industries than an earlier proposal designed by Lane Regional Air Pollution Authority (LRAPA) staff.

Though the committee is only advisory in nature, it is comprised of industry and environmental officials from throughout the county and will be responsible for making a recommendation as to how the metropolitan area can comply with EPA standards by the 1982 deadline.

The proposal the committee looked at Wednesday night, however, can be viewed as a new twist to the ongoing battle against suspended particulates.

Malliris' proposal suggested that cities and the county should be shouldering part of the cost to clean up the air in the metropolitan area because much of the emission has been identified as coming from unpaved roads.

LRAPA staff members acknowledged there are 43.5 miles of unpaved road in the metropolitan area, which accounts for 40 per cent of the suspended particulates evident in the control area.

(Point sources, or local industries account for 50 per cent of the emissions, according to LRAPA staff, and the other 10 per cent of the pollution particles identified in the metropolitan area come from open burning, auto exhaust, wood fire stoves and other miscellaneous sources, they say.)

Malliris told the committee that his proposal for an emission control strategy would be to attack the problem of unpaved roads first, although he didn't leave local industry out of his formula to reduce pollution.

He did, however, note that local industries are making strides in curbing emissions and said in some cases it would take industries a considerable amount of money to make a relatively small dent in the total pollution inventory.

Malliris talked about limits imposed on the Kingsford plant in Springfield, a charcoal manufacturing enterprise, and said that while efforts should be taken to reduce emissions, he also suggested that Kingsford officials have said even if they rebuilt their entire system, they probably couldn't reduce emissions to the most desirable limits.

There was also discussion about pulp mill standards, and Malliris proposed that the control strategy for local pulp mills be kept at the current permit level. He cited pulp mills as an example of an industry that would have to spend a lot of money to reduce emissions by just a small amount.

Probably the most discussion centered on strategies for hog fuel boilers, one of the most notorious sources of pollution emissions in the metropolitan area. Malliris noted that any strategy attempting to control what comes out of hog fuel boilers will have an impact on the areas wood processing industries, one of the largest affected being Weyerhaeuser Co. in Springfield.

Malliris' proposal generated some discussion and some questions from fellow committee members because he basically was suggesting that a "wait and see" look be taken at the situation when the Dec. 31, 1982 deadline rolls around.

(See INDUSTRY, Page 3A)

Industry . . .

(Continued from Page 1A)

The local industry representative proposed that desired emission levels for hog fuel boilers be defined, but that they only go into effect in 1982 if the area has not reached compliance with EPA standards.

Jerry Bollen, representing Weyerhaeuser on the advisory committee, talked about the potential cost to the Springfield lumber products company if new emission standards are imposed, and suggested that because the cost impact is so critical, there must be evidence it's necessary before industry is forced to make such a commitment.

Owen Brown, who represents Eugene Water and Electric Board on the committee, complained that there hasn't been enough concern about the potential cost to industry.

Jack Delay, a Eugene city councilman and chairman of the advisory group, commented that the committee is not insensitive to the cost considerations industry faces.

Brown commented that it's time for citizens and public agencies to do their share by paving roads.

The EWEB representative said that EWEB, which also has boilers, will do anything it's told to do in terms of controls, but he acknowledged the hardship is passed on to customers through utility rates.

But Brown suggested that the same isn't true for all industries; he said some smaller firms might have to abandon their old boilers, get new boilers, or possibly close down.

While the cost to industry if further restrictions are ordered was a consideration Wednesday night, Ollie Snowden, representing Lane Council of Governments, said it would be unrealistic to assume that all unpaved roads in the cities can be paved by 1982.

Paving of 43 miles held key to clean air

Eugene RG
12/7/78

By DAN WYANT
Of the Register-Guard

Controlling dust by paving some 43 miles of streets in the Eugene-Springfield area is the biggest single step governmental agencies can take to assure compliance with the federal Clean Air Act, an air advisory group was told Wednesday night in Eugene.

At least that's what Bill Green, state Department of Environmental Quality adviser to the committee, said is shown in a computer study of suggested pollution control strategies for the metropolitan area.

He said the computer model was applied to two days in early 1977 when suspended particulate emissions exceeded federal standards in the two cities.

Eliminating the dust, which the DEQ claims is generated from the unpaved streets, would have reduced the particulate level several times more than by placing tigher emission controls on veneer dryers, the Kingsford charcoal plant, hogged fuel boilers, or the Weyerhaeuser pulp and paper plant, the computer study indicated.

Periods of heavy atmospheric inversions that kept particulates from escaping into the atmosphere occurred during the two days of the study, Jan. 25 and Feb. 18, he noted.

Green made his comments after another DEQ representative, John Core, summarized the agency's interim report on the Willamette Valley Field and Slash Burning Impact, which was made public in mid-November.

That report also emphasizes the impact of soil dust on the valley's particulate levels. It says airborne dust from roads and fields accounted for 65 percent of the valley's summer particulate levels.

Field burning had little significant

Please turn to Page 2A

Clean air

impact on the valley airshed's overall particulate mass, the study concludes. However, it says localized impacts can be substantial for short periods of time.

Core said the interim report covered the period from June 1 through mid-August when most of the summer's field burning but relatively small amounts of slash burning occurred. He said a subsequent report will include the impact of slash burning smoke on the valley's airshed after mid-August.

Core said the study contrasted particulates in the airshed during days in which 1,000 or more acres of seed grass stubble was burned with days when burning did not occur and concluded there was no significant difference in the valley's overall particulate levels.

However, he conceded the comparison might not be valid because the days on which field burning was prohibited were generally those days with poor dispersion conditions that tended to trap particulates in the air. Air dispersion was good on days when field burning was permitted.

Ollie Snowden, Lane Council of Governments transportation program manager, summarized the reactions of a public works subcommittee of the L-COG Transportation Committee to suggestions that Eugene, Springfield and Lane County pave 43 miles of streets by 1983 as one of the region's control strategies.

He said the public works representatives questioned whether funds will be available from federal or local sources to accomplish the paving, estimated to cost as much as $22 million, by 1983. He said the subcommittee suggested the paving be completed during a 10-year period.

Snowden said the subcommittee feels it can develop a priority paving program aimed at paving those streets contributing the heaviest quantities of dust. The air quality committee asked Snowden to return with a priority program at its Dec. 13 meeting.

The committee also heard a report from David Jung, from the Oregon State University Department of Mechanical Engineering, on a federally funded study he is heading to improve combustion in wood-fired boiler furnaces.

Noting that six pounds of air is required to burn each pound of wood, Jung said experiments show that distribution of air in the firing process can have a critical impact on how cleanly the wood burns.

The committee's formal title is the Eugene/Springfield Air Quality Maintenance Area Citizen's Advisory Committee for Total Suspended Particulate. It is responsible for recommending a particulate control strategy that will satisfy federal clean air standards.

Chairman Jack Delay, a Eugene city council member, expressed hope that the committee can arrive at a consensus on control strategies during two final meetings scheduled in December so the Lane Regional Air Pollution Authority staff can begin its work on "consequences and details" for a preliminary draft to submit to the federal Environmental Quality Commission.

A-628

Oregon Statesman 12/8/78

Paving of streets urged to improve air quality

EUGENE (AP) — A computer study shows that paving 43 miles of streets in the Eugene-Springfield area to control dust would be the biggest single step governmental agencies can take to assure the area's compliance with the federal Clean Air Act.

Bill Green of the state Department of Environmental Quality told an advisory committee Wednesday that the computer model was applied to two days in early 1977 when suspended particulate emissions exceeded federal standards in the two cities.

Eliminating the dust, which the DEQ claims is generated from the unpaved streets, would have reduced the particulate level several times more than by placing tighter emission controls on veneer driers, the Kingsford Charcoal Plant, hogged fuel boilers, or the Weyerhaeuser pulp and paper plant, the computer study indicated.

Springfield News 12/7/78

Paving roads a good policy but . . .

By LIZ PEEPLES
News Staff Writer

Springfield, Eugene and Lane County public works officials say they believe it's good urban policy to pave all unpaved roads, but they don't think it's realistic to assume 43 miles of unpaved roads in the metropolitan area can be paved by 1983.

That reaction comes in response to a proposal presented to the Lane Regional Air Pollution Authority's LRAPA, citizens advisory committee last week. The committee is charged with the task of developing a plan to reduce pollution emissions in the metropolitan area to comply with Environmental Protection Agency, EPA, standards.

Richard Malliris of National Matallurgical Co. of Springfield had suggested to the committee last week that public agencies must assist in reducing the metro area's pollution inventory, by paving unpaved streets. According to LRAPA staff, road dust accounts for 40 per cent of the suspended particulates in the emission control area, while local industry accounts for 60 per cent of the pollution particulates.

Ollie Snowden, the citizens advisory committee representative from the Lane Council of Governments, reported Wednesday night that public works officials from Springfield, Eugene and Lane County agree that roads should be paved.

But, Snowden said, not only do the public works officials think a 1983 target date is unrealistic, but they also have strong concerns about how to fund such a massive project.

The L-COG representative said that only very limited funding might be obtained from federal agencies and grants, and said that public works officials contend the burden would have to fall on local taxpayers if the paved road control strategy is adopted as part of the plan to reduce air pollution in the area.

Public works officials also expressed concern about what kind of paving might be done under such a project, feeling that chip seal can only be considered a temporary solution. (Chip seal is probably the least expensive road paving technique.)

Snowden told the citizens advisory committee, which is composed of industry, public and environmental representatives, that public works officials also questioned the enforcement provisions of the road paving proposal because of the code provision which allows Springfield residents to remonstrate against unwanted services, such as paved roads.

In coming up with recommendations for the committee which is currently studying two pollution control strategies, the public works officials made several recommendations.

First, they told the advisory group that if paving is adopted as a control strategy, that the public agencies will need longer than the 1983 deadline suggested. The public works officials said they'd also want a priority listing of unpaved streets and said they would not consider temporary improvements to roads such as using chip seal. They also told the air pollution advisory group that public agencies would be receptive to ideas about where funding for the project that would involve 43 miles of unpaved roads might come from.

Bend Bulletin 12/6/78

A-629

DEQ says paving would clean up Eugene-Springfield air

EUGENE (AP) — A computer study shows that paving 43 miles of streets in the Eugene-Springfield area to control dust would be the biggest single step governmental agencies can take to assure the area's compliance with the federal Clean Air Act.

Bill Green of the state Department of Environmental Quality told an advisory committee Wednesday that the computer model was applied to two days in early 1977 when suspended particulate emissions exceeded federal standards in the two cities.

Eliminating the dust, which the DEQ claims is generated from the unpaved streets, would have reduced the particulate level several times more than by placing tighter emission controls on veneer driers, the Kingsford Charcoal Plant, hogged fuel boilers, or the Weyerhaeuser pulp and paper plant, the computer study indicated.

Periods of heavy atmospheric inversion that kept particulates from escaping into the atmosphere occurred during the two days of the study Jan. 25 and Feb. 18.

Green made his comments after another DEQ representative, John Core, summarized the agency's interim report on the Willamette Valley Field and Slash Burning Impact, which was made public in November.

That report also emphasized the impact of soil dust on the valley's particulate levels.

It said field burning had little significant impact on the valley air shed's overall particulate mass, but localized impact can be substantial for short periods.

Advisory group postpones work on dust pollution in Eugene

By DAN WYANT
Of the Register-Guard

A citizen group decided Wednesday night it will have to carry its work over to next year to arrive at a set of recommendations for strategies to reduce air pollution in the Eugene-Springfield area.

Jack Delay, a Eugene city councilman and chairman of the Eugene/Springfield Air Quality Maintenance Area Citizen's Advisory Committee for Total Suspended Particulates, hoped last week that the committee could reach a consensus after two more December meetings.

But after the first of the two meetings Wednesday night, Delay canceled the session scheduled for next Wednesday and asked the 25-member committee to report back Jan. 10 after a Christmas holiday break.

He said more time will be required to resolve conflicting estimates of amounts of dust that can be eliminated from the airshed through the paving of presently unpaved streets and more time will be needed to target other sources of particulates that can be reasonably reduced between now and 1982.

Some of the conflicting estimates were produced by a study that public works department representatives of Eugene, Springfield and Lane County carried out the past week in an effort to establish priorities to pave gravel or dirt streets that contribute the largest amounts of dust to the airshed.

A Portland consulting firm — Seton, Johnson and Odell Inc. — estimated for the state Department of Environmental Quality last spring that dust from about 43 miles of unpaved public streets and roads in the Eugene-Springfield Metropolitan area contribute about 3,528 tons of particulates annually, the highest of any single particulate source. Paved road dust was second, at 2,829 tons and motor vehicle emissions ranked third, at 566 tons.

However, public works representatives told the committee that the Portland study failed to account for dust from private roads or from some 18 miles of unpaved alleys in the area — and Lane Regional Air Pollution Director Vern Adkison said the study also ignored dust emissions from the giant Southern Pacific railyards in the River Road area.

Further, Dave Reinhard, chief of transportation planning for the city of Eugene, said the consulting firm's estimates assumed that traffic traveled at an average of 20 mph on all unpaved streets. Actual surveys for Eugene's unpaved streets showed an average speed of less than 14 miles per hour, he said.

Because it is calculated that dust emissions increase with the square of the speed, Reinhard said his staff estimated that the volume of emissions from unpaved streets were half the levels computed in the study.

He estimated that paving 3.5 miles of Eugene's present 13.9 miles of unpaved public streets would reduce dust emissions from that source from 600 tons to 250 tons per year.

Bob Adams, a Springfield city councilman and another member of the advisory group, warned that even if the committee adopts a strategy of paving the unpaved streets by 1982 — a target date required by the federal Environmental Protection Agency — the city of Springfield is powerless to do so if residents along a street file a remonstrance against the paving project. He said the city lacks funds to carry out the work if costs can't be assessed against the abutting properties.

Cost of paving the 43 miles of public streets within the metropolitan area is estimated to be up to $22 million.

A-630

Air pollution control strategy

SPRINGFIELD NEWS 12/14/78

Paving may not be total answer

By LIZ PEEPLES
News Staff Writer

Will people in Springfield breathe easier if five miles of unpaved roads can be paved by 1982?

That's what a citizens' advisory committee on air pollution control in the metropolitan area was hoping. But at a Wednesday night meeting, figures provided by public works officials cast some doubt on the theory.

An advisory committee to the Lane Regional Air Pollution Authority, the group is wrestling with the task of figuring out how to best reduce pollution emissions in the Springfield-Eugene area to comply with Environmental Protection Agency (EPA) standards.

The task is not an easy one, as the committee is discovering. In fact, at Wednesday night's meeting, the committee members agreed they were not going to come up with a plan to curb pollution by the quantified amount desired by the first of the year as originally planned.

But they are still plodding ahead, trying to determine who to assign the burden of cleaning up the suspended particulates floating about the area.

The committee has looked at several options to date and one of the most interesting is a plan created by Rick Malliris of National Metallurgical Co. in Springfield, the Chamber of Commerce representative on the committee.

Malliris' proposal would place much of the burden of curbing emissions on the public sector, which is a switch from the more traditional concept that industry is responsible for air pollution, and should be responsible for taking care of the problem.

Based on figures that indicate 40 per cent of the emissions in the metropolitan area come from "fugitive" road dust and 50 per cent come from industry sources, Malliris' proposal would make the public shoulder its share of the clean air chore.

But reports from public works officials in Springfield, Eugene and Lane County Wednesday night indicated that what paving is feasible by the 1982 EPA deadline may not do the job of reducing the pollution inventory to the desired degree.

Ollie Snowden, of the Lane Council of Governments, spoke about meetings among public works officials looking at the problem created by 43.5 miles of unpaved roads in the metro area.

Snowden said public works officials have designated priority one and two roads within their jurisdictions, and have indicated priority one routes could have dust-free surfaces by the end of 1982. (There is, however, question as to where the three jurisdictions would get the money to do the paving.)

Snowden also said that the public works officials would like to see more information on whether the impact of paving the roads in question would achieve the emission rollback desired.

He said they also pleaded for flexibility in the paving issue if it is selected by the committee as the control strategy, so that the various jurisdictions can work within the guise of existing paving policies.

Bob Adams, a Springfield city councilman and member of the air pollution advisory committee, told the group after Snowden's remarks that the city of Springfield may have a problem complying with a paving mandate, even though it would want to.

"We've got to know where we're going to get the financing," Adams charged, indicating the city doesn't have the money to pave the streets.

Mike Kelly, public works director for Springfield, said there are five miles of streets he has designated priority one streets and 7.5 miles of priority two (or less traveled) streets in the city.

(See PAVING, Page 3A)

Paving roads like this one in Springfield could make breathing easier

News photo by Jim Clark

Paving. . .

(Continued from Page 1A)

He said the priority one streets are basically located throughout the city near parks and schools where traffic volume is high. He said some of the unpaved streets in question are already scheduled to be paved, but he said four out of the five miles are not scheduled for improvement at the present time. He also said there are no surplus funds currently reserved for such a comprehensive paving program within the city budget.

The private logging road shared by Weyerhaeuser and [illegible] the priorities, Kelly said, and he estimated that with the paving of the priority one roads and the private road, that 500 to 550 tons of particulate per year could be eliminated.

Though there are discrepancies in figures because they come from various sources, Kelly's report, together with reports from public works officials in the city of Eugene and the county, indicate that the amount of paving that could conceivably be done by 1982 might not be enough to make the proper impact on the total pollution picture.

But, the advisory committee will continue looking at the options available as they work out a detailed plan to submit to LRAPA, and eventually to the state's Environmental Quality Commission and the federal Environmental Protection Agency.

Trying to ease the worries of public works officials lamenting the possibility of stringent paving guidelines coming down from the environmental agencies, Bill Greene of the Department of Environmental Quality commented that EPA is not going to set up such a demanding requirement that it would keep the cities from making a "good faith" effort.

"Lane County has made some good strides. Lane County is still over the standards; that's why we're here," Green later commented.

Eugene RG 4/5/79

Group sets strict limit on Kingsford

By JACQUI BANASZYNSKI
Of the Register-Guard

A promise that the Kingsford Co. will substantially reduce its air pollution emissions will be submitted to the federal government as part of the Eugene-Springfield air quality control strategy, a Eugene-Springfield advisory committee agreed Wednesday.

However, Kingsford officials told the committee it may be too expensive to meet the strict clean-up goals.

The Eugene-Springfield Air Quality Maintenance Area Citizens' Advisory Committee for Total Suspended Particulate decided Wednesday to set a strict limit on the allowable level of particulate pollution emitted by Kingsford, Springfield's charcoal briquette plant.

The pollution limit — which was set at 10 pounds of particulate emission for each ton of production — was recommended by the federal Environmental Protection Agency and will be submitted to the EPA as part of the local control strategy.

The committee originally recommended an emission limit of 20 pounds per ton but EPA officials have indicated a stricter level would have to be reached to meet federal air quality standards by 1982.

Meanwhile, Kingsford's regional manufacturing manager, Tom Faber, saying the plant may be able to reduce its emission levels to 25 pounds per ton of production, said it is unlikely the plant can achieve a 10-pound per ton level in the near future.

Kingsford opened its Springfield plant in 1967.

Recent improvements at the plant will result in substantial reductions in the particulate emission level that will be tested at the end of this month, he said. No one knows exactly how much pollution Kingsford is emitting at the present time.

If the company spends an additional $1 million on pollution control equipment, emission levels can be reduced to 25 pounds per ton, Faber said.

Reducing emissions to the federally required level of 10 pounds per ton would cost an additional $5.7 million and would increase operating costs by 27 percent, he said, adding, "That's more than it cost to build the plant."

The committee agreed to set the 10-pound per ton limit in an effort to gain an 18-month extension from the EPA for submitting the region's air pollution control strategy.

The extension is needed to give the committee more time in dealing with other particulate pollution sources, especially road dust, according to Marty Douglass, public affairs representative for the Lane Regional Air Pollution Authority.

$5.7 million for pollution control

Springfield News 4/5/79

Kingsford balks at clean-up cost

By TOM JACKSON
News Staff Writer

It would cost the Springfield Kingsford Co. charcoal briquette manufacturing plant about $5.7 million to meet the federal requirements for air pollution control, Thomas Faber, regional manufacturing manager for the company told the Springfield-Eugene Air Quality Maintenance Area Advisory Committee Wednesday.

But in spite of the costs, the committee voted unanimously to advise the Lane Regional Air Pollution Authority to recommend that the plant be held to the standards but be given as long as possible to meet them.

Faber said Wednesday after the action he has no response to the decision yet. The matter will come to the LRAPA board of directors during its regular May 8 meeting.

(The air quality maintenance area committee is a 25-member committee representing a wide range of area jurisdictions and interests. It advises the LRAPA board on how to meet federal requirements for total suspended particulates only.)

Faber told the committee that the company has already spent more than $1 million to install air pollution control equipment. To spend the additional $5.7 million, he said, would mean that the company would have an increase of 27 per cent in its production costs, making it uncompetitive with other charcoal manufacturing plants.

Other plants in the state, however, have said they will be able to meet the federal requirements.

The reason the committee decided to give the company the longest possible time to comply with the federal limits was that the company is now doing a feasibility study of using waste gases and heat to power steam generators for the Eugene Water and Electric Board.

Faber said he has no price estimate of the steam generation alternative, and it will probably take one year to do the study. He said the company is sharing the cost of a $100,000 study with the power board, but it is still negotiating details.

Faber said the Kingsford company did the area a favor by coming to the Springfield site, since most of the charcoal briquettes it manufactures are made from wood waste. Most of the wood waste, he said, was burned in the now-banned wigwam burners.

He urged the committee to adopt an emission standard that "both the county and the Kingsford company can live with."

The federal Environmental Protection Agency (EPA), which monitors industrial pollution through the local air pollution authority, has already turned aside a request by the advisory committee to relax the standards and the EPA, has told the authority that it is highly unlikely that it will allow

(See KINGSFORD, Page 3A)

Kingsford . . .

(Continued from Page 1A)

the company to exceed its limits.

Currently the EPA standards allow 10 pounds of particulates to be emitted to the air for every ton of product the company produces. The Kingsford company said it will have to spend $5.7 million to attain that goal – unless co-generation is cheaper and is feasible.

The EPA has said it will not allow the company to hold its emissions to 20 pounds of particulate per ton of product.

"Ladies and gentlemen, this is as far as we think we can afford to go," Faber told the committee, referring to the 20 pounds per ton limit.

Faber said if the company is forced to spend the $5.7 million and the co-generation possibility doesn't work out, the company will have to "make some policy decisions," but he declined to elaborate.

When asked by a committee member why the company hasn't considered using its wastes to produce electricity before, Faber said, "We're not in the electric power business."

A-633

SPRINGFIELD (ORE.) NEWS, THURSDAY, MAY 10, 1979 PAGE 3A

Pollution bill 'needs work'

By TOM JACKSON
News Staff Writer

The people most familiar with air pollution issues in Lane County think the legislature's onto a very good idea — but they also think the legislature isn't doing it right yet.

The legislative Trade and Economic Development committee is proposing a bill to allow businesses to expand their production if they make efforts to put out even less air pollution than the federal government's standards require.

In an "air quality maintenance area" such as Springfield-Eugene, businesses are limited in the amount of particulate emissions they can produce per ton of production. Particulate emissions are things such as dust and fly-ash.

Under the legislative committee's proposal, businesses would be able to "bank" their credits for putting out less than the federal government requires. Then, if the company desires, it can either use the "banked" credit to expand its own production or it can sell the credits to another business.

The members of the Air Quality Maintenance Area Advisory Committee Wednesday night said the idea is "tremendously complex," and that is why the state legislation is lacking.

Committee members, who represent industry, government and citizen groups, unanimously opposed the legislation in its current form, but decided to support the concept and testify in favor of amended legislation. They said the idea should probably be the topic of an interim committee study before the next session of the legislature.

One problem the committee members pointed out was that the state Department of Environmental Quality would control the "offset" program for all areas of the state. They said that would erode local control and indicated support for having the authorities such as the Lane Regional Air Pollution Authority, to which the committee reports, manage the program.

The bill is designed to find a way to maintain air quality at the same time it encourages industrial growth.

Eugene RG 5/11/79

Citizens' group opposes 'offsets' on air pollution

Opposition to a bill before the Oregon Senate that would establish an air pollution "offset" program for industry w xpressed at a Wednesday meeting o e Eugene-Springfield Air Quality Maintenance Area Citizen's Advisory Committee.

The committee voted to send a representative to testify against the bill, SB 915, when the Senate Trade and Economic Development Committee considers it at a work session in Salem next Wednesday.

Committee members said they are not opposed to the concept of emission offsets but believe the proposed bill would pre-empt local control and planning and contains too many loopholes for industry.

The bill would allow industries to accumulate an "emissions offset" by reducing pollution below maximum allowable limits. The offset could be "banked" to count against future emissions or be transferred to other firms.

Members of the advisory group said if the Legislature wants an offset program for Oregon it should direct the state's Environmental Quality Commission to develop a program, working with both industry and community air pollution control agencies and citizen's groups.

Pollution monitor for burning back?d

EUGENE RG 12/6/79

By JACQUI BANASZYNSKI
Of the Register-Guard

For Oregon's grass seed farmers, the morning pollution forecast may become as important as the morning weather forecast next summer.

And, if it does, a polluted day could squelch a farmer's plan to burn his fields as easily as a rainy day.

Scott Freeburn, smoke management coordinator for the state Department of Environmental Quality (DEQ), said Wednesday the state wants to add regular pollution forecasting to its laundry list of field-burning rules.

If the idea wins the approval of the state Environmental Quality Commission (EQC), an "automatic particle monitoring" machine will be installed in the Eugene-Springfield DEQ office as early as next month to help determine the daily pollution potential, Freeburn said.

Freeburn received official support for the proposal Wednesday from the Air Quality Maintenance Area Citizen Advisory Committee for Total Suspended Particulate — a Eugene-Springfield group that advises local and state pollution officials on strategies for achieving air quality standards.

The Eugene City Council also will be asked to endorse the proposal next week before the DEQ presents it to the EQC at a Dec. 14 meeting in Portland, Freeburn said.

Automatic particle monitoring, or APM, recently was added to a package of proposed 1980 field-burning rules after negotiations with Eugene city officials and representatives of the grass seed industry, he said.

The goal is to "minimize or eliminate, if possible," the number and intensity of field-burning related smoke intrusions in the metropolitan area each summer, he said.

APM uses a machine that collects and counts the amount of particulate (dust and smoke) in the air on an hourly basis, Freeburn explained. Teamed with other pollution monitoring equipment, it will give environmental officials the ability to make daily predictions about the level of particles in the air.

If the combined particulate pollution level from all sources (industry, unpaved roads, wood-burning stoves and the like) becomes great enough to violate air quality standards, field burning would be prohibited under north wind conditions, he said.

In essence, smoke from field burning would not be allowed to enter the Eugene-Springfield area from farms north of the metropolitan area if pollution levels in the city were already high, he said.

"The APM is not in and of itself a

Turn to MONITOR, Page 2A

wonder machine," Freeburn said. "In the whole smoke management program, it will play a minor but important role." However, he said the $20,000 gadget, which would be installed atop the state and county pollution offices at the Oakway Mall, can provide the information needed to prevent most smoke intrusions.

The automatic particulate monitoring and proposed "performance standards" will be the key elements in the DEQ's new smoke management strategy to be presented to the EQC next week.

The performance standards — which also are a result of brainstorming between the city of Eugene, the DEQ and the grass seed industry — would allow field burning up to the point that it violates air quality standards. In recent years, burning has been 180,000 acres per year.

If air quality standards in the Eugene-Springfield area were violated for more than 14 cumulative hours in any one season, field-burning restrictions would be tightened, Freeburn said.

Additional violations would result in even tighter restrictions until the cumulative violations exceeded 25 hours. Then field burning would be banned for the rest of the season.

Eugene city officials had a major role in designing the performance standard and see it as an incentive for grass seed growers to conduct "clean" burning of fields.

Eugene City Councilman Jack Delay said Wednesday that approval of the proposed smoke management package would be "a real step forward for this community" but he warned that it would not be a panacea for the 10-year-old field-burning dilemma.

"It will provide almost instantaneous control so they can get a lot of burning done when the conditions are right," Delay said. "And if it works for field burning, we may be able to apply it to other sources of pollution in the future, such as slash burning."

However, Delay said it would take several years to perfect the new rules and in the meantime, "we may get socked in."

If the proposed field-burning rules are adopted by the EQC and approved by the federal Environmental Protection Agency (EPA), the grass seed industry would be controlled, in part, by other polluting industries in the Eugene-Springfield area for the first time, Freeburn said.

"They're (the grass seed farmers) willing to do that in the Eugene-Springfield area because they want to resolve the situation down here," he said. "But when it comes to giving up their rightful increment of air pollution in other areas (such as Lebanon, Sweet Home and other communities in the mid-Willamette Valley), they may not be as willing to negotiate."

Terry Smith, the clean-air analyst for the city of Eugene, said Wednesday he will recommend that the City Council support the proposed rules.

"The (Oregon) seed council is eager to do what it can to prevent putting Eugene in the positions it's been in for the past several years," Smith said. "The seed council would like to resolve this as much as Eugene because that would get us off their back."

When the EQC meets next week, it will consider a proposal to change the state's federally approved clean-air plan to allow a ceiling of 250,000 acres of field burning annually. A 250,000-acre burning limit, effective next summer, was mandated by the 1979 Legislature but must be approved by the EPA as part of the state's clean-air goal.

The EQC currently is waiting for formal EPA approval of a 180,000-acre burning season implemented this past summer under an emergency order from Oregon Gov. Victor Atiyeh.

If the EQC adopts field-burning rules that include a performance standard and the use of the automatic particle monitoring machine, the city of Eugene will not attempt to block a 250,000-acre burning program, Smith said Wednesday.

A-635

Youth asks $5 million

Paving, home weatherization urged to cut air pollution

By ERIC MORTENSON
News Staff Writer

Springfield News 9/23/80

To improve air quality in the Springfield-Eugene metropolitan area, residents should pave dirt roads, weatherize as many homes as possible and improve pollution control devices at local mills.

That's the conclusion of a two-year study by a citizen's advisory committee to the Lane Regional Air Pollution Authority.

The committee was formed in 1978 to come up with effective, but cheap, ways to improve air quality in the metropolitan area. The metro area violates secondary federal standards for suspended particulates — dust and smoke. The secondary standards classify the pollution as a nuisance but not necessarily a health hazzard.

If approved by the LRAPA board or directors, the plan will be sent to the state Environmental Quality Commission and then to the federal Environmental Protection Agency as part of Oregon's official clean air plan.

The study calls for the paving of about 10 miles in the metropolitan area, half of that in Springfield. Those unpaved roads account for more than half the road dust in the metropolitan area, according to the study.

Mike Kelly, director of Public Works for Springfield, said most of the unpaved roads in the city are in one to three block lengths between 17th and 39th streets. About half of those roads have already been paved, Kelly said, noting that the study calls for the paving to be completed by 1987.

The pollution study also calls for weatherization programs to cut down on the amount of wood burned during the winter months. As wood stove sales increase, so does the amount of smoke in the metropolitan area. Improved insulation in area homes would reduce the amount of wood needed to heat a home and thus cut down the smoke produced.

A third way to cut down on pollution is to improve air filters on industrial smokestacks. Adding improved fabric filters would remove particulates that escape from planing mills and sander and particleboard plants.

LRAPA spokesman Marty Douglass said the advisory committee concentrated on finding "cost effective" ways to reduce pollution.

Clean-air strategy urged

EUGENE RG 9/18/80

Aims at Eugene-Springfield wood stoves, dusty roads, industry fumes

Wood stoves, unpaved roads and industrial exhausts are the targets of a local clean-air strategy recommended Wednesday night by a citizen advisory committee to the Lane Regional Air Pollution Authority.

Cutbacks in emissions from those three sources would be the easiest and cheapest way to reduce the amount of suspended particulates (dust, smoke and other particles) in the air in Eugene-Springfield, according to LRAPA Director Don Arkell.

Strategies for reducing those emissions will be discussed at a public hearing in November before the LRAPA Board formally adopts the policy. The clean-air plan then will be sent to the state Environmental Quality Commission and the federal Environmental Protection Agency for approval.

The clean-air goals are designed to bring the Eugene-Springfield metropolitan area into compliance with federal air quality standards, LRAPA spokesman Joe Lassiter said today.

Although the Eugene area meets the primary federal standard for particulates, which is a standard designed to protect health, it violates the secondary standard, which is designed to prevent the "nuisance" of particulates, such as soiling and poor visibility, Lassiter said.

The federal EPA has required that all cities meet primary health standards by the end of 1982 and meet secondary nuisance standards by 1987.

The strategies recommended Wednesday night will not eliminate entirely particulate pollution in the Eugene-Springfield area, according to Arkell, the LRAPA director.

However, he said the three target areas "can be initiated early, have a reasonable cost and have the great impact in those areas where the most people would benefit."

The clean-air plan approved by the citizen advisory committee calls for:

- The paving of unpaved roads in Eugene and Springfield to cut back on dust from those roads. Although both cities already include street-paving as a part of their annual road maintenance, they might be prompted to speed up street paving if it becomes part of an air quality control plan, LRAPA said.
- Upgrading the weatherization and insulation of dwellings to reduce the need to burn wood as a heating source. Weatherization programs already are being considered by both cities. LRAPA officials said weatherization would benefit the entire metropolitan area by reducing pollution levels and would benefit individuals by reducing utility bills.
- More efficient reduction of particulate emission from the exhausts of industrial systems that handle dry materials such as wood products and mineral aggregates.

A-637

SECTION B

Eugene Register-Guard

EUGENE, OREGON, FRIDAY, NOVEMBER 7, 1980

Area News

Stocks, TV

Pollution agency tightens clean-air goals

By JACQUI BANASZYNSKI
Of the Register-Guard

Dust from unpaved roads and pollution from wood products firms and home woodstoves will have to be reduced under a local clean-air strategy approved Thursday by the Lane Regional Air Pollution Authority.

The plan received the unanimous approval of the LRAPA board and the endorsement of the cities of Eugene and Springfield, even though it could cost the Weyerhaeuser Co. and other wood product firms in the area thousands of dollars.

The board agreed to delay the deadlines for some of the pollution control requirements after hearing from Weyerhaeuser officials, who said strict enforcement of the plan could place a "severe, unique hardship" on wood products firms in the metropolitan area.

The plan, which was the result of more than two years of work by the Eugene-Springfield Air Quality Maintenance Area Citizen Advisory Committee, must be approved by the state Environmental Quality Commission and the federal Environmental Protection Agency.

If approved, it will become part of the state's federally approved clean-air strategy.

The clean-air goals are designed to bring the Eugene-Springfield area into compliance with federal air quality standards by 1987, according to LRAPA Director Donald Arkell.

Although the Eugene area meets the primary federal standard for particulate matters, which is a standard designed to protect health, it violates the secondary standard, which is designed to prevent the "nuisance" of particulates, such as soiling and poor visibility.

The clean-air strategy targets three main areas for clean-up:

• Almost 10 miles of unpaved roads in Eugene and Springfield (4.7 miles in Springfield and 4.5 miles in Eugene) would be paved to eliminate 95 percent of the fugitive dust emissions from roads.

Arkell said the road-paving projects would be conducted over the next seven years, and would be part of the two cities' budgeted road maintenance. The roads selected for paving are those with the highest traffic counts, he said.

• About 50 cyclones at wood products plants throughout the area would be fitted with additional pollution control equipment to eliminate 98.5 percent of those dust emissions from those cyclones.

The cyclones, which separate particles from gas streams that move materials through wood products plants, are a relatively inefficient pollution control device by themselves, Arkell said. The plan recommends that baghouses or other equipment be added to the cyclones.

Cyclones that emit more than five tons a year would have to be upgraded by Jan. 1, 1983, and cyclones that emit less than five tons a year would have to be upgraded by July 1, 1985, Arkell said.

LRAPA originally wanted all cyclones to be improved by June 30, 1982, but delayed the deadlines after meeting with Weyerhaeuser officials.

The Weyerhaeuser Co. owns 22 of the area's cyclones and would have to spend an estimated $1.6 million to meet the requirements of the clean-air plan, according to Ronald Dersham, a Wey-

Turn to POLLUTION, Page 2B

Pollution

Continued from Page 1B

erhaeuser official. Operation and maintenance of the equipment will cost another $140,000 a year, he said.

The LRAPA board rejected Weyerhaeuser's request that the wood products firms be allowed to find other ways to reduce emissions levels. Arkell said he didn't want to sacrifice the "fixed strategy" of cyclone clean-ups until he had proof that other clean-up efforts would be as effective.

However, he said the plan allows the LRAPA to consider other control strategies in the future, if industries can show that those strategies will work as well.

• Weatherizing and insulating homes in the Eugene-Springfield area would reduce the need to use wood-burning stoves and fireplaces and therefore would cut back on the increasing pollution caused by wood-burning devices.

The plan does not require weatherization, but relies on city ordinances and rising energy costs to prompt conservation, Arkell said.

"That would cause a corresponding reduction in the need to burn wood in those homes that have wood-burning appliances," he said. "And if that's true, the air pollution from wood stoves would decrease accordingly."

In addition to the three clean-up strategies, the plan calls for further study of the area's pollution problem and for extra controls to be recommended after 1983.

Arkell said the plan would allow for continued growth of population and industry in the area but at the same time would prevent an increase in pollution levels by requiring new industries to meet air quality standards.

A-638

Pollution plan includes deadline extension for lumber-plywood mills

By DEBBIE SELINSKY
News Staff Writer

Springfield News
11/5/80

Weyerhaeuser Co. received deadline extensions for purchasing filters for their particulate-spewing industrial cyclones in the Lane Regional Air Pollution Authority Board's newly adopted three-phase control plan — a plan designed to help the Springfield-Eugene area attain federal clean air standards.

The extension dealt with the phase of the plan that called for controlling industrial cyclones that emit over one ton of particulate matter per year.

Weyerhaeuser Co.'s Springfield plant has several of the pollution controlling industrial cyclones. "Alone, they just aren't very efficient, because they tend to spew particulates out into the environment," says Marty Douglass of LRAPA.

Because of the money involved in purchasing additional pollution control devices, Weyerhaeuser was granted an extension in the industrial cyclone control deadline, June 30, 1982, outlined in Phase I. Weyerhaeuser asked the deadline be extended to Jan. 1, 1983 or 18 months after Environmental Protection Agency approval of the plan, whichever is longer. Cyclones emitting from one to five tons would be controlled by July 1, 1985.

"Particularly with the difficult economic conditions facing the Northwest forest products industry, implementation of this requirement within the time frame proposed would place a severe unique hardship on the Eugene-Springfield area's lumber and plywood plants that other mills will not have to bear," company spokesman Ron Dersham told the board.

A proposal by both Weyerhaeuser and the Department of Environmental Quality that the board adopt a provision to re-evaluate the plan if federal standards change before 1987 was accepted.

A third Weyerhaeuser recommendation to allow "an alternate emission reduction strategy if an industry could demonstrate that equal air quality results would be achieved" was rejected by the board. LRAPA director Don Arkell said the concept of an alternate strategy should be considered when the need arises.

Other portions of the plan's Phase I calls for paving 10 miles of unpaved roads in Springfield and Eugene. A home weatherization plan would also be implemented.

Phase II represents further study of the local problem, while Phase III would carry out additional strategy that emerges from Phase II, Douglass says.

Though Springfield officials indicated support for the plan, city manager Steve Burkett reminded LRAPA that road paving would depend on Springfield's remonstrance clause. The clause allows the majority of affected property owners the right to determine the fate of any proposed public improvement project.

The plan will now go to the Oregon Environmental Quality Commission, then on to the U.S. Environmental Protection Agency as part of Oregon's official clean air plan.

A-639

Appendix 4.6.11.3

Transcript of Public Hearing

LANE REGIONAL

AIR POLLUTION AUTHORITY

(503) 686-7618
16 Oakway Mall, Eugene, Oregon 97401

Donald R. Arkell
XXXXXXXXXXXX, Program Director

November 6, 1980

Introductory Remarks
Otto t'Hooft
Public Hearing - AQMA Plan

The purpose of this public hearing is to take testimony concerning the Air Quality Maintenance Area plan, recommended by the Eugene/Springfield Air Quality Maintenance Area Citizen's Advisory Committee. Following the public hearing, this Board may take action on the proposed plan.

A record is being made of this hearing and it will be appended to the document.

Notice of this public hearing has been published in the Eugene Register-Guard on September 24th and October 8th.

By way of background, the Federal Clean Air Act Amendments of 1977 emphasize local planning and public participation in the development of air pollution control strategies in those areas not meeting federal standards. To ensure this public participation, a local Citizen's Advisory Committee was established in 1978, whose purpose was to study the local problem, based on data and information provided by the staffs of the Lane Regional Air Pollution Authority and the Department of Environmental Quality, and eventually recommend a plan designed to solve the non-attainment problem in this Air Quality Maintenance Area.

A draft plan was prepared, and has been recommended for approval by the Citizen's Advisory Committee. Opportunity for review of the draft was extended to other local and regional governments, as part of the Federal A-95 intergovernmental review process. In addition, copies of the document have been available to the public at the LRAPA office.

As indicated earlier, this Board may take action on the plan following public testimony at this hearing. If the Board approves the plan, the document will then be submitted to the Oregon Environmental Quality Commission for determination of sufficiency, in terms of meeting the requirements of the Clean Air Act and Environmental Protection Agency regulations. The EQC, in turn, will submit the document to the EPA. Upon approval by EPA, it will become part of Oregon's State Implementation Plan.

It is assumed that those persons wishing to comment this evening have reviewed the draft and are familiar with its contents. LRAPA Director Don Arkell will present a brief summary of the plan, which is also available in written form.

(Don Arkell - General Summary)

Otto t'Hooft

I will now open the public hearing and ask those wishing to testify to step forward to either microphone. Please state your name and address, for the record, prior to giving your statement.

Lane Council of Governments
NORTH PLAZA LEVEL PSB / 125 EIGHTH AVENUE EAST / EUGENE, OREGON 97401 / TELEPHONE (503) 687-4283

November 7, 1980

Otto t'Hooft, Chairman
Lane Regional Air Pollution Authority
Oakway Mall
Eugene, OR 97401

RE: State Implementation Plan (SIP) Revision for
Total Suspended Particulate

Dear Commissioner t'Hooft:

The following comments on the L-RAPA SIP revision fall into two categories--official L-COG Board comments and L-COG staff comments which do not necessarily reflect the position of the Board of Directors.

Board Comments

The Lane Council of Governments (L-COG) Board of Directors reviewed the SIP revision at its October 23, 1980 meeting as part of its Areawide A-95 Clearinghouse responsibilites. The Board supported the SIP revision and added the following comment: "Weatherization financing mechanisms that are developed [to implement the SIP] should insure that the mandatory weatherization standards [called for by the SIP] do not adversly affect the supply, quality or cost of the rental housing stock, especially that segment available to low and moderate income persons."

Staff Comments

As a staff member of L-COG, I was appointed to the SIP Citizen Advisory Committee to represent the EPA Section 208 Water Quality Program, the DOT Urban Transportation Planning Process, the EPA Section 175 Air Quality Program, the HUD Section 701 Comprehensive Planning Program and the Areawide A-95 Clearinghouse. On behalf of those programs, I feel the proposed TSP SIP revision represents a reasonable approach to achievement and maintenance of the TSP secondary standard in Eugene-Springfield and I recommend adoption.

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Throughout the period of SIP development, the process has been open, with ample opportunity for participation by the L-COG program areas identified above. Our interaction with the L-RAPA staff during SIP development has been both positive and timely, and continued coordination during Phase II and Phase III of the SIP is essential to ensure that air quality, water quality and transportation goals remain compatible. I would like to take this opportunity to pledge the support and cooperation of the L-COG transportation and water quality staff during the remaining phases of SIP implementation.

Sincerely,

Oliver P. Snowden

Oliver P. Snowden
Transportation Program Manager
Acting Housing and Community Development Program Manager

OS:mjl/F-3-4

CITY MANAGER'S OFFICE • P.O. BOX 1967 • EUGENE, OREGON 97440 • (503) 687-5010

November 4, 1980

Don Arkell, Director
Lane Regional Air Pollution Authority
16 Oakmont Way
Eugene OR 97401

Dear Mr. Arkell:

The City management supports the Eugene-Springfield Air Quality Maintenance Area (AQMA) State Implementation Plan (SIP) for Suspended Particulates--1980. As the plan points out, the metro area exceeds Federal and State standards for suspended particulate. Failure to attain those standards threatens the livability, vitality, and growth of this community. The SIP charts the best course through the complex scientific and social issues to the desired goal of attainment.

On numerous occasions in the past, the council has supported actions to reduce suspended particulate concentrations in the AQMA. Members of the council have been intimately involved with the development of the SIP. Presently, City management is cooperating with Lane Regional Air Pollution Authority (LRAPA) to devise a City program to recommend to the council for implementing an unpaved road dust control strategy called for in the plan. Future phases of the plan will study possible control strategy for paved road dust. Where possible, City management will cooperate in carrying out those studies and will carefully examine the findings to see how City operations might be improved. The addition of pollution control equipment to some industries seems justified and practical. Future studies may find economical solutions for other large industrial emission sources such as hog fuel boilers.

The City management supports the balanced approach taken in the plan. Equal emphasis is placed on each major pollutant source category for which controls are currently feasible. Studies are proposed to clarify important areas of scientific uncertainty. The growth management plan acknowledges the importance of attaining and maintaining particular standards and the need to limit the effects of emissions outside the AQMA.

The City management urges the LRAPA Board, the Oregon Environmental Quality Commission, and the US Environmental Protection Agency to approve this plan.

Sincerely,

Charles T. Henry

Charles T. Henry
City Manager

CTH:TS:db/Ma23

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LANE REGIONAL AIR POLLUTION AUTHORITY

To: LRAPA Board of Directors

Dear Sirs:

In my opinion the following is a summory of the general feelings members of the public have expressed to me in regards to the AQMA Plan.

It is our feeling that the Draft SIP Document reflects the thinking of a broad spectrum of local opinion and would be supported by the General Public. It appears from the document, that it became clear during this planning process that the problem we face is complicated and that there remains much for us to learn in this area.

PHASE I :

We feel that with Phase I all the basic contributing forces to air quality have been touched upon and that it is a sound beginning for the AQMA Plan.

PHASE II :

The air quality problem is one that should be continually studied and the SIP Document recognizes and responds to this need.

PHASE III :

We feel that the selection of additional control measures in the form of ordinances, regulations, etc., might be necessary to meet federal standards.

The SIP Document has addressed the concept of "controlled trading" as a growth management tool for new industries. It is felt that this would be to the best interest of the public, insuring a healthy source of economic growth. SIP has also addressed the effects of sources outside the AQMA and the potential need for some additional provisions.

The aforementioned reasons bring me to the conclusion that the Draft SIP Document would be supported by, and in the best interest of the General Public.

Sincerely,

Gary L. Reed

Gary L. Reed

Environmental Protection Agency
Region Ten
Seattle, Washington

Gentlemen:

I am submitting this letter as the Eugene-Springfield Chambers-of-Commerce representative for the Eugene-Springfield Air Quality Management Area Citizens Advisory Committee.

The purpose of the C.A.C. was to advise the Lane Regional Air Pollution Authority on strategies our community believes would be most effective and economically feasible to bring the Eugene-Springfield AQMA into compliance with the Federal Clean Air Act within the mandated time periods.

I believe the document submitted to the hearing process on November 6, 1980 to be an accurate consensus of the CAC's choices regarding the options available to us for reducing the suspended particulates in our AQMA.

Area sources were recognized as a major source of particulates in the Eugene-Springfield area. It is difficult to determine the causes and thus the cures of area source emissions. There are still many unknowns that must be identified and quantified before successful action can be taken to curtail those emissions. Because of this, part of the strategy involves the use of demonstration projects and future work by the committee to evaluate information acquired, and then to develop further action. I believe this to be a reasonable course. To do otherwise could cause severe economic hardships in the community with little actual benefit.

For years the industrial point sources in and around Eugene and Springfield have been installing controls to comply with emission regulations administered by LRAPA. This Implementation Plan calls for additional commitments from point sources. I believe the point source strategies chosen are also reasonable. Further more drastic regulations would be crippling to our industry, and without indication of any substantial benefit.

As representative of the joint Chambers-of-Commerce I support acceptance of the State Implementation Plan Revision for the Eugene-Springfield area for suspended particulates as submitted by the Lane Regional Air Pollution Authority to the public hearing on November 6, 1980.

Sincerely,

Richard J. Malliris

November 6, 1980

TO: Board of Directors
Lane Regional Air Pollution Authority

SUBJECT: Proposed State Implementation Plan Revisions
Eugene-Springfield
AQMA

I am Ron Dersham, Panel Products Business and Operations Manager with Weyerhaeuser Company in Springfield. On behalf of our Company, I appreciate this opportunity to comment on the control strategy that is being proposed to achieve compliance with the secondary particulate standards in the Eugene-Springfield area.

Jerry Bollen of our company was a member of the Citizens' Advisory Committee which developed the proposed strategy that is being considered for adoption. This committee, working closely with your staff and representatives of DEQ, spent many months assessing the numerous particulate sources that impact air quality within the AQMA and evaluating alternative strategies to meet the secondary standards that have been established by EPA. During their deliberations, the Committee considered relative impacts of the numerous sources that contribute to particulate levels in the area and the capital and operating investments that will be required by source category to meet more restrictive standards.

We would like to recommend the following revisions and additions to the control strategy for your consideration. These recommendations will, in our opinion, offer greater flexibility to the industrial community in meeting emission requirements, yet still assure reasonable progress towards air quality attainment.

1. We recently retained a local consulting firm to determine the capital investment and annual operating cost which would be required to obtain 98.5% removal of particulate from all dry material cyclone sources emitting more than one ton per year. The results of this study show that the cost of compliance is more than double the estimated impact that was considered by the Advisory Committee.

   Our estimated cost of compliance is conservatively $1,639,619 capital and $146,145 annual operating cost. The annual operating cost considers only energy and baghouse replacement. It does not include routine maintenance or replacement of a facility following an explosion.

Particularly with the difficult economic conditions facing the Northwest forest products industry, implementation of this requirement within the time frame proposed will place a severe unique hardship on the Eugene-Springfield's lumber and plywood plants that other mills will not have to bear. For this reason, we would propose the following:

A. For five-ton or greater sources only, extend the completion date from June 30, 1982 to January 1, 1983 or 18 months after approval of control strategy by EPA, whichever is longer.

b. For sources of one ton to five tons, require control completion by July 1, 1985 based on demonstrated need for air quality attainment. This additional period will lessen the short-term financial impact on industry and will provide opportunity to verify the accuracy of the model and to measure improved air quality created by the control of larger emission sources.

2. Add a provision to the control strategy that would allow LRAPA to approve an alternate emission reduction strategy if an industry could demonstrate that equal air quality results would be achieved.

3. There currently is some uncertainty regarding the federal particulate standards. EPA is in the process of reevaluating these standards and considering revisions. In order to protect affected sources in the area in the event that secondary standards should be changed, we would request that a provision be added to the control strategy. This provision should stipulate the intent of LRAPA to reevaluate the appropriateness of the strategy should the standards be revised. A similar statement has been included in the control strategy for the Portland AQMA.

Both the Advisory Committee and your staff have, in our opinion, done an excellent job in developing this document on an extremely complex issue. We do feel, however, that the recommended revisions we have presented are vital to the well-being of the area's industrial operations and would therefore ask your favorable consideration.

P R O C E E D I N G S

MR. CHAIRMAN: I'll call this meeting of the Lane Regional Air Pollution Authority to order on Thursday, November 6, 1980, at 7:30 p.m.

The first item is Approval of Minutes of the Last Meeting.

MR. ADAMS: I move approval is presented.

MR. HAMEL: Second.

MR. CHAIRMAN: Call for the question. All in favor? All opposed? All right. That's unanimous.

Thirty-six people.

The next item is Public Hearing: State of Oregon Implementation Plan Revision, Eugene-Springfield Air Quality Maintenance Area.

I would like to start off with some introductory remarks. The purpose of the public hearing is to take testimony concerning the air quality maintenance area plan recommended by the Eugene, Springfield Air Quality Maintenance Area Citizens' Advisory Committee. Following the public hearing, this Board may take action on the proposed plan. A record is being made of this hearing and it will be appended to the document. Notice of this public hearing has been published in the Eugene Register-Guard on September 24 and October 8.

By way of background, the Federal Clean Air Act Amendment of 1977, emphasizes local planning and public participation in the development of air pollution control strategies in those

LANE REGIONAL AIR POLLUTION AUTHORITY

PUBLIC HEARING

In Re:

STATE CLEAN AIR ACT
IMPLEMENTATION PLAN REVISION
for the Eugene-Springfield
Air Quality Maintenance Area.

This public hearing was held before the Board of Directors of the Lane Regional Air Pollution Authority at 7:30 p.m., on November 6, 1980, at the Eugene City Council Chambers, 777 Pearl, Eugene, Oregon.

A P P E A R A N C E S

OTTO t'HOOFT, Chairman, LRAPA Board of Directors
BILL WHITEMAN, Board Member
EMILY SCHUE, Board Member
BOB ADAMS, Board Member
JOHN LIVELY, Board Member
BILL HAMEL, Board Member
DON ARKELL, Director, LRAPA
GARY REED, Public-at-large
RON DERSHAM, Weyerhaeuser Representative
OLLIE SNOWDEN, Department of Transportation
BRIAN BAUSKE, Public-at-large
HENRY WOHLERS, Public-at-large
PAT HANRAHAN, Department of Environmental Quality

Karen M. Jordan
Court Reporter   Notary Public
2180 Monroe
Eugene, OR 97405

areas not meeting federal standards. To ensure this public participation, a local Citizens' Advisory Committee was established in 1978, whose purpose was to study the local problem based on data and information provided by the staffs of the Lane Regional Air Pollution Authority and the Department of Environmental Quality, and eventually recommend a plan designed to solve the nonattainment problem in this Air Quality Maintenance Area.

A draft plan was prepared and has been recommended for approval by the Citizens' Advisory Committee. Opportunity for review of the draft was extended to other local and regional governments as part of the Federal A-95 Intergovernmental Review Process. In addition, copies of the document have been available to the public at the LRAPA office.

As indicated earlier, this Board may take action on the plan following public testimony at this hearing. If the Board approves the plan, the document will then be submitted to the Oregon Environmental Quality Commission for determination of sufficiency in terms of meeting the requirements of the Clean Air Act and Environmental Protection Agency regulations. The EQC, in turn, will submit the document to the EPA. Upon approval by EPA, it will become part of Oregon's State Implementation Plan.

It is assumed that those persons wishing to comment this evening have reviewed the draft and are familiar with its contents. The LRAPA Director, Don Arkell, will present a brief summary of the plan, which is also available in written form. I have those members of the public that wish to testify and have also got some written testimony here. Prior to getting the testimony and also commenting on that written testimony, I will have Mr. Arkell give a staff presentation.

MR. ARKELL: Thank you, Mr. Chairman.

The Eugene-Springfield metropolitan area exceeds the federal secondary standard for particulate matter and has been designated a nonattainment area for this pollutant. A plan to attain the standard must be adopted and submitted to the U.S. Environmental Protection Agency for approval. This plan is designed to meet the necessary requirements and to provide a course of action to attain the standard.

The plan is organized into three phases. The first phase, to run from 1981 to 1987, calls for the paving of ten miles of unpaved road in the Eugene-Springfield area, approximately five miles each in Eugene and Springfield; controlling industrial cyclones emitting over one ton of particulate matter per year, by means of fabric filtration or equivalent control; and implementation of a metropolitan areawide weatherization program to achieve a reduction in the use of wood as a home-heating fuel. Implementation of the latter program is dependent upon the cities of Eugene and Springfield as well as the local utilities adopting weatherization programs.

These Phase I programs will not, however, by themselves resolve an attainment of the federal standard. Therefore, there is a Phase II which involves further study of the local problem prior to recommending additional specific strategies to complete the attainment demonstration. These studies are designed to improve the grid model used to estimate and project future particulate levels throughout the metropolitan area, improve the data base itself, and to evaluate the effectiveness of other alternative strategies.

Finally, the Phase III, which is scheduled to begin in 1983, is the selection of additional control measures in the form of ordinances, regulations, and so forth, to complete the clean-up of the remaining areas. Additional recommendations on which strategies are appropriate will be made by the Citizens' Advisory Committee based on the results of the Phase II study effort.

The plan also provides an emissions growth-management plan which allows for continuing the economic growth while limiting the corresponding increase in particulate emissions. This will be accomplished by employing a growth-management tool known as controlled trading, involving the creation of growth increments and emissions-offsetting and emissions-banking programs. These trading programs will be built with locally adopted regulations patterned after Oregon's proposed New Source Review rules. The effects of sources located outside the AQMA will also be considered in these new regulations.

Once approved by the Lane Regional Air Pollution Authority Board of Directors and the Oregon Environmental Quality Commission, this plan will be forwarded to the EPA as part of Oregon's State Implementation Plan.

I would like to note for the record, Mr. Chairman, we did receive, as you noted earlier, several pieces of correspondence: a letter from the City of Springfield, signed by the City Manager dated November 3 that I will submit for the record; a letter from the City of Eugene from Charles Henry, City Manager, dated November 4 for the record; a letter, also from the City of Eugene, dated November 6, for the record. These letters are included in your packets. This evening, I also received a letter from the Department of Environmental Quality dated November 6, from Bill Young, Director of the Oregon Department of Environmental Quality, for the record.

MR. CHAIRMAN: Anything more, Don?

MR. ARKELL: That's the end for me right now.

MR. CHAIRMAN: If I haven't done it already, I would like to welcome you to this hearing. I will also put into the record -- and some of these people may be here, also, to testify. If they are, I hope I don't repeat what they will be saying -- into the record, some statements that I have here on points by various individuals. One is from a Mr. Richard J. Malliris, who is submitting a letter as the Eugene-Springfield Chamber of

Commerce representative for the Eugene-Springfield Air Quality Management Area Citizens' Advisory Committee.

He states, "As representative" -- and this is just a summary paragraph. He goes through and, I think, comments on a number of points but ends up concluding, "As representative of the joint Chambers of Commerce, I support acceptance of the State Implementation Plan Revision for the Eugene-Springfield area for suspended particulates as submitted by the Lane Regional Air Pollution Authority to the public hearing on November 6, 1980."

A letter here from Gary L. Reed, essentially supporting the conclusion that the draft SIP document would be supported by and in the best interests of the general public. And a letter from Ron Dersham with a number of points. I don't know if he's here to testify or not.

MR. DERSHAM: I'm here.

MR. CHAIRMAN: He is. I will let him cover those points himself. I don't feel like summarizing that one. And I've got four people here that are here to testify, are signed up: Gary Reed, Ronald Dersham, Brian Bauske, and Henry Wohlers. Is there anyone else that wishes to testify?

MR. SNOWDEN: Yeah. I'm Ollie Snowden from Lane Council of Governments.

MR. CHAIRMAN: Anyone else? Then I will, with that, open the public hearing. And I'll call you by name for those wishing to testify. And please state your name and your address for the record prior to giving your statement.

Gary Reed.

MR. REED: Gary Reed, 35511 Camp Creek Road, Springfield, Oregon 97477.

Mr. Chairman, Members of the Board: In my opinion, the following is a summary of the general feelings that members of the public have expressed to me in regards to the AQMA plan.

It is our feeling that the draft SIP document reflects the thinking of a broad spectrum of local opinion and would be supported by the general public. It appears from the document that it became clear during this planning process that the problem we face is complex and that there remains much for us to learn in this area.

In regards to Phase I, we feel that, with Phase I, most of the basic contributing forces to air quality have been touched upon and that it is a sound beginning for the AQMA plan. Phase II, the air-quality problem is one that should be continually studied, and the SIP document recognizes and responds to this need. In regards to Phase III, we feel that the selection of additional control measures in the form of ordinances, regulations, etc., might be necessary to meet federal standards.

The SIP document has adressed the concept of controlled trading as a growth-management tool for new industries. It is felt that this would be to the best interest of the public, ensuring a healthy source of economic growth. SIP has always addressed the effects of sources outside the AQMA and the potential need for some additional provisions.

The aforementioned reasons bring me to the conclusion that the SIP draft document would be supported by and in the best interests of the general public. Thus, we urge your support and adoption. Thank you.

MR. CHAIRMAN: Thank you. Any questions? None.

The next person is Ronald Dersham.

MR. DERSHAM: My address is 32466 Camas Swale Road, Creswell. I'm Ron Dersham, the Panels Manager with Weyerhaeuser Company in Springfield.

Oh behalf of our company, I appreciate this opportunity to comment on the control strategy that is being proposed to achieve compliance with the secondary particulate standards in the Eugene-Springfield area.

Jerry Bollen of our company was a member of the Citizens' Advisory Committee which developed the proposed strategy that is being considered for adoption. This Committee, working closely with your staff and representatives of DEQ, spent many months assessing the numerous particulate sources that impact air quality within the AQMA and evaluating alternative strategies to meet the secondary standards that have been established by EPA.

During their deliberations, the Committee considered relative impacts of the numerous sources that contribute to particulate levels in the area and capital and operating investments that will be required by source category to meet more restrictive standards.

We would like to recommend the following revisions and additions to the control strategy for your consideration. These recommendations will, in our opinion, offer greater flexibility to the industrial community in meeting emission requirements, yet still assure reasonable progress towards air quality attainment.

We recently retained a local consulting firm to determine the capital investment and annual operating cost which would be required to obtain 98.5 percent removal of particulate from all dry-material cyclone sources emitting more than one ton per year. The results of this study show that the cost of compliance is more than double the estimated impact that was considered by the Advisory Committee.

Our estimated cost of compliance is conservatively $1,639,000 of capital and $146,000 of annual operating cost. The annual operating cost considers only energy and baghouse replacement. It does not include routine maintenance or replacement of a facility following an explosion.

Particularly with the difficult economic conditions facing the Northwest forest-products industry, implementation of this requirement within the time frame proposed will place a severe, unique hardship on the Eugene-Springfield's lumber and plywood plants that other mills will not have to bear. For this reason, we propose the following:

(1) For five-ton or greater sources only, extend the completion date from June 30, 1982, to January 1, 1983, or eighteen months after approval of control strategy by EPA, whichever is longer.

(1a) For sources of one ton to five tons, require control completion by July 1, 1985, based on demonstrated need for air quality attainment. This additional period will lessen the short-term financial impact on industry and will provide opportunity to verify the accuracy of the model and to measure improved air quality created by the control of larger emission sources.

(2) Add a provision to the control strategy that would allow LRAPA to approve an alternate emission reduction strategy if an industry could demonstrate that equal air quality results could be achieved.

(3) There currently is some uncertainty regarding the federal particulate standards. EPA is in the process of re-evaluating these standards and considering revisions. In order to protect affected sources in the area, in the event that secondary

standards should be changed, we would request that a provision be added to the control strategy. This provision should stipulate the intent of LRAPA to re-evaluate the appropriateness of the strategy should the standards be revised. A similar statement has been included in the control strategy for the Portland AQMA.

Both the Advisory Committee and your staff have, in our opinion, done an excellent job in developing this document on an extremely complex issue. We do feel, however, the recommended revisions we have presented are vital to the well-being of the area's industrial operations and would, therefore, ask your favorable consideration. Thank you.

MR. CHAIRMAN: Thank you. Any questions? None. Brian Bauske.

MR. BAUSKE: My name is Brian Bauske at 327 Adams Street in Eugene. I have been a member of the Eugene-Springfield Air Quality Maintenance Area Citizens' Advisory Committee for Total Suspended Particulates since its formation in the spring of 1978. I served on the Steering, Modeling, and Strategy Subcommittees as well, representing the general public of Eugene.

These two and a half years have been among the most challenging, frustrating, and fascinating I have ever spent. The Committee, with its broad-based composition of representatives of local government, industry, environmental groups, and the populace, had a formidable task to fulfill. We had to become familiar with the entire field of air-quality measurement and intervention, as well as the detailed inventory of local sources of particulate emissions, and the relevant activities of area jurisdictions, LRAPA, state agencies, and industries. We had to learn an entire vocabulary of technical terms, and we had to struggle to digest some of the most formidable bureaucraties I have ever seen in the Clean Air Act and its amendments.

Incidentally, I learned firsthand, just what is at stake in the air-pollution work when I tried to say the full name of this Committee in one breath.

We also spent many hours studying the complex topic of computer-assisted simulation modeling. And, finally, we were required to reconcile all the varied economic, political, and sociological considerations which come into play when attempting to formulate fair strategies to bring our area into compliance with ambient air standards as well as to provide a margin for anticipated future growth.

I believe that our efforts have been successful and that we have produced an implementable plan to both begin to reduce local emissions without disrupting our economic base, as well as to acquire, through further research and study, additional strategy mechanisms to introduce a few years down the line when the necessary data have been compiled and experience accumulated. Our deliberations have been free from strife, and all the major actions of the CAC were made unanimously.

It is important to bear in mind that the strategies we recommend for implementation of Phase I will not, by themselves, be sufficient to attain compliance with federal standards for clean air in the AQMA. However, the state of the art in air-pollution measurement and control technology is advancing rapidly. Just during the term of the CAC, the Willamette Valley field-burning study has been completed and chemical mass balance techniques applied for the first time to identify the sources of our problem.

Further requirements are expected in the next few years as well as new federal EPA regulations on fine particulate matter. It will be necessary to reconvene the Committee in 1983 in order to take a fresh look at the progress attained and problems remaining by then and to recommend additional strategies, which may be very difficult to select.

Nevertheless, I am convinced that we are on the correct course and that the processes of the Clean Air Act have been successfully applied here to generate local solutions to our local problem. A body of highly informed citizens has been produced. A great deal has been learned about the nature and causes of our nonattainment problem, and policies have been devised which can interact with area-planning programs to lead to wise decisions on growth management, land use, and resource utilization.

I recommend that the Board and the Environment Quality Commission adopt our State Implementation Plan Revision for Total Suspended Particulates. It will serve both the environmental and economic interests of the Eugene-Springfield area.

MR. CHAIRMAN: Thank you, Brian. I'm sure that many people have shared your frustrations, joys, excitement, and everything else along the way.

Henry Wohlers.

MR. WOHLERS: My name is Henry Wohlers and I live at 36381 Row River Road, Cottage Grove, Oregon.

First, may I congratulate the Citizens' Advisory Committee and the LRAPA staff for the excellent report they have prepared on a very complicated subject.

I feel there is one aspect of the problem which has not been addressed in this report which I believe should be looked into by the Board of Directors before the report is accepted.

In essence, as I read the report, on page 25, it states:

"The information gained from the modeling effort is
"considered the best available at this time and,
"tempered by a good understanding of actual conditions
"in the area, is sufficient for prudent application
"here."

It's my belief that a thorough error analysis of the data would be necessary before the Board makes any political judgment as to which phase should be undertaken first and what part of the various phases should be undertaken first. It may well be that a study of an error analysis would show that certain aspects of the data are more prone to mistakes and error than others. And, therefore, the entire picture may change, depending upon the outcome of such an error analysis. And I think, if an error analysis were undertaken, it would improve the quality of the present report. Thank you.

MR. CHAIRMAN: Thank you, sir.

Ollie Snowden.

MR. SNOWDEN: Thank you. I'm Ollie Snowden and I live at 4030 Dillard Road in Eugene. I'm the Transportation Program Manager of the Lane Council of Governments as well as the acting Housing and Community Development Program Manager.

I would like to make two comments tonight; one would be the Board's position on the SIP revision and then, secondly, some staff comments.

The Lane Council of Governments' Board of Directors reviewed the SIP revision at tis October 23, 1980, meeting as part of its areawide A-95 Clearinghouse responsibilities. The Board supported the SIP revision and had the following comment:

"Weatherization financing mechanisms that are
"developed to implement the SIP should ensure that
"the mandatory weatherization standards called for

"by the SIP do not adversely affect the supply,
"quality, or cost of the rental-housing stock,
"especially that segment available to low and
"moderate income persons."

The remaining comments are staff comments and have not been reviewed by the Board; and, as I said, they represent the staff comments at L-COG.

As a staff member of L-COG, I was appointed to the SIP Citizens' Advisory Committee to represent several L-COG programs, including Water Quality, Transportation, and Housing. On behalf of those programs, I feel that the proposed Total Suspended Particulate SIP Revision represents a reasonable approach to achievement and maintenance of the TSP secondary standard in Eugene-Springfield and I would recommend adoption.

Throughout the period of SIP development, the process has been open, with ample opportunity for participation by the L-COG program areas identified above. Our interaction with the LRAPA staff during the SIP development has been both positive and timely; and continued coordination during Phase II and III of the SIP is essential to ensure that air quality, water quality, and transportation goals remain compatible.

I would like to take this opportunity to pledge the support and cooperation of the L-COG Transportation and Water Quality staff during the remaining phases of SIP development. Thank you.

MR. CHAIRMAN: Thank you. Anyone else? No one? Then I'll close this public hearing.

Don, do you have anything that you would like to comment on at this time? What about the comments from the general public?

MR. ARKELL: Maybe just briefly. Mr. Chairman, I do have a couple of recommendations that I would like to put into the record.

In response to several of the comments that we heard this evening, that I heard for the first time, indirectly responding to the concerns of Mr. Dersham from Weyerhaeuser. We have accepted the notion that a shift in time for fully implementing the dry-materials handling might be a reasonable approach, taking the large units first and then phasing those smaller ones in perhaps a year later. We have no objection to that.

This matter of providing for the re-evaluation of the strategies should the standards be revised was also a comment offered by DEQ, and I do have some language proposed that we would like to insert as the last paragraph in the summary. A similar language does appear in the document, but the preference expressed by DEQ is that this be an up-front comment and a qualifier provision, that we will re-evaluate the SIP if the standards are changed. We have no objection to that.

In response to Mr. Wohlers' comments about error analysis of the modeling, we asked DEQ to send a representative down, who had a lot to do with the modeling that was used to develop the strategies in the plan. Mr. Hanrahan is in the audience, Pat Hanrahan, from DEQ. And I don't know if he has any response, specifically, to Mr. Wohlers' comments.

As a participant in the development of the plan, however, I can say that the modeling did receive a very thorough, exhaustive review by the Modeling Committee, a subcommittee of our CAC; and a number of analyses were requested and provided by DEQ to validate the information that was provided by the modeling.

Maybe Mr. Hanrahan can comment very briefly on those factors.

MR. WHITEMAN: Can I ask a point of information here?

When you speak about an error analysis, is this further computerized analysis of the information; and how is it -- Can you explain it?

MR. ARKELL: Maybe Mr. Hanrahan can explain it better then I.

MR. HANRAHAN: My name is Pat Hanrahan. I represent the Oregon Department of Environmental Quality in Portland.

I would like to say in terms of the data that's been used in our model, there are a number of variables that we recognize; there can be variability with the date. However, we've done our best, we feel, in terms of recognizing those variables.

In terms of the validation of the date, we did have a chance to independently check out our model in terms of not only checking out how the model performs versus total mass, as it's done in most other states, but we also were able to check out how our model performs versus individual components that contribute to the total mass, as we have done through our chemical mass balance. And this independent verification of the model, we feel, adds more credibility to the model than has been able to be produced in most other states.

In terms of an error analysis, specifically, I do feel that that would be a major undertaking that would be pretty much something that has not been done in any other state, where you look at every variable independently. There are a number of standards, in terms of how you evaluate a model versus -- what it predicts versus what you observe in the true world; and I think that we have done the best job that we can do in that respect.

MR. CHAIRMAN: Thank you, sir.

Anything else, Mr. Arkell?

MR. ARKELL: Just with those recommendations, Mr. Chairman, I give you the plan.

MR. ADAMS: Mr. Chairman?

MR. CHAIRMAN: Go ahead.

MR. ADAMS: I have worked on this plan since it started. I feel it's a good plan. I am Vice-Chairman of the AQMA Committee. And I would move that the Lane Regional Air

Pollution Authority adopt the State Implement Plan revised for the Eugene-Springfield area and add the Weyerhaeuser recommendations and also the language of the DEQ.

MR. HAMEL: Second.

MR. CHAIRMAN: Does that satisfactorily address the two concerns that were mentioned earlier?

MR. ADAMS: They will be added to it, won't they?

MR. HAMEL: As an amendment.

MR. ARKELL: I mentioned two recommendations, Mr. Chairman, that we would support. Weyerhaeuser had another that we don't support.

MR. ADAMS: That wasn't in the motion.

MR. CHAIRMAN: All right. Discussion?

MR. WHITEMAN: Mr. Chairman, I guess for reason of information, which of the three, then, of the recommendations made by Weyerhaeuser from Mr. Dersham are we not including in the motion?

MR. ARKELL: The number two provision.

MR. WHITEMAN: The control strategy that would allow LRAPA to approve an alternate emission reduction strategy if an industry could demonstrate that equal air quality results would be achieved; is that the one?

MR. ARKELL: Yes, sir.

MR. WHITEMAN: Would it be improper for me to ask what the staff's objection is to that, since it does speak to demonstrate the equal air quality results would be achieved?

MR. ARKELL: Our problem is that we have developed these strategies after a rather exhaustive analysis of a number of strategies available to us. We are not certain what kinds of other strategies may be used to substitute for that; and I would prefer, personally -- and I believe that the staff would support it -- that the current strategies be retained intact. We must consider that there is a provision that, if the standards are changed, we're going to be reconsidering this anyway. And we anticipate a two-year period of time prior to the initiation of Phase III anyway.

And if you examine the timetable proposed by Weyerhaeuser, their second proposal, which we have agreed to, is in 1985. So we think that this is ample opportunity to revise this without putting this provision in the current document.

MR. WHITEMAN: Just another question of clarification, When we speak of strategy, are we then talking also of equipment to produce the results that we're looking for; in other words, I read this -- and maybe it's my not being involved with the Committee. I read strategy here that speaks to, maybe, new technology as far as equipment and process is concerned within the next few years. Am I reading that wrong?

MR. ARKELL: Yes. We are not talking about new technology.

MR. CHAIRMAN: Bill, does that answer your question?

MR. WHITEMAN: Yes, it does. Thank you, Mr. Chairman.

MR. CHAIRMAN: We do have a question from the audience. The public hearing is closed. If the Board would just bear for a moment, maybe the question can be asked. If this is in the form of public testimony, I'm going to have to disallow it unless I open the hearing again.

MR. DERSHAM: I just want to clarify our point on that. Item 2 was to try to allow us some flexibility, and that's what that was for. Instead of saying, "We will use baghouses, period," it was to try to give us some flexibility to see if there was other technology that might come up.

Also, we looked at our total plant site and felt that, if there were other alternatives that we could look at on the plant site that might equal what we could gain in a cyclone, we wanted that flexibility, also.

MR. CHAIRMAN: I think that's going to be taken into consideration. Mr. Arkell, would you comment on that?

MR. ARKELL: The intent of the plan is to achieve a 98.5 percent reduction by baghouse or equivalent. There will be some systems that will not require a baghouse installation but may get by with something slightly less costly.

MR. CHAIRMAN: I think it's already covered. The concern that you mentioned, I think we already covered it, that it is not necessary that a certain process occur, like a baghouse. You can have alternatives. And I think it does allow changes, what you're talking about, as long as the overall goal is met; is that correct?

MR. ARKELL: We will provide and propose to the Board a 98.5 percent reduction or a mass emission rate without regard to the specific technology. However, baghouses will be required in many instances.

MR. CHAIRMAN: But not all.

MR. ARKELL: Not all.

MR. CHAIRMAN: Does that answer your question?

MR. DERSHAM: That's part of it. But the other part was, if for some reason we could do something in the pulp area -- Baghouses and cyclones are over in the wood products area. And we felt if there was something done in the fiber area or pulp mill area, we might have much more of a gain at that plant site out there; for example, a precipitator in the pulp mill area.

MR. CHAIRMAN: Mr. Arkell, would you comment on that one?

MR. ARKELL: We are talking about a plan here. I think that we need not add this provision to have it available to us. If, at the time the regulation is proposed to the Board, if Weyerhaeuser or any other company has an alternate strategy, I can't imagine the Board not listening to it.

The plan, if it needs to be revised, may be, provided we can show that the air quality will not be jeopardized or the standards will not be exceeded; so we're not locked into this thing totally by not putting this provision in at this time. It still may be available later.

MR. WHITEMAN: Well, I interpret the conversation just concluded that if Weyerhaeuser has an idea of a better way to get there from here --

MR. ARKELL: I'm not sure what they have in mind. They haven't discussed that with us yet in detail.

MR. WHITEMAN: I don't either. And I just want to make sure -- My intent would be to leave that option. As he said, maybe there's a better way -- they come up with a better way to do it than a certain process, if we want to say baghouse or whatever, and can show it and it's reasonable in the staff's eyes, that that can reach that 98 plus percent for the elimination in the air, would be considered.

MR. ARKELL: We have reservations about that at this time.

MR. CHAIRMAN: But is that optional?

MR. ARKELL: I believe it is open without putting it into the plan.

MR. CHAIRMAN: Okay. Emily?

MS SCHUE: I just want to be sure I understand Mr. Arkell's thinking. When you say you have reservations, is that that you're not convinced that such technology exists to reach the standard in any new way? But I think I understood you to say that if Weyerhaeuser or anybody else can find that technology, that we could accommodate to the change in circumstances; is that correct?

MR. ARKELL: Yes. I think it's premature to prejudge what Weyerhaeuser may present to the Board as an option at this point in time. And what I'm saying is that the planning process allows for those judgments to be made at a later time when we have more specific information.

MR. CHAIRMAN: So long as it allows for that consideration, I think that probably addresses the concern.

MR. WHITEMAN: I see that as the only request for their item No. 2 was to allow for that opportunity.

MR. CHAIRMAN: And as long as it is allowed in here, for that consideration, I feel that you can go ahead with it.

Does any Board member have a comment on that? Bob?

MR. ADAMS: I'm happy.

MR. CHAIRMAN: Bill?

MR. HAMEL: I'm happy.

MR. CHAIRMAN: John?

Okay. Then we have a motion on the floor to accept with the changes as has been proposed.

MR. ADAMS: And to present to the DEQ. I didn't make that in the motion, and that's where I want it to go.

MR. CHAIRMAN: Okay. I'll call for the question. All in favor? Opposed? It's unanimous.

C E R T I F I C A T E

STATE OF OREGON)
) ss.
County of Lane)

I, Karen M. Jordan, do hereby certify that: At the time and place heretofore mentioned in the caption of the foregoing matter I was a Notary Public in and for the State of Oregon; that at said time and place I reported in stenotypy all testimony adduced and proceedings had in the foregoing matter; that thereafter my notes were reduced to typewriting by my own hand, and that the foregoing transcript consisting of twenty-five pages is a true and correct transcript of all such testimony adduced and proceedings had and of the whole thereof.

IN WITNESS WHEREOF, I have hereunto set my hand and notarial seal this 10th day of November, 1980, in the City of Eugene, County of Lane, State of Oregon.

Karen M Jordan

Notary Public, State of Oregon

VICTOR ATIYEH
GOVERNOR

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. Q, January 30, 1981, EQC Meeting

Proposed Adoption of Addition of Division 52 to the Rules Governing Approval or Rejection of Construction Plans.

Background

ORS 468.742 requires that plans and specification for the construction, installation or modification of disposal systems, treatment works and sewerage systems be submitted to the Department for review. This statute also allows the Commission to exempt from submittal and Department review, "class or classes of disposal systems, treatment works and sewerage systems for which the Commission finds plan submittal and approval unnecessary or impractical."

At its May 16, 1980 meeting, the EQC authorized the Department to hold a public hearing on proposed rules to establish procedures for plan submittal, review and approval, including a section on exemptions from the review process.

Public Notice was given by direct mailing to known interested persons on August 18, 1980, and publication in the Secretary of State's Administrative Rules Bulletin on September 1, 1980.

Public hearings were held on September 23, 24, and 25, 1980, in Eugene, Bend, and Portland respectively.

The Hearings Officer's report is included herewith as Attachment A.

Summary and Evaluation of Testimony

The significant issues raised in testimony are presented and discussed as follows:

1. The most common item of testimony concerned land use compatibility statements by local planning jurisdiction which must precede our approval activity. Those most concerned were special districts who are not planning jurisdictions (i.e., a sanitary authority, county service districts, etc.).

Response

The comments against inclusion of land use compatibility statements for projects submitted for Department review are ones we have no option to change at this point in time. The statutes require that action of state agencies be in conformance with LCDC goals and guidelines and our interagency agreement with LCDC requires that we assure compatibility of land use in taking action on projects.

2. Several persons were concerned about the requirement for submittal of plans for any modification to a treatment or disposal facility. They suggested that minor modifications be exempt and that only 'significant' or 'substantial' modifications be subject to review by the Department. Similarly, several persons were concerned about certifying projects as being constructed in conformance with approved plans when minor changes in plans are inevitable.

Response

The statutes do not differentiate between 'major' or 'minor' modifications which are to be subject to the plan review process. However, in the exemptions section of the proposed rules, (340-52-040), minor modifications may be exempted from the process by the Department after an informal notification of the Department.

This exemption would allow the Department reasonable judgment in deciding the significance of a modification and require or exempt plans accordingly. This would prevent unnecessary submittal of plans.

The statutes also require that construction proceed in accordance with approved plans. We agree that it is inevitable that in the course of following plans during construction, that minor construction-related deviations occur. Normally, deviations are documented and authorized in a change order when specific plan and specification provisions are changed or changes of materials, workmanship or cost are allowed or ordered. Inconsequential deviations in practice are not subject matter for change orders. Construction completion 'in accordance with the plans and specifications, including any changes therein approved by the Department' is acceptable language for our purposes.

3. Timeliness of reviews was addressed by five persons. Most suggested that a fixed number of days be indicated in the rules for Department review of plans. The suggestions ranged from 15 to 30 days. Others felt that the Department needed reasonable review time tailored to the project but should be responsive to special requirements, such as funding restraints which a private developer may face. Others felt that an automatic approval should be granted after a certain number of days without Department response.

   Response

   The period of time required for final review of a project after a complete submittal is received is difficult to set due to the nature of projects and the workloads within the Department. All projects are not necessarily equal in urgency or complexity. We have proposed in the rules that reviews "shall be completed within a reasonable period of time commensurate with the nature and complexity of the project." We believe there is an advantage to both the project sponsor and the Department with a flexible response time as proposed.

4. The two industries submitting comments were fearful about being forced to retain an outside registered professional engineer for every minor modification to pollution control facilities.

   Response

   Company engineers in industry may practice engineering without a license on company waste water projects where such work doesn't involve 'public safety or health' as allowed under ORS 672. We are acknowledging in our rules that such exemption from licensing exists.

5. Numerous comments and suggestions were received regarding the technical appendices for design requirements and guidelines.

   Comment

   The numerous technical comments pertaining to the technical appendices have been reviewed and considered. Many have been incorporated into the finally proposed rules.

Attachment B contains the rules as now proposed for adoption, based on input from the hearings and written testimony.

Summation

1. State law requires that plans and specifications for certain waste water facilities be submitted to the Department for approval or rejection prior to construction. Department actions must be in conformance with rules adopted by the Commission.

2. Proposed rules have been drafted which establish submittal requirements, contain approval/rejection criteria, implement land use compatibility requirements, grant certain exemptions and are believed to be consistent with authority granted under the statutes.

3. At the May 16, 1980, Commission meeting, the Department was authorized to hold a hearing on the proposed rules.

4. Public notice was mailed to the rulemaking notice list on August 18, 1980. The notice was published in the Daily Journal of Commerce on August 21, 1980, and in the Secretary of State's Bulletin on September 1, 1980.

5. Testimony has been received on the proposed rules at public hearings held in Eugene, Bend and Portland during September 23, 24 and 25 respectively.

6. Several pieces of written testimony were received by the Department.

7. Testimony was mostly supportive and constructive. Testimony has been reviewed, evaluated, and considered in preparation of the finally proposed rules.

Director's Recommendation

Based on the summation, it is recommended that the rules contained in Attachment B be adopted.

Bill

William H. Young

Attachments: 3
- Attachment A - Hearings Officer's Report
- Attachment B - Proposed Rules (OAR 340-52)
- Attachment C - Statement of Need

James L. Van Domelen:l
WL509 (1)
229-5310
January 8, 1981

STATE OF OREGON 1859
VICTOR ATIYEH
GOVERNOR

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. Van Domelen, Hearings Officer

Subject: Report of Public Hearings Held to Receive Testimony Regarding Proposed New Water Quality Rules for Review of Plans and Specifications (OAR 340, Division 52).

Procedures Followed

A public notice of proposed rules was mailed to on August 18, 1980, to various Department rulemaking lists including cities and special districts with sewage responsibilities. A special mailing was made to consulting engineering firms who regularly prepare and submit plans. The notice appeared in the Daily Journal of Commerce, on August 21st and was placed in the Secretary of State's Administrative Rules Bulletin, September 1st edition.

Public hearings were conducted on September 23, 24, and 25, 1980, at Eugene, Bend and Portland respectively. A brief discussion of the purpose and content of the proposed rules preceeded each hearing.

Several mail and telephone requests for copies of the proposed rules were satisfied. Several telephone discussions and explanations of the proposed rules were conducted since the placement of the public notice.

Summary of Testimony

Attendance at the three public hearings was light and consisted of eight persons, six of whom offered some testimony. Eighteen (18) pieces of written testimony were submitted by mail. Distribution by interest group for the twenty-four (24) contributors offering comments or testimony is as below.

Municipality	11
Consultant	5
Industry (food processor)	2
Industry (pipe manufacturer)	2
State Agency	2
Developer	1
Home Builders Association	1

Summary of Oral Testimony

Portland Hearing

A reporter from the Eugene Register-Guard and Ray Walter, consulting engineer, were present for the hearing. Several questions concerning the rules were answered and provisions of the rules were explained. No specific testimony was offered.

Bend Hearing

Mike Kment of the Central Oregon Home Builders Association, offered that the Department should commit itself to a specific time to complete reviews since this may be urgent when developers are arranging project financing.

Jan Ward of Ward Construction Co., was concerned how the proposed rules would affect the future approvals or extensions of his type of experimental pressure sewer system as operated by Juniper Utilities Co., He volunteered that mandating a specific period to review a project may not be in anyone's best interest but that we should commit to expeditious reviews within a reasonable time period.

Bob Shimek of Century West Engineering Corporation, asked what the future relationship of regional versus headquarters office of the Department might be with respect to reviews both now and in the future. He suggested that regional offices be used to fill plan review needs or gaps to facilitate local area needs as appropriate. He felt that acknowledgment of receipt of complete plan review submittal information should be made and an expected final review date indicated, especially where review might not be immediate. He also suggested that some guidelines be developed for pressure sewer systems. Bob suggested that we work with the Health Division to arrive at a uniform standard for water and sewer separation guidelines.

Portland Hearing

Bruce Rawls of CH_2M-Hill, requested that draft operation and maintenance manuals for treatment works and lift stations not be a part of plan review requirements since draft manuals are generally not prepared until construction is 30 to 50 percent complete.

Chuck Liebert of the Unified Sewerage Agency, further suggested that operation and maintenance manuals are more aptly prepared following bid opening and prior to startup of facilities. He continued that the requirement for no deviations from approved plans and specifications during construction, if interpreted literally, would be unreasonable since plans are never followed exactly.

He also suggested that if an agency accepts the construction inspection responsibility for a project, that it should not be presumed that it also accepts responsibility for the facility to function as intended, or that the agency assumes any design responsibility.

Doug Roth of the U.S. Forest Service, had some questions regarding the interpretation of the water and sewer line separation guidelines.

Summary of Written Testimony

The attached letters were received in reference to the proposed rules and are listed below:

City of Albany
Bear Creek Valley Sanitary Authority
City of Corvallis
Clackamas County
City of Cottage Grove
Metropolitan Service District
City of Springfield
Unified Sewerage Agency
City of Woodburn
Department of Commerce, Building Codes Division
Department of Human Resources, Health Division
Lamb-Weston
Stayton Canning Company Cooperative
Pacific N.W. Concrete Pipe Association
Simpson Extruded Plastics Company
CH_2M-Hill
Marquess and Associates, Inc.
Waker Associates In.

Respectfully submitted,

James L Van Domelen

James L. Van Domelen
Hearings Office

JLV:l
WL509.B (1)

WRITTEN TESTIMONY

The written testimony received in this matter is too voluminous to copy. The letters may be reviewed in the office of the Water Quality Division, DEQ, 522 S. W. Fifth Avenue, Portland, Oregon.

AGENDA ITEM Q

January 30, 1981

WRITTEN TESTIMONY

Div 52

Ash Baker/[illegible]

City of Albany

ENGINEERING DEPARTMENT

September 25, 1980

Department of Environmental Quality
Water Quality Division
P.O. Box 1760
Portland, OR 97207

Gentlemen:

In regards to the proposed rule changes for the review of plans and specifications to the Water Pollution Control Rules, I would like to offer my comments.

Section 340-52-035 states that "construction of all projects shall be in strict conformance to the approved plans. No changes or deviations shall be made without the prior written approval of the Department." Your mandatory statement is entirely too strict. It would perhaps be more appropriate if the Department would review only those revisions that make significant changes in the scope of the project, as minor changes are always expected.

I would appreciate it if the Department of Environmental Quality would review their condition that construction of projects could not begin until the plans were reviewed and approved. This requirement could cause a hardship for many projects if the Department were to delay their response for more than two or three weeks. For the benefit of all applicants, the Department of Environmental Quality should commit themselves to a maximum number of working days for their plan review. I might suggest that you amend your requirements to include a statement that the Department shall either approve submitted tentative plans, as originally submitted, or shall propose modifications pursuant to the Department's standards, within 15 working days of submission.

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
SEP 29 1980
WATER QUALITY CONTROL

Sincerely,

James Rankin

James Rankin, PE
City Engineer Pro Tem

DIV 52

Ashbaker/ VanDomelen

BEAR CREEK VALLEY SANITARY AUTHORITY

PHONE (503) 779-4144 • 3915 SOUTH PACIFIC HWY. • MEDFORD, OREGON 97501

September 25, 1980

Department of Environmental Quality
Water Quality Division
P. O. Box 1760
Portland, OR 97207

Gentlemen:

The following is submitted in response to your request for comments re proposed Division 52, Review of Plans and Specifications:

340-52-015, (1)(f) - The requirement for the written statement of "compatability" is both inconsistent with language in the Statutes and is unnecessary. ORS 197.185(1) requires special districts to carry out their plans and programs affecting land use in accordance with statewide planning goals. ORS 197.255 directs the county governing body to review all comprehensive plans for land conservation and development within the county and to advise the state agency, city, county, or special district preparing the comprehensive plan whether or not the comprehensive plans are in conformity with the statewide planning goals. If not in conformity, ORS 197.185(2) provides that the county shall specify in a cooperative agreement with the entity what tasks are necessary to bring the plans into conformity with the statewide planning goals.

We submit that when the above stated requirements are met that special district plans will be in conformity with statewide planning goals making the required statement unnecessary.

Language inconsistencies occur when the proposed new rule states "compatability" and statutes use "conformity" and consistency".

We request that the requirement under this item be deleted or reworded to say that the statement is not required of entities whose plans have been determined to be in conformity with statewide planning goals.

Your consideration of our request is appreciated. If you have a question, please call.

Yours very truly,

BEAR CREEK VALLEY SANITARY AUTHORITY

Richard O. Miller

Richard O. Miller,
Manager

ROM:gj

City of Corvallis
INCORPORATED JANUARY 1857

CORVALLIS CITY HALL
501 S.W. MADISON AVENUE
CORVALLIS, OREGON 97330

PUBLIC WORKS DEPARTMENT / ENGINEERING DIVISION (503) 757-6941

September 29, 1980

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
OCT 2 1980
WATER QUALITY CONTROL

James L. VanDomelen
Department of Environmental Quality
P.O. Box 1760
Portland, OR 97207

PROPOSED CHANGES AND ADDITIONS TO WATER POLLUTION CONTROL RULES

The City of Corvallis has reviewed the proposed rule changes and additions and in general, we are in agreement with and support the proposals as outlined in the draft materials.

Appendix A to the rules relating to sewer pipeline appears to be much the same as the rules that we have been operating under. For the most part the new format helps to clarify between "Minimum Requirements" and "Guidelines." The guidelines shown under Section (i), "Separation of Water and Sewer Lines" continues to complicate and confuse the construction of sanitary sewers in water line conflict zones. We believe that the areas or zone conflicts as identified under Section A(i) through H(iii) and Section B need to clarify the conflict zones. Perhaps some sketches, or drawings, or sections showing typical conflict areas would help.

One of the weakest links in sewer line construction is where a change in pipe materials is required to mitigate a sewer/water conflict. Internal and external diameters of the different materials usually require the use of some type of flexible coupling, e.g., a Calder coupling. Seasonal high ground water tables in much of the Willamette Valley create conditions that probably result in contamination over a much wider area if a leak in the sewer exists. Perhaps the type of pipe used and the length, e.g., between manholes, would be better than changing pipe materials around the conflict zone area. The provisions under Section C(i)II, for PVC (ASTM D-2241) pipe would support and encourage the manhole to manhole construction concept.

The City of Corvallis has recently updated and published new standards and construction specifications that comply with the requirements and guidelines for sewer lines as contained in the proposed rules.

We have recently had our Sewer Facilities Plan updated and, in general, this plan complies with the proposed rules.

We thank you for the opportunity to review the proposed rule changes and additions.

A. Gordon Wyatt

A. GORDON WYATT
PRINCIPAL ENGINEER

gs
cc: City Engineer
Public Works Director

DEPARTMENT OF ENVIRONMENTAL SERVICES
COUNTY OF CLACKAMAS
STATE OF OREGON

902 ABERNETHY ROAD
OREGON CITY, OREGON 97045
(503) 655-8521

JOHN C. McINTYRE
Director

WINSTON W. KURTH
Assistant Director
DON D. BROADSWORD
Operations Director
DAVID J. ABRAHAM
Utilities Director
DAVID R. SEIGNEUR
Planning Director
RICHARD L. DOPP
Development Services Administrator

November 26, 1980

Department of Environmental Quality
P.O. Box 1760
Portland, Oregon 97027

SUBJ: Clackamas County Utilities Division - Review of Draft for Sewer Pipe Lines

I have reviewed the above noted draft and have the following comments:

1. On Page 6, Item (C) (i), I prefer to see 42 inch manholes used as a minimum as they work fine for us and they cost less.
done
2. On Page 7, Item (vii), I prefer to have it read "an approved outside drop manhole assembly should be used".
3. In most items, the word "should" is used frequently. I think in 80% to 90% of the cases, the word "should" can be replaced with the word "shall". The word "should" leaves too much leeway on what is to be done.

If you have any questions regarding the above items, please feel free to contact our office. I trust we will receive a copy or two of the adopted changes when it is all completed.

William F. Sanders
WILLIAM F. SANDERS - Engineering Technichian
Utilities Division

/mb

File WQ Rules
Div 52

Mullane

CITY OF
COTTAGE
GROVE

RECEIVED
SEP 12 1980

400 E. Main Street, Cottage Grove, Oregon 97424

September 10, 1980

OFFICE OF PUBLIC WORKS

Oregon Department of Environmental Quality
P.O. Box 1760
Portland, OR 97207

RE: Testimony on Proposal to Add a Section to Water Pollution Control Rules.
-Review of Plans and Specifications-

I strongly suggest that an addition be made to 340-52-015 to say:

"Action by the Department must be taken within 30 days of receipt of plans and specifications. A request for more information must be made within 7 days of receipt of plans and specifications. After additional information is requested and received by the Department, the 30 day response period begins."

The reason for this suggestion is that lengthy delays have been experienced. More formal actions of State Government such as Boundary Commission actions, have a time limit. It seems responsible and necessary for a staff review to be complete in 30 days.

Sincerely,

Bill Guenzler

Bill Guenzler
Director of Public Works

WG/sa

File: WQA-Rules-Division 52

CHA.

METROPOLITAN SERVICE DISTRICT
527 S.W. HALL ST., PORTLAND, OR. 97201, 503/221-1646

METRO

RECEIVED
SEP 22 1980
Water Quality Division
Dept. of Environmental Quality

September 19, 1980

Department of Environmental Quality
Water Quality Division
P.O. Box 1760
Portland, Oregon 97207

Dear Sir:

In accordance with your notice of August 14, 1980, concerning proposed additions to Water Pollution Control Rules; Division 52 the Metro staff submits the following written comment in lieu of testifying at the public hearing scheduled September 25, 1980, in Portland.

1. Part 340-52-035 Section 3 item (a) and item (b) on page 12 of the notice concerning design engineers responsibility is a positive change and has Metro's support.

2. Part 340-52-040 Sections 1 thru 4 pages 13 and 14 providing for exemption from DEQ review is a positive change and has Metro's support.

3. Part 340-52-045 page 15 concerning new technology is unacceptable as written, sentence number three which requires documented histories of successful demonstration or operation on a full scale basis of the proposed technology rules out the consideration of new technology.

Sincerely,

Gary L. Bradshaw

Gary L. Bradshaw, P.E.
Project Engineer

GB:pj

CITY OF SPRINGFIELD
SPRINGFIELD, OREGON 97477

PUBLIC WORKS

346 MAIN STREET
726-3753

OCT 2 1980

September 30, 1980

Oregon Dept. of Environmental Quality
522 S. W. 5th Avenue
Portland, OR 97205

Attention: Mr. Hal Sawyer

Subject: Proposal to Add a Section to Water Pollution Control Rules

Gentlemen:

Although our response is belated, listed below are the various questions or comments generated by your recent proposal to amend various water pollution control rules:

(1) What is the interface between the City of Springfield and the Metropolitan Wastewater Management Commission as a result of Paragraph C, Page 7?

(2) What type of formal plan is envisioned as a result of Paragraph 4, Page 7?

(3) What constitutes a 'change' in the plans as described in Paragraph (1), Page 11?

(4) Why is the City responsible for completing a project just because the design engineer does not want to finish the job? Maybe the project does not need to be finished and all work is halted in response to the developer's request.

In general, the proposed amendments are vague and therefore subject to a wide range of interpretation. We cannot fully determine the impact to our operations until the above questions are clarified.

Very truly yours,

Michael A. Kelly

Michael A. Kelly
Director of Public Works

MAK:sk

File: WQA - Rules Div. 52 (Plans & Specs)

JLV

Unified Sewerage Agency of Washington County

150 N. First Avenue
Hillsboro, Oregon 97123
503 648-8621

September 5, 1980

RECEIVED SEP 10 1980 Water Quality Division Environmental Quality

Harold L. Sawyer
Administrator, Water Quality Division
Oregon Department of Environmental Quality
P.O. Box 1760
Portland, Oregon 97207

Dear Mr. Sawyer:

We have completed review of your proposed administrative rules concerning review of plans and specifications. We were pleased to see the exemption language you included in the draft rules (under OAR 340-52-040) and would hope that this will be adopted.

The following comments are intended as constructive criticism which we hope will be useful in your preparation of the final rules:

1. The introductory paragraph in 340-52-015 can be interpreted to mean that any design modification (even extremely minor adjustments) must be approved by DEQ before work can be done. We would suggest the addition of the term substantial modification for existing facilities.

2. Item (1)(f)(B) under 340-52-015 infers that a regional sewer authority would have to get "statements of compatibility" from several planning authorities, even when one statement from one authority may be sufficient to satisfy the LCDC requirement. Since LCDC currently requires contracts between ourselves and affected jurisdiction, we also question whether this is redundant.

3. An operation and maintenance manual for pump stations is more meaningful when it is tailored to a facility as bid rather than how it is planned; therefore, a "draft" manual would be more appropriate after bids are received. USA has required a final manual prior to acceptance for the last several years and experienced no problems.

4. Appendix A and B referred to in 340-52-020 (3) were not attached to the proposed rules and could not be reviewed.

5. In 340-52-025, it is not clear how DEQ can dissociate structural and electrical design from "process related aspects of design".

Harold L. Sawyer
Page 2
September 5, 1980

6. Your language in 340-52-035 (1) is too all inclusive (see comment #1), particularly in light of the constant field modifications being made during construction as to alignment and grade.

7. In order to assure compliance with 340-52-035 (2), DEQ may want to consider requiring submittal of an approval letter by sewerage system owner with plans and specfications.

8. You have implied that complete sewerage system water tightness is possible and practical (see 340-52-035 (3)(c)) which is unfortunately not possible. Also sanitary districts do not have the authority to control private sewer construction.

9. DEQ should agree to some time period for review of plans and specifications (e.g., 20 days) and state that the plans are considered approved if DEQ does not send written acceptance or rejection within that time period.

Thank you for the opportunity to comment.

Very truly yours,

Gary F. Krahmer

Gary F. Krahmer
General Manager

THB:jf

CITY OF WOODBURN

270 Montgomery Street · Woodburn, Oregon 97071 · 981-7111

September 30, 1980

James L. Van Domelen, P.E.
Department of Environmental Quality
P. O. Box 1760
Portland, Oregon 97207

RECEIVED
OCT 3 1980
Dept. of Environmental Qual.

Dear Mr. Van Domelen:

A. The following comments are submitted with regard to proposed Division 52 of the Water Pollution Control Rules (Review of Plans and Specifications):

1. In subpar. 340-52(2)(b) the mandatory submittal of a hydraulic profile with all plans for treatment works appears quite unnecessary.

2. In subpar. 340-52-030(8) "Affirmative statement of land use compatibility determination is not made" has a very high fog index. A paragraph explaining the statement should be provided; or, better yet, omit the statement.

B. The following comments are submitted with respect to the Draft Rules, Appendix A, Sewer Pipelines:

1. In item (2)(b)(A) design velocity should be 2½ feet per second with a qualifying statement that design velocities between 2½ and 2 may be permitted if supported by suitable justification. In my experience, velocities of 2½ for sanitary and 3 for storm sewers are barely minimal. Also, in the first line, the word "grade" should be changed to "gradient". In the last line delete "not less than". The value of n=0.013 is as good an approximation as any for the friction factor of the slimes which form on the inside of pipes, regardless of wall material.

2. In item (2)(b)(B) "Steepened and/or reduced in diameter" is ambiguous since diametric reduction will require steepening. For the case at hand, a minimum velocity of 2½ fps should be specified.

3. In item (2)(b)(D) "grade" should be changed to "gradient". I concur in the 0.4 percent for 8-inch (v=2.19) but would propose insertion of a requirement for 0.75 percent for 6-inch (v=2.48).

4. In item (2)(b)(F) matching of 0.8 depth levels for intersecting unequal-sized sewers is hydraulically unsound. To assure at least a modicum of head for the change in direction, the crowns of the two pipes should be matched.

5. Item (2)(c)(A) is well-stated. Please preserve the wording.

6. The phrasing of item (2)(c)(B) could cause trouble. I have seen the watertight integrity of some types of ring-joints destroyed by such testing. Some types are not susceptible to testing by internal pressure.

7. In item (2)(c)(C) materials should be selected for their structural and watertight capabilities. The one all too often hinges on the other.

8. In item (2)(d)(B) append "and another within 4 feet of manhole". It takes 2 flexible joints to accomplish the objective. Laterals smaller than 8-inch should not enter manholes but should be connected to the main by means of a wye and eighth-bend. The use of tees for connection of laterals should be prohibited.

9. In item (2)(e)(C) other means of applying tolerances should be explored. The wording as given could permit a negative gradient several times the design forward-gradient.

10. Item (2)(e)(D): Not anyone has ever invented a satisfactory justification for the use of a drop manhole.

11. In item (2)(f)(A) at end, append "or in the native ground-water or soils". For example, the acid soils in Woodburn are very aggressive to A.C. and steel piping.

12. In item (2)(g)(B) no flexible pipe or flexible plastic air-duct should be permitted as a substitute for rigid pipe.

13. Headings for (2)(h) and (2)(h)(A) are confused.

14. Item (2)(h)(C) should contain some specific references to item (2)(h)(B), particularly with respect to use of cleanouts and the spacing of manholes. Some sewer-cleaning equipment cannot be used in a cleanout (no matter what size) and some cannot accommodate manhole spacing greater than 450 feet. Drops should not be permitted, whether inside or outside manhole. A 1-in-12 slope in bottom of manhole should be used only for change of direction. Straight-through channels should be same gradient as the piping. Neither free-fall nor drops should be permitted.

15. In item (2)(i)(B) append the following: "except where granular bedding or back-fill is used for either, grout curtains shall be provided 5 to 10 feet each way from the crossing.

16. In item (2)(i)(C) structural suitability should be a consideration of applicability of materials. Internal pressure rating may or may not be a proper criterion. No flexible pipe material nor any heat-fused or solvent-welded joints should be permitted.

17. In item (2)(i)(D) the specified distance from a well should be 100 feet, not 10 feet.

18. In item (2)(i)(F) the requirement for 15 psig for gravity sewer test does not appear generally practical since it would seldom be possible to test just the special pipe material as an isolated unit. Such a pressure could destroy the seals on some gravity pipe-joints.

C. The following apply to the Draft Rules, Appendix B, Raw Sewage Lift Stations:

1. In item (2)(c)(A) it is unclear what need is served by the assumption of a 4-hour power outage. If it is to size the fuel-supply tank for a stand-by generator the results would be disastrous.

2. Item (2)(d)(A) should be revised so as not to preclude shear connections for discharge piping.

D. I trust the above will be of value in formulating the new regulations.

Sincerely,

Robert M. Crichton

Robert M. Crichton, P.E.
Assistant City Engineer

RMC/dlm
CC: City Administrator
File

VICTOR ATIYEH
GOVERNOR

Department of Commerce
BUILDING CODES DIVISION
401 LABOR & INDUSTRIES BUILDING, SALEM, OREGON 97310 PHONE 378-4133

October 2, 1980

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
OCT 9 1980
WATER QUALITY CONTROL

Department of Environmental Quality
Water Quality Division
Box 1760
Portland, OR 97207

Subject: Proposed revisions of OAR 340-52

The definition of "common sewer" under OAR 340-52-010(1) appears to include everything. Who knows whether it will ultimately serve two or more tax lots? The comment under subsection (10), on the definition of "sewerage system", makes it appear that there is either a double definition, or no means of distinguishing between a "common sewer" and a "sewerage system".

"Project", for which plans are required under OAR 340-52-015, is not a defined term.

It appears that under OAR 340-52-015(1)(f) there should be a comma after the word "case" in the sixth line under subsection (A), and after the word "project" in the second line of subsection (B).

OAR 340-52-040(1)(g) is not clear. Are you requesting plans for proposed projects or proposed plans for projects?

It appears that the comma in OAR 340-52-040(2) should be removed.

OAR 340-52-045 is unclear. What is a "plan on the new technology"? Do you mean plans for facilities utilizing a new or experimental technology? How do you demonstrate a new process, treatment system, or technology with a design?

I would request that your specifications be given in SI units with imperial units as a secondary specification. This will avoid having to redo the specifications in a few years as construction moves into the metric sector.

Lawrence Van Jordan, Jr

Larry Jordan
Assistant Administrator
Mechanical Program

LJ:ro

VICTOR ATIYEH
GOVERNOR

Department of Human Resources
HEALTH DIVISION
1400 S.W. 5th AVENUE, PORTLAND, OREGON 97201 PHONE 229-5554

Rec'd 30Sep80
JLV

September 29, 1980

Dept. of Environmental Quality
PO Box 1760
Portland, OR 97207

RE: W - Water/Sewer Separation
Proposed Regulations

ATTN: Mr. James L. Van Domelen

Gentlemen:

We thank you for the opportunity to review the proposed Regulations concerning the addition of a section on Review of Plans and Specifications. These proposed regulations are to be in Division 52 and are numbered 340-52-005 through 340-52-045. We find no concern for the regulations as proposed but we do wish to comment upon the content of the appendices that are referred to in Section 340-52-020, and specifically to Appendix "A". We will have no comment upon the content of Appendix "B", for the use of reduced pressure backflow prevention devices as protection of water supplies that enter sewage works pump stations or treatment plants conforms to the requirements of this agency. Concerning Appendix "A", our comments follow and these conform to the Appendix numbering.

Section (i), Separation of Water and Sewer Lines. The requirements are general and satisfactory. We do not like the guideline lead in statement and suggest that it read as follows. "Protection of the water supply, be it distribution system, production facilities or source is not only prudent but mandatory and absolutely necessary." There can be no matter of degree for either you do or you don't make an effort for protection of the potable water system.

(A) Horizontal separation of parallel Water and Sewer Lines. We suggest that items (i) and (ii) be deleted and that the attached sketch be used in their place. Such a sketch clearly identifies the acceptable zones for maintenance of the required separation. We suggest that the following verbage be substituted for item (iii). "Common trench construction may be used only where the minimum pipe zone separations can be maintained, and only where the water line is not located below the elevation of the sewer line."

(B) Vertical Separation at Crossings of Water and Sewer Lines. No comment.

(C) Exceptions: Use of Special Sewer Pipe Materials - item (i), we suggest the following addition: ---special sewer pipe materials shall be used, and in no case shall less than 12 inches of separation be allowed.
Item (ii), the minimum laying length each side of the water line crossing should be reevaluated, keeping in mind that one standard section of special sewer pipe is to be centered over the water line. The right hand column of the table on page 9 should not read less than 9 ft.

(D) Soil Restoration at Crossings - no comment.

(E) Well Protection - to conform to Health Division regulations 42-215 (3) (a) the last sentence must be changed to read 50 ft. instead of 10 ft. In the protection of a well, special materials cannot be substituted for the outright physical separation of at least 50 ft. We must advise that we cannot accept a lesser setback, for too much is at stake when it comes to not only protecting the individual water supply, but also the ground water aquifer. Therefore we suggest that in total, the sense of this subsection be changed to delete reference to the use of special materials and simply project the need for absolute protection of all wells by not encroaching upon the 50 ft. sanitary hazard easement with any sewer line.

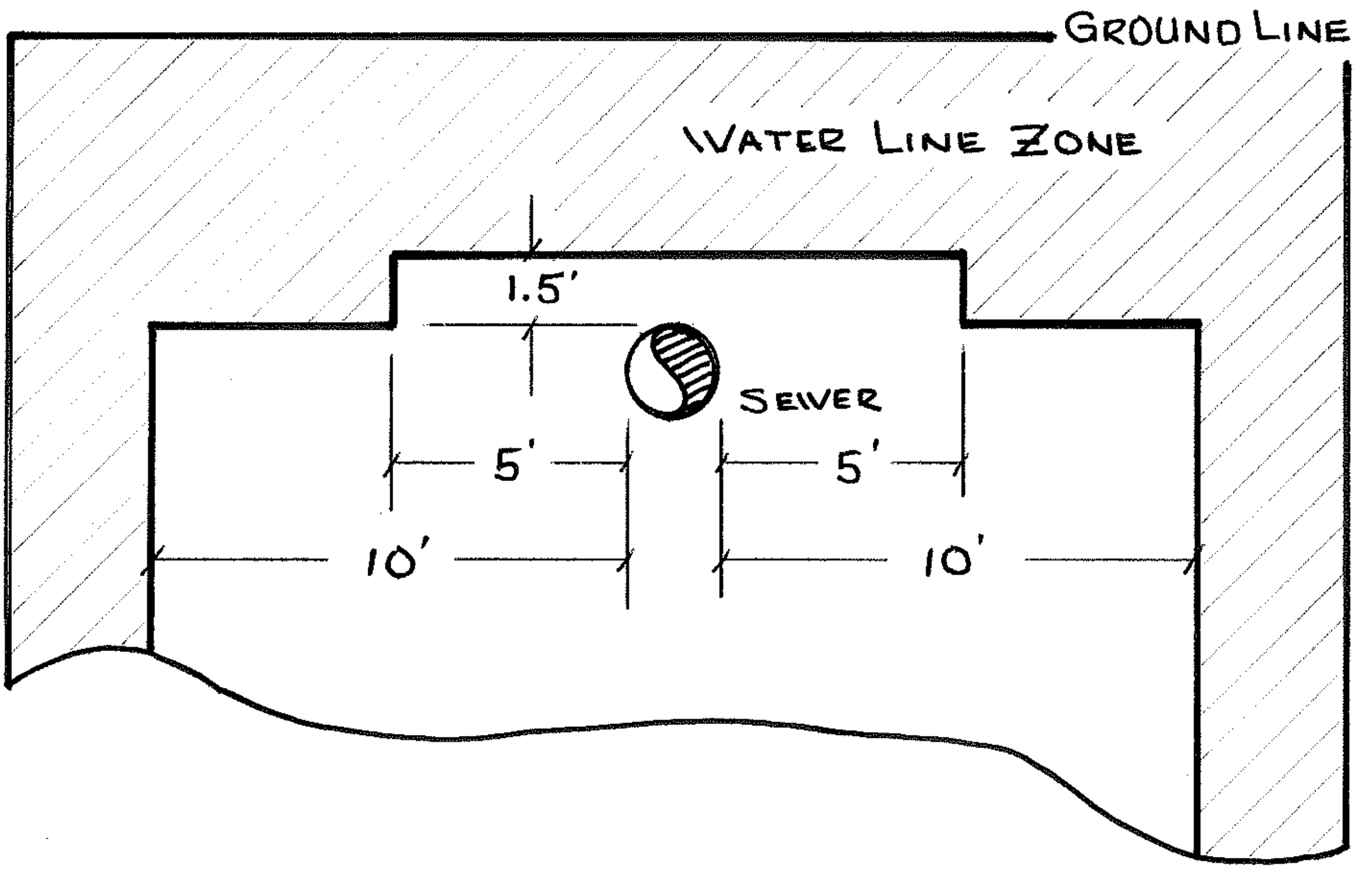
Again, we thank you for this opportunity to comment upon these proposed regulations. We feel that incorporation of these comments will alleviate conflict between the regulations of our two agencies as well as project good engineering judgements in the protection of the public health.

Very truly yours,

Joe Jensen
Plan Review Program

do

enclosure



SEPERATION ZONE —
WATER-SEWER LINE CONSTRUCTION
SEPT. 80.

SEP 30 1980

LAMB'S

AN Amfac COMPANY

September 29, 1980

Department of Environmental Quality
Water Quality Division
P.O. Box 1760
Portland, Oregon 97207

Gentlemen:

This letter is in response to your notice of public hearings regarding water pollution control rules, which was prepared on August 14, 1980. Paragraph 4 indicates that any written comments should be received at your office by September 30, 1980.

Lamb-Weston has reviewed the proposed rules and although does not disagree with the intent of providing administrative controls to assure that the quality of life relating to our water and effluent is maintained for everyone, we cannot agree with some aspects of the proposed rules. They are very specific and in many cases restrictive to the best interests of project management. Without going into a item by item analysis, we would like to highlight a few items which we believe require more attention and perhaps redrafting. For example, in section 340-52-015 it indicates that " no construction, installation, modification shall be commenced until the plans and specifications submitted are approved". In many instances it can be perceived that reasons for disapproval is very minor, and that in general the plans are acceptable. The above statement is too restrictive and partial approval to proceed within certain constraints would seem appropriate. Also under the same section it indicates that the plans and specifications should be stamped and signed by a design engineer. This again appears to be a new precedent for industrial facilities.

Paragraph F under the same section indicates a statement of making the proposed project compatible with the LC DC be provided. This is bringing in another level of bureaucratic control.

In section 340-52-030 it lists detail requirements which if any one of them is not met, that the application will be rejected. This is very restrictive and situations can be perceived where very minor items need clarification etc., and that there should be a mechanism to provide conditional approval to proceed.

In section 340-52-035 it indicates that there can be no changes without prior written approval from the department. This is very restrictive.

Lamb-Weston, a Division of Amfac Foods, Inc.
General Office: 6600 S.W. Hampton Street • P.O. Box 23517 • Portland, Oregon 97223
Phone 503/639-8612 • TWX 910/458-8796 • Cable: LAMBWESTON

There are circumstances which will arise where prudent judgement dictates proceeding through some verbal confirmation or routine notification to the department of what changes were made.

Your consideration of the above, is appreciated.

Sincerely,

Darrell L. Covert

Darrell L. Covert
Corporate Engineering Manager

DLC:mlb

cc: Northwest Food Processors Association
Cascade Plaza
2828 S.W. Corbett
Portland, Oregon 97201

EMBER OF ASSOCIATED BLUE LAKE GREEN BEAN CANNERS, INC • NATIONAL CANNERS ASS'N Santiam CUT STRINGLESS GREEN BEANS NATIONAL ASS'N FROZEN FOOD PACKERS • NORTHWEST CANNERS AND FREEZERS ASS'N

PHONE: AREA CODE 503. 769-2101

Stayton Canning Company Cooperative

AFFILIATED WITH NORTH PACIFIC CANNERS AND PACKERS INCORPORATED

ALSO PLANTS AT: SILVERTON, DAYTON, SALEM AND BROOKS OREGON

FLAV-R-PAC BERRIES FLAV-R-PAC GREEN BEANS FLAV-R-PAC STRAWBERRIES

PACKERS OF BERRIES • PURPLE PLUMS • CHERRIES BLUE LAKE BEANS • CORN • CARROTS

P. O. BOX 458
STAYTON, OREGON 97383

WQA - Rules - Div. 52

LDP prepare response

September 12, 1980

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
SEP 17 1980
WATER QUALITY CONTROL

Department of Environmental Quality
Water Quality Division
Box 1760
Portland,ore. 97207

Dear Sirs,

The proposed review of plans and specification, Division 52, will considerably delay the implementation of any minor modifications to industrial treatment works, unnecessarily.

It is felt that the proposed regulations were written for municipal or other public treatment works or for the construction of major new systems. Perhaps the industrial systems, or at least spray irrigation systems were included, probably, as an after thought or not considered at all?

Stayton Canning Company spray irrigates practically all of their food processing water. For example, if it is decided to add an aerator to one of the irrigation ponds, to improve B.O.D. loadings or odor control, then all of the steps for permission to construct and all of the information would still have be submitted to D.E.Q. In order to comply the company would have to:

1. Hire a professional engineer at $40 to $50 per hour.
2. Make detailed plans and specifications.
3. Obtain an affirmative written statement from appropriate juristiction that the project is compatible with L.C.D.C. comprehensive plans.
4. Comply with the request for all of the data of paragraph (2) a through g. Some of the data required is considered proprietary or confidential and has no bearing on system performance.

The result of the above requirements is that the company will not expend time or funds to update and improve their systems. It is felt that the DEQ water quality staff will attest to the fact that the company has been willing, of its own volition, over the last several years improved their waste water disposal systems appreciably.

Since DEQ does not assume any responsibility over the performance of the waste water disposal systems, why is all the added paper work necessary?

It is requested that the requirement for the professional registered engineer be deleted, and the information requirements be streamlined when minor modifications to existing systems are being considered. When structual changes or public safety aspects are involved then the requirements are quite valid.

Yours Truly,

Tom Villman

Tom Villman

Div 52

Ashbaker/van Domelen

LELAND L. SPHAR
Engineer-Manager

PACIFIC NORTHWEST CONCRETE PIPE ASSOCIATION

2366 Eastlake Avenue East
Seattle, Washington 98102

324-7544

September 25, 1980

Department of Environmental Quality
Water Quality Division
P.O. Box 1760
Portland, Oregon 97207

Gentlemen:

A copy of your Notice of Public Hearings re Additions to Water Pollution Control Rules, with attachments, was received in this office yesterday. We regret that, with this short notice we are unable to attend any of the three hearings scheduled, but are pleased to be given the opportunity to submit the attached comments, which we trust will reach you before your September 30 deadline.

Leland L. Sphar

Leland L. Sphar/Engineer-Manager
LLS:cs

LELAND L. SPHAR
Engineer-Manager

PACIFIC NORTHWEST CONCRETE PIPE ASSOCIATION

2366 Eastlake Avenue East
Seattle, Washington 98102

324-7544

September 25, 1980

COMMENTS RE DEQ DRAFT RULES APPENDIX A

(a) Capacity, Guideline (C)

While it is quite proper to prohibit Inflow, it would appear to be unrealistic to stipulate zero allowance for inflow in capacity design. Human nature being what it is, there will be some illegal connections of roof, foundation, or area drains, and there will be some inadvertent admissions of surface water from a variety of sources. All investigations of existing systems bear this out and indicate that the cost of continual policing to stop all inflow would be not cost-effective. An allowance at least equal to the allowance for infiltration ought to be included, and perhaps several times that much, depending on an assessment of long-time policing capability.

(c) Watertightness Guideline (D)

The exfiltration/infiltration rate is an incomplete specification because no test head is stipulated and there is no limitation on the length of line tested as a unit. The 10 State Standards stipulate 200 in-gal at 2 ft. of positive head (above the pipe or above the water-table.) Since flow through any kind of opening varies as the square root of the head, an allowance should be made to adjust to the actual test conditions. For example, the allowable rate for a 6 ft. test head should be $200\sqrt{6/2} = 350$ *in-gal. This is a good test which will find any defects that ought to be fixed and is cost-effective with respect to limiting infiltration.*

The length of pipe to be tested at one time should be manhole to manhole, or about 700 ft. maximum. If longer tests are permitted, gross defects can go undetected because their leakage may be averaged out.

There does not appear to be good reason to specify a range of acceptance limits. If 200 in-gal is acceptable (as it ought to be) then indicating a range of 50-200 only tends to get people involved in meaningless numbers games that limit competition and raise costs without compensating benefits.

(d) Structural Guideline (A)

It would be better to stipulate that bedding requirements follow practices advocated for the various materials. It is not economical to require bedding to the springline for all concrete pipe installations, regardless of the loading. In some circumstances (5 or 6 ft. of cover) hardly any bedding is needed, while in very deep trenches the bedding indicated would not be sufficient. And the bedding indicated is not adequate for flexible pipe, which depends on side support. The plastic pipe industry recommends more stringent requirements.

(d) Structural Guideline (B)

It is also important that flexible pipe not be subjected to bending and shear stresses at junctions with structures and at tees or wyes. For 50 year life expectancy, PVC should not be subjected to more than 2000 psi tensile stress. 5% deflection, with no longitudinal stresses, develops about 2000 psi tension at the springlines. Add any considerable longitudinal bending and the estimated service life goes way down.

(e) Ability to Pass Solids Guideline C.

The installation tolerances appear to be unduly restrictive and could lead to worse problems than they are intended to avoid.

To achieve these requirements, installers will have to do a great deal of tamping down, or raising by scraping loose bedding under the bells. Both procedures tend to result in non-uniform support along the barrel, after backfill loads have been applied, and this is the most frequent cause of pipe damage. It is suggested that representative Oregon designers be consulted about this.

(f) Durability Guideline (B)

Perhaps high velocity jet cleaning should also be addressed. This is like sandblasting and can be disastrous especially when directed into joints of pipe like truss pipe.

(g) Stability Guideline (B)

The <u>longterm</u> deflection of PVC should not exceed 5%, according to plastic pipe industry Technology and European practice. The recent promotion of 7½% completely disregards service life limitations based on extrapolations (by ASTM procedures) which result in a maximum design stress of 2000 psi tension to assure 50 year life.

We will be pleased to arrange to meet with you, at any mutually convenient time, in order to enlarge on the foregoing comments, provide backup references, etc. D.E.Q. is to be congratulated for this very commendable document, and again, we appreciate very much your invitation to review and comment.

Leland L. Sphar

Leland L. Sphar/Engineer-Manager
LLS:cs
cc: Oregon Members

Jim Van Domelen

Simpson

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
OCT 20 1980
WATER QUALITY CONTROL

Oct. 17, 1980

Mr. Jim Van Domelen
Dept. of Environmental Quality
P.O. Box 1760
Portland, OR 97207

Dear Jim:

I would like to relate a recent experience to you to illustrate some of the points I've been making in our recent discussions.

The Bear Creek Valley Sanitary Authority in Medford was given a deflection mandrel by Armco. This mandrel was clearly marked" ASTM D-3034 5% deflection". I'm enclosing information which I believe pertains to it.

Armco's mandrel is designed for one purpose and that is to get stuck in PVC sewer pipe. It ignores the extra wall thickness (approx. 6%) necessary to ensure no thin spots, and the out-of-roundness tolerance accorded us by ASTM. In addition, the runners are very long so it sticks at minor bends which occur. This mandrel will hang up in virtually every PVC pipe installed. In fact, the BCVSA had to dig up a PVC pipe to remove a stuck Armco mandrel, and, as a result, felt that their pipe had been improperly installed. I took our PHOS mandrel to the jobsite and it passed through the line easily.

Jim, if the DEQ is going to require a deflection test, even as a guideline, it is imperative that you be specific on the equipment to be used. The contractors can't be expected to evaluate one mandrel as compared to another. The intent of this test is to ensure good installation, but without this clarification,the deflection test will continue to be a marketing tool. The only way I can see to clear this up is to specify the inside diameters of PVC on which the deflection will be based. Uni-Bell has derived "Base ID's" which statistically account for the tolerances in our pipe. I'm also enclosing information on this concept.

I certainly think that a written statement from the DEQ would be appropriate. Otherwise, those marketing games will continue to cloud the issue of good installation practices.

I hope you will consider this. Thank you very much.

Sincerely,

SIMPSON EXTRUDED PLASTICS COMPANY

Mike

Mike Kalish
Market Development Manager, Waterworks

MK/sc
Encl.

Simpson Extruded Plastics Company P.O. BOX 10049 EUGENE, OREGON 97440 503-747-4255

CH2M
HILL
engineers
planners
economists
scientists

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
OCT 15 1980
WATER QUALITY CONTROL

October 13, 1980

C10.72

Department of Environmental Quality
P.O. Box 1760
Portland, Oregon 97207

Attention: Mr. James VanDomelin

Gentlemen:

I appreciate the opportunity to comment on the proposal to add a section to the Water Pollution Control Rules including the draft rules listed under Appendix A and Appendix B for sewer pipelines and raw sewage lift stations, respectively. My comments follow:

1. Section 340-52-015, Item 1F. I feel that the requirement for affirmative written statement acknowledging that the proposed project is compatible with LCDC, comprehensive planning, local ordinances, and zoning requirements is not necessary. It should be the responsibility of the local jurisdiction, not the Department of Environmental Quality, to ensure that a sewerage system project is compatible with local planning and ordinances.

   It has been my experience that sewers are constructed for two reasons:

   a. A potential health hazard exists because drainfields serving existing developments do not work properly. These developments may be within or outside of newly established urban growth boundaries and may, in fact, not conform to new comprehensive plans. However, the facts that development existing prior to enactment of the plan and that a health hazard exists cannot be overlooked.

   b. A proposed new development. New developments must undergo extensive reviews to ensure conformance with comprehensive plans and zoning ordinances before they are approved. Sewerage systems simply will not be financed if the developer cannot get approval for his development.

Corvallis Office
1600 S.W. Western Blvd., P.O. Box 428, Corvallis, Oregon 97330 503/752-4271 Cable: CH2M CVO

2. <u>Section 340-52-015, Item 2F</u>. It would seem advisable to continue the current practice of submitting the draft Operations and Maintenance manual after start of construction. Many of the equipment items are selected after bids, and operation and maintenance manuals should be tailored to the specific equipment. This comment also applies to Item 3D.

3. <u>Section 340-52-035, Item 1</u>. I would suggest adding after the words "No changes or deviations..." in the second sentence, the words "in service area and/or changes which would result in deviation of the requirements or guidelines". There are always field changes on most sewerage projects; as written, this would suggest that all changes no matter how minor would have to receive prior written approval from the department before they could be made.

4. <u>Section 340-52-035, Item 2</u>. I would suggest adding the words "Owner of the" between "The..." and "...sewerage system...".

5. <u>Section 340-52-035, Item 3B</u>. It would seem more appropriate that the owner or developer rather than the design engineer notify the Department of Environmental Quality of a change in the responsibilities of the design engineer. The owner or developer are in a better position to advise how supervision and inspection will be accomplished.

6. <u>Section 340-52-035, Item 3C</u>. The sentence that "He shall monitor or control all private..." is in conflict or at least a duplication of the State Plumbing Code.

7. <u>Section 340-52-040</u>. Generally, I agree wholeheartedly with this section. It should reduce time and expense without sacrificing quality. In Item 1C, I question if the words "professional staff" include outside consultants, which are retained by a city or a special district to act on behalf of them; I hope it does.

Regarding the draft rules, Appendix A, for sewer pipelines, I have the following comments:

1. <u>Item 1(a)</u>. I get concerned that no allowance is made for inflow. While great effort is made during the

design and during the construction of a collection system to avoid any inflow sources, I feel that it is nearly impossible to eliminate it.

2. Item 2(a). It should be noted that these design capacities are for new collection systems versus replacement or relief sewers.

3. I assume that collection sewers under Item 2(a)(A) is for essentially 8-inch lines versus trunk and interceptor lines. If it does include trunk and interceptor lines, it conflicts with EPA's requirement that trunk and interceptor lines be designed for 20-year periods. I do not advocate changing to EPA design criteria.

4. Item 2(a)(C). While I think it is idealistic to hope that infiltration during the design period of a collection system will remain no greater than 1,000 gallons/acre/day, I know of nothing that really supports it. I also know of nothing that supports a zero inflow over a design period. To the contrary, all of the infiltration/inflow analysis I have seen, even on fairly new collection systems, would indicate that infiltration and inflow both far exceed these design allowances.

5. Item 2(b)(D). I feel that occasionally there are locations where an exemption to the .4-percent slope requirement is justified and practical. I realize that this is a guideline which, I assume, would allow the exemptions when it is shown to be practical and reasonable.

6. Item 2(c)(A). If television equipment is available, I think it would be nice to inspect the sewer by television both after the initial completion and prior to the expiration of the warranty period. However, good inspection and proper testing of the completed sewer system allows detection of nearly all defects. I feel that the initial television inspection should normally be left up to the option of the engineer and the owner. Because it is more difficult to inspect a live sewer line, the 11th month television inspection should be encouraged.

7. Item 2(c)(B). This paragraph suggests that the test pressure be varied depending on ground water conditions and depth of sewer. This sounds good but could result in some very high test pressures for deep sewers that are being tested during high ground water conditions. For

instance, the test pressure on a 20-foot-deep sewer would be 40 feet of head or 17.36 psi when the pipeline is tested with the ground water at the surface. Seventeen pounds per square inch test pressure on all diameters of pipe results in a dangerously large force on the test plug. On 8-inch diameter pipe, the force on the test plug is nearly 1/2 ton; on a 21-inch diameter pipe, 3 tons.

8. Item 2(c)(E). I agree that the jurisdiction that has responsibility for transport and treatment of sewage should have the responsibility for establishing materials and construction practices for building sewers. The State Plumbing Code does not allow it. In many cases, the municipalities and in particular special districts no longer have the authority to inspect building sewers.

9. Item 2(e)(C). It is desirable to maintain a grade within plus or minus 0.01 feet; however, it is very difficult to achieve in practice even with laser beams. From a practical standpoint, that kind of tolerance seems over-restrictive.

10. Item 2(g)(B). There has been considerable discussion on the deflection of PVC pipe materials. As you know, the PVC pipe suppliers claim that 5 percent is too restrictive. I personally feel that it can easily be met with good construction practices and should remain at 5 percent. I am not fully convinced that the 5-percent deflection criteria is valid for all PVC pipe materials. For instance, it may not be restrictive enough for the ABS truss pipe.

11. Item 2(i)(C)(ii). The table appears to conflict with the written sentence above it. It indicates that the minimum laying length on each side of the water line crossing is a full pipe length, whereas the written text indicates that only one standard length should be used.

12. Item 2(i)(F). No criteria for loss is given for the test pressure of 15 psig. Is the test to be applied to one section of pipeline that was installed, or is it to be applied to the entire manhole-to-manhole section?

The following are comments regarding the draft rules, Appendix B, for raw sewage lift stations:

1. Item 2(a). I do not think it is always practical or desirable to build lift stations which are expandable

to the long-range or ultimate requirement. It should certainly be considered. There are many instances where full development might not occur until after the useful life of a pump station package.

2. Items 1(b) and 2(b). I suggest making paragraphs the same.

3. Item 2(c)(A). I suggest rewording "Where no specific records exist, ...".

Very truly yours,

Dale A. Cannon

Dale A. Cannon, Manager
Wastewater Collection Department

dmk

WQ Rules
Div 52

JLV

Marquess & Associates, Inc.... CONSULTING ENGINEERS

TELEPHONE: (503) 772-7115

P.O. BOX 490
1120 EAST JACKSON STREET
MEDFORD, OREGON 97501

September 5, 1980

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
SEP 8 1980
WATER QUALITY CONTROL

Department of Environmental Quality
Water Quality Division
Box 1760
Portland, Oregon 97207

Re: Comments on Proposal to Add Water Pollution Control Rules, Division 52, Review of Plans & Specifications

Dear DEQ Staff:

According to your notice of public hearings prepared 8-14-80, comments on the subject proposal are to be forwarded to your office by 9-30-80. We submit the following comments for your consideration.

COMMENTS

Ref. (proposed) OAR 340-52-035(3) and (3)(a): These paragraphs require the design engineer or his authorized representative to "certify" in writing that the construction was inspected by him and found to comply with approved plans and specifications.

We submit that the word "certify" and "certification" have major professional liability implications for all design professional firms. These words may imply an express warranty, which is not the intent of the requirement. It is virtually impossible for any inspector observing a complex construction project to observe every piece of work as installation proceeds.

Certification requirements are, of course, not new. However, professional liability insurers exclude such certifications from coverage, so the design professional cannot comply with the requirement. Attached is a copy of a discussion of this matter, from Hurley, Atkins & Stewart, Inc., design professional insurance brokers, regarding a similar requirement from the Federal Government.

We request that the words "and certification" be removed from 340-52-035(3), and that the second sentence of 340-52-035(3)(a) be changed to read as follows:

"At the completion of the project, he shall declare in writing to the owner and the Department that such construction was observed by him or his authorized agent, and it was, to the best of his information, knowledge, and belief, constructed and completed in accordance with the approved plans and specifications".

Sincerely,

MARQUESS & ASSOCIATES, INC.

Robert L. Gantenbein

Robert L. Gantenbein, P. E.

RLG:ds
Encl.

DIRECTIONS
FOR THE DESIGN PROFESSIONAL

HOW TO AVOID CERTIFICATION

Rec'd Aug., 1980
Chs.

A new addition to the Washington Administrative Code requires a "Certification of Construction" by the engineer. Gerald Weisbach, an attorney with Design Professionals Insurance Company, has explained the inherent risk of the requirement and offers suggestions for modification of the contract for conformance with Professional Liability Insurance. We are taking the opportunity to share this advice with you, which is applicable in both Oregon and Washington.

The Certificate of Construction of Water Pollution Control Facilities, as presently worded, can be construed as a guarantee by the project engineer of all of the work of the general contractor. Clearly, this is an unreasonable requirement.

The certificate requires the engineer to certify that the work of the contractor has been completed in accordance with the plans and specifications and major change orders approved by the Department of Ecology and as shown on the owner's as-built plans.

To certify means "to attest to authoritatively" and may constitute an express warranty. By signing a certification that certain things are so, a design professional makes an assumption of liability which would not be his under common law, nor expected of him by a knowledgeable client.

Such a certification can also create major insurance problems since every underwriter of Professional Liability Insurance in the United States has in its policy of insurance an exclusion of coverage of liability assumed under a contract, including but not limited to, warranties, guarantees, and certifications. Most clients are willing to modify their requirements when this is pointed out to them. In this particular instance, it is most important to explain to the State of Washington that given the complexity of most construction projects, it is virtually impossible for a design professional to ascertain that all work was or will be completed in compliance with applicable laws or with the plans and specifications. The courts hold that a design professional need not be the guarantor of a satisfactory outcome, nor need he be an insurer that the contractor will perform properly in all respects.

The words "certification" and "certificate" should be removed from this form each time they appear, and the paragraph which precedes the engineer's signature should be modified to read as follows:

> I hereby declare that I am the project engineer of the above identified project, that said project was reviewed by me or my authorized agent, and that it was, to the best of my information, knowledge, and belief, constructed and completed in accordance with the plans and specifications and major change orders approved by the Department of Ecology, and as shown on the owner's as-built plans.

We trust you will find this information helpful in revising this and other certification requirements.

JLO

WAKER Associates inc. CIVIL ENGINEERING PLANNING · SURVEYING

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
OCT 6 1980

WATER QUALITY CONTROL

October 1, 1980

Department of Environmental Quality
Water Quality Division
Box 1760
Portland, Oregon 97207

Dear Sir:

Thank you for the information regarding additions to Water Pollution Control Rules. We were pleased to see Section 340-52-015 and 340-52-040 which will provide for exemption of municipalities regarding duplication of effort. The duplication is similar to that which we used to experience in the review of water system plans. We have long felt that review of the plans by a Professional Engineer ought to be sufficient when they were also prepared by a P.E. This is what we have been seeking for a long time. We would like to add our endorsement to the many you have probably already received. Thank you again for this opportunity.

Sincerely,

WAKER ASSOCIATES, INC.

Wilton A. "Bud" Roberts, P.E.
Vice President

WAR/md

VICTOR ATIYEH
GOVERNOR

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. R, January 30, 1981, EQC Meeting

Request for Approval of Sewage Disposal Methods for the Alsea Dunal Aquifer Area in Accordance with the EQC Interim Groundwater Quality Protection Policy Adopted April, 1980.

Background and Problem Statement

During the last few years Lincoln County and Department sanitarians have been concerned about the continued installation of septic tank - drainfield systems in the Bayshore-Sandpiper Subdivisions. These subdivisions are located in Lincoln County near Waldport. The subdivisions happen to be located over the Alsea Dunal Aquifer.

The Alsea Dunal Aquifer has been identified as a small aquifer with a potential use as a drinking water source for the area. The specific yield of the aquifer is relatively small; it is believed to be between 0.5 to 1.5 mgd. No one is presently utilizing the aquifer for drinking water supplies.

The subdivisions were platted in the 1960's into small, urban size lots. Typical lot sizes range between 5,000 to 7,500 square feet. There are scattered, developed lots throughout the subdivision with approximately 300 homes built out of a total of 1,019 lots. In addition, there is a 90 unit condominium complex. The entire development covers approximately 305 acres. An aerial photo of the subdivisions is included under Attachment 1.

The southern part of the Alsea Dunal Aquifer where the Bayshore-Sandpiper Subdivision is located has experienced the greatest problems with high groundwater tables. Standard septic tank-drainfield systems will function in the rapidly draining sands; however, short circuiting and inadequate treatment of the sewage before it enters the groundwater will occur with this type of sewage system.

In response to Lincoln County sanitarians and the Departments concern for the groundwater, the Department requested the county to re-evaluate past site approvals in the southern part of the development. This action caused the Department, in conjunction with Water Resources personnel, to conduct a thorough on-site evaluation of the entire Bayshore-Sandpiper development. During that review several backhoe test pits were excavated. Groundwater was encountered at approximately five (5) feet in the northern portion of the Sandpiper Subdivision. The test pit dug in the southern Bayshore Subdivision encountered no groundwater to ten (10) feet. The soil is unconsolidated dunal sand. Past observations through several winter-summer seasons by Lincoln County sanitarians have shown prediction of water levels by conventional soil profile examination to be unreliable. The most reliable method for predicting water level has been actual winter observations. The results of the Department's field observations were finalized in a report. A copy of that report entitled "On-Site Sewage Disposal Status Report for the Bayshore-Sandpiper Subdivision" is enclosed (Attachment 2).

Alternatives and Evaluation

Department staff have identified five alternatives the Commission may wish to consider in allowing further development on the platted lots within the Bayshore-Sandpiper Subdivisions. The Commission's action is being requested in accordance with the EQC Interim Groundwater Quality Protection Policy adopted April 18, 1980.

1. Direct staff to adopt the highest and best practical treatment standards to protect the Alsea Dunal Aquifer for future drinking water purposes.

   This alternative would require the construction of collection lines and a package sewage treatment plant with discharge to Alsea Bay. The estimated cost to construct collection lines, pump stations and treatment plant for a 0.25 mgd plant would be about $2,000 per lot owner. Adoption of this alternative would place a moratorium on future building in the area until a sewage system was constructed and placed in operation.

   The staff does not feel that these are realistic options because of the level of development that already has occurred and the presence of other reasonable alternatives.

2. Direct staff to allow continued development with standard septic tank-drainfields.

   This alternative would offer the cheapest option to the landowners. These systems would cost about $1,000. It, however, would pose the greatest risk to contaminating the aquifer with high levels of nitrates.

Nitrate levels would be expected to rise to 8 to 10 mg/l range. Present nitrate levels are less than 1 mg/l. U. S. Environmental Protection Agency (EPA) drinking water standards have established 10 mg/l nitrate-nitrogen as the upper limit.

3. Direct staff to require the installation of pressurized drainfield, seepage bed and sand filter systems. These could be used effectively on the majority of the remaining lots. The recommended site suitability standards would be as follows:

   a. Minimum groundwater depths for these systems shall be (3) three feet from the bottom of the disposal trench or bed.

   b. The minimum distance between disposal trenches, center to center, shall be (5) five feet.

   c. Filter fabric shall be used around the filter rock.

   d. Disposal trenches and seepage beds shall be a minimum of 50 feet from surface waters.

   e. Disposal trenches shall be sized at a minimum of 150 square feet per 150 gallons daily waste flow.

   f. Seepage beds shall be sized at a minimum of 200 square feet of bottom area per 150 gallons daily waste flow.

   g. Replacement areas will not be required for site approvals and septic permits.

   h. Sand filter systems without a drainfield (bottomless sand filters) may be used when groundwater depths are a minimum of (1) one foot from ground surface. (Minimum of one (1) foot separation between the bottom of the sand filter and the upper surface of the groundwater).

Results from experimental systems that have been monitored for nitrates indicate a 50 percent reduction in nitrate levels after treatment with pressurized drainfields and sand filter systems. We would estimate nitrate levels in the aquifer to range between 4 to 6 mg/l with the adoption of these type of system standards.

Current estimated costs for pressurized drainfields are $2,000 to $2,500. Sand Filter systems would range from $4,000 to $5,000.

Staff feels the on-site pressurized drainfield, seepage bed and sand filter disposal systems alternative is the most reasonable and practical since it recognizes the present development that has occurred and will allow limited development on the remaining lots of record.

Water Resources staff are in concurrence with this alternative. Alsea Dunal Aquifer is of relatively small volume and yield.

Estimated yield is 0.5 mgd to 1.5 mgd. There are no foreseeable plans to use the aquifer as a drinking water source. Existing and projected needs through year 2000 can be met from surface streams according to officials from the Seal Rock Water District.

4. Direct staff to allow continued development with pressurized drainfield, seepage bed and sand filter system as an interim policy. Hold public hearings in Lincoln County with respect to the permanent policy that ought to be adopted. (i.e. conventional septic tank and drainfield systems, pressurized drainfield - seepage bed - sand filter, sewers - sewage treatment facility).

5. Direct staff to allow continued development on conventional septic tank and drainfield systems up to 500 single family unit equivalents which equates to an input of nitrate-nitrogen of from 4 mg/l to 6 mg/l coupled with an order to install sewers and provide sewage treatment as soon as practicable but by no later than December 31, 1985.

Summation

1. The Bayshore-Sandpiper Subdivisions are platted for urban densities. Existing practices of subsurface sewage disposal are inadequately treating the sewage before it enters the groundwater.

2. The Alsea Dunal Aquifer is relatively small in volume and yield potential. The aquifer is not proposed to be used as a drinking water source through the year 2000. Surface streams are expected to be the principal drinking water sources through the foreseeable future.

3. The Commission could allow continued development of the remaining lots of record within Bayshore-Sandpiper Subdivisions utilizing pressurized on-site sewage disposal systems. This action could be expected to elevate the nitrate-nitrogen levels in the aquifer to the 4 mg/l to 6 mg/l range. These nitrate-nitrogen levels are below the U. S. E.P.A. drinking water standard of 10 mg/l.

4. The Commission has the authority within the Interim Groundwater Protection Policy adopted April, 1980 to approve less stringent sewage treatment standards for areas where urban densities are present and where rapidly draining soils overlay local groundwater bodies. Collection, treatment and disposal of sewage is deemed to be the highest and best practicable treatment and control unless otherwise approved by the Commission.

The Interim Groundwater Protection Policy allows the Commission to permit less stringent controls for a specific area if technical studies show that lesser controls will adequately protect beneficial uses.

Director's Recommendation

Based upon the summation, it is recommended that the Commission authorize the Director to adopt its pressurized drainfield/seepage bed and sand filter system and specific site suitability standards listed under alternative 3 as interim policy and conduct a public hearing as outlined in alternative 4. This sewage treatment standard would apply to all lots of record within the Bayshore-Sandpiper Subdivision. Since this action could be expected to elevate the nitrate-nitrogen levels in the aquifer to the 4 mg/l to 6 mg/l range, the EQC authorizes the Department to conduct a public hearing in Lincoln County to receive public comment on this alternative as well as the other alternatives described in this report.

William H. Young

William H. Young

Attachments: 1. Aerial photos of this subdivisions.
2. On-Site Sewage Disposal Status Report for the Bayshore-Sandpiper Subdivision

CG:g
RG70 (1)
229-5288
January 13, 1980

ATTACHMENT 1

The aerial photos are too large to reproduce. A copy may be inspected at the DEQ Northwest Region Office, 522 Southwest Fifth Avenue, Portland, Oregon. See Jack Osborne, Subsurface Sewage Office.

ATTACHMENT 2

ON-SITE SEWAGE DISPOSAL
STATUS REPORT FOR THE BAYSHORE SANDPIPER SUBDIVISION

INTRODUCTION

The Bayshore Sandpiper subdivisions are located north of the city of Waldport on the northwest side of Alsea Bay in Lincoln County. The subdivisions were originally platted in the mid-1960's. The total number of platted lots is 1,019. Approximate number of lots that have been built on with subsurface sewage disposal systems is 300. In addition, there is a 90-unit motel/condominium in operation at the southeasterly end of the spit.

The Department took several restrictive steps in June 1980 regarding further development on subsurface sewage disposal systems. This action was prompted by difficulties in predicting water table levels in the dunal sands and concerns over the protection of ground and surface water quality. As a result, several hundred site approvals were held in abeyance pending further review of groundwater conditions in the area.

BACKGROUND INFORMATION

The county records indicate approval of Bayshore, Addition 1 on June, 1963, with subsurface sewage disposal systems. The remaining Additions II through VII occurred from January, 1964, through July, 1965. It is interesting to note, that Robert Fatland, County Sanitarian in April of 1966 (copy attached) felt most of Bay Shore should be served by a community sewer system. A package treatment plant was proposed in 1965 and approved in 1966 to serve the motel and the lowland Bay Shore area (approximately 250 homes). The records indicate the motel was subsequently built with septic tank-drainfield system approved by Lincoln County Health Department. For unknown reasons, the package plant was never built. Then, in December, 1968, the package plant concept was resurrected and a DEQ waste discharge permit was issued on January, 1969. Again, for unknown reasons, the package treatment plant was not built. The area which the sewage treatment plant was to serve is approximately the same area which the Department stopped lot site approvals in June of this year. Lincoln County Planning Department currently zones the Bayshore-Sandpiper area as RA single family residential, excluding mobile homes. Minimum lot size is 15,000 square feet with septic systems and public water. There are small areas zoned tourist commercial above and adjacent to the existing motel.

The Bayshore-Sandpiper development is within the city of Waldport urban growth boundary. There is, however, no plans at present to annex and provide community sewers. The entire development is served by the Seal Rock Water District located north of the subdivision. Their water source is a surface stream that reportedly will provide the area's needs for ten to thirty years.

Since the key element of concern is groundwater protection, we requested Kent Mathiot, of Water Resources Department, to evaluate the groundwater aspects. Bob Paeth, Soil Scientist with the Department, evaluated the possible alternative sewage disposal systems which could be used in the area.

As a result of Mr. Mathiot's investigation, a groundwater report was prepared and sent to the Department for consideration. A copy of that report is attached.

KEY POINT OF MATHIOT'S REPORT ARE:

1. The Alsea dune sheet is a fragile natural environment. The dunes are subject to erosion from wind and wave action and their delicate stability and beneficial characteristics can be destroyed by man's activities.

2. The Alsea dune aquifer is highly susceptible to contamination from a variety of sources commonly associated with the residential development on subsurface sewage disposal systems.

3. The water supply capability of the Alsea dune aquifer has not been fully evaluated but, it appears to have potential as a supplemental drinking water source for the Waldport area.

4. The inherent quality of the existing groundwater is good. The present level of development, however, has most likely resulted in localized water quality degradation, especially in the southern portion of the aquifer.

5. The unplatted dunes just north of Sandpiper should be protected as a supplemental groundwater source. Lot densities of at least (1) acre in size with low-pressure distribution systems should be required in this area.

6. Any additional development on the platted lots should incorporate stringent groundwater safeguards, including low-pressure distribution systems/or sand filter systems, prohibiting of subsurface fuel storage tanks, and encouragement of residences to avoid products and practices that could result in groundwater quality degradation.

7. Water Resources recommends that a disclaimer statement be placed on each on-site and septic permit approvals regarding the unstable nature of dune environments, and the susceptibility of some portions of the dunes to severe flooding and/or erosion.

During field reconnaisance along the beach line, several areas showed evidence of nutrient enrichment along the beach and sea cliff. We plan to sample the seeps next summer to determine if there is fecal bacteria contamination coming from the adjacent septic systems. Those homes found to be discharging sewage on the ground surface will have to make repairs. The corrections required may necessitate the installation of a low-pressure distribution drainfield.

OPTIONS AVAILABLE

In our deliberations with Mr. Mathiot, Water Resources Department, we mutually agreed that there appeared to be three possible options available to the unbuilt lot owners. Those options considered were:

1. Package sewage treatment plant to serve the entire Bayshore Sandpiper development. This system would discharge treated effluent to Alsea Bay.

2. Allow installation of on-site low-pressure distribution or sand filter sewage disposal systems. Low-pressure systems should be allowed only where sufficient vertical separation distances could be maintained from the water table.

3. Restrict development to installation of on-site split-waste sewage disposal systems, i.e., compost toilets, and/recirculating toilets with low-pressure distribution systems for gray water waste such as kitchen, bathing and laundry waste waters (as per proposed 1981 rules).

Option No. 2 was generally felt to be the most reasonable alternative since it provides for limited development while reducing the potential negative impact on groundwater and surface water.

CONCLUSIONS

The southern part of the Alsea Dune sheet aquifer, which includes the Sandpiper Bayshore developments, is platted on small lots and a significant development has already occurred. Some (300) homes plus a motel/condominium of 90 units now exists. Approximately (800) individual lots remain unbuilt.

The Water Resources Department is agreeable to allow development on most of the remaining platted lots. Specialized on-site sewage systems can be used where sufficient vertical separation from the groundwater can be found. Ultimate development of the two subdivisions will have a density of approximately 3.35 and 2.67 houses per acre respectively for Bay Shore and Sandpiper.

This level of development will result in increased contaminant loading and decreased recharge to the aquifer. However, the types of on-site sewage systems proposed for future development should reduce the total contaminant loads significantly from the levels that would be generated by standard systems. We do not anticipate any significant increases in fecal contamination of the aquifer or adjacent surface waters will result from further development with pressurized distribution systems. It is also expected that nitrate and other chemical contaminant levels will be tolerable as long as the southern portion of the aquifer is not developed for water supply purposes.

RECOMMENDATIONS

We recommend that the following on-site sewage disposal systems be allowed on the remaining unbuilt, platted lots:

1. Low-Pressure Distribution Systems, e.g. Pressurized Drainfield or Pressurized Seepage Beds.

    a. Minimum groundwater depths for these systems shall be (3) three feet from the bottom of the disposal trench or bed.

    * b. The minimum distance between disposal trenches, center to center, shall be (5) five feet.

    c. Filter fabric shall be used around the filter rock.

    d. Disposal trenches and seepage beds shall be a minimum of 50 feet from surface waters.

    e. Disposal trenches shall be sized at a minimum of 150 square feet per 150 gallons daily waste flow.

    * f. Seepage beds shall be sized at a minimum of 200 square feet of bottom area per 150 gallons daily waste flow.

    g. Replacement areas will not be required for site approvals and septic permits.

2. Sand filter systems without a drainfield (bottomless sand filters) may be used when groundwater depths are a minimum of (1) one foot from ground surface. (Minimum of one (1) foot separation between the bottom of the sand filter and the upper surface of the groundwater).

3. Undeveloped areas on the northern part of the dune sheet should be developed within the new rules that will be adopted early in 1981. These rules will require low-pressure distribution and limit density to one dwelling unit per acre.

GENERAL COMMENTS

Systems may be installed in the variable grade dunes. Some replacement and movement of sand is permissible to provide level grade for disposal trenches.

These types of systems are for non-commercial residential development only. Any application for high flow (greater than 600 GPD) must have the concurrence of the Department.

*Note: Current rules do not allow the Department to reduce the separation distance between disposal trenches. It is anticipated that a rule change will be in place in April of 1981 to allow discretion on trench separation distance. Seepage beds are currently not authorized disposal systems. The same proposed rule change package will allow their usage in 1981.

Permits issued on the fragile dune areas shall require replanting of dune grasses to minimize erosion over the drainfield.

It is strongly recommended that Lincoln County issue a disclaimer statement to each lot approval granted regarding the dangers of building on unstable land forms, i.e. sand dunes.

RDD20 (2)

LINCOLN COUNTY HEALTH DEPARTMENT

COURTHOUSE • NEWPORT, OREGON 97365 • PHONE 265-5341

MESSAGE	REPLY
TO Harold Milliken. Asst Chief Sanitary Engineer OSBH.	DATE 4-8-66
DATE 4-6-66	Enclosed is a copy of the layout of sewers and treatment plant. Due to lack of street names it still is not too clear as to location. It is immediately north of the bridge.
re: Your Letter 3-31-66 Swan-Wooster Engr - Bashore Estates. - Sewage.	
I'm in the dark as to what Part of Bashores 7 Divisions will be served by this Approved System. most all of the Project should be served - Hope this is the plan - without Bldg Permits can do nothing now	
BY R.B. Tatland R.S.	SIGNED Harold E. Milliken

RECIPIENT KEEP THIS COPY, RETURN WHITE COPY TO SENDER

CH9

VICTOR ATIYEH
GOVERNOR

Water Resources Department
MILL CREEK OFFICE PARK
555 13th STREET N.E., SALEM, OREGON 97310 PHONE 378-8455 or 1-800-452-7813

October 16, 1980

MEMORANDUM

Dept. of Environmental Quality
RECEIVED
OCT 20 1980
NORTHWEST REGION

TO: CHARLIE GRAY

FROM: KENT MATHIOT Kent

SUBJECT: ALSEA DUNE SHEET

The following comments are in response to your request for information concerning the hydrogeologic conditions in the area of the Alsea Dune Sheet, and on the general suitability of the dune environment for residential development. My comments are based on a review of pertinent hydrogeologic information and on observations made during a September 23 and 24, 1980 visit to the site.

CONCLUSIONS:

Dune environments are unique, and in their natural state they provide a barrier between the sea and inland areas, constitute excellent ground water aquifers, are very aesthetically pleasing, and provide valuable wildlife habitats. However, the natural state of beach and dune environments and the benefits that can be derived from them can easily be destroyed by improper land use management, and such mismanagement can also endanger the health and welfare of persons living in these areas. The existing development on the Alsea Dune Sheet has significantly degraded the natural environment of that area. If any of the natural benefits of this landform are to be maintained, careful planning and land use management programs must be instigated.

The potential for development of major amounts of ground water from the Alsea Dune Aquifer is limited by the small size (.86 sq mi) of the dune area, and by the threat of poor ground water quality resulting from existing residential development. However, significant portions of the dune sheet are as yet undeveloped, and if adequate steps are taken to limit the affect of future development, the dune aquifer could be maintained as a potential supplemental ground water source.

The dune aquifer is highly susceptible to contamination from surface sources. Contaminants commonly associated with high density residential development include drainfield effluent, runoff from roads, parking lots and driveways, leaking underground fuel storage tanks, dumping or spillage of crankcase oil and other normal household products, and fertilizer and pesticides from gardening and landscaping activities. Contaminated ground water in the dune aquifer will eventually reach and degrade the water quality of the interdune lakes, boat canal, beach seeps, springs and creeks, and to a lesser degree, the quality of water in the near shore areas on the bayside of Alsea Spit.

In addition to the direct contamination of ground water, high density development will significantly reduce the amount of ground water recharge, and thereby increase the impact of the contaminant load.

RECOMMENDATIONS:
Existing conditions of land ownership, and building permit status need to be considered, but the effective total density of development on the dune area should be kept as low as possible. In addition, low pressure distribution (or similar systems) of septic tank effluent should be required on every new facility. Low pressure distribution of effluent has been shown to be an effective disposal and treatment method in rapid draining materials. Test results have shown dramatic reduction in bacterial levels and BOD and a 50% reduction in nitrate levels.

In areas that have not as yet been subdivided, low pressure distribution and a maximum effective density of one dwelling unit per acre should be required.

In addition, the following programs should be carried out:

(1) The water quality of beach springs and streams in the dune area should be checked. If fecal bacteria are detected, a program of dye testing, and where necessary, repairing of failing systems with low pressure systems should be instigated.

(2) Installation of underground fuel storage tanks should be prohibited.

(3) All home owners in the area should be provided with a written description of the nature of dune aquifers, and should be requested to avoid products and practices that could increase the potential for ground water contamination.

(4) An Attorney General's determination should be made of the DEQ's liability in issuing sub-surface permits on a potentially unstable landform. A permit liability disclaimer may be required.

(5) Consideration should be given to requiring future developers of the remaining large parcels of the dune sheet to develop additional detailed information on the hydrogeologic characteristics of the dunal aquifer.

PREVIOUS WORK:
A definitive study of the aquifer characteristics or water supply potential of the Alsea Dune Aquifer has not been conducted. Both Schlicker, 1973 and Frank, 1977 report that the aquifer has potential as a future source of water supply, but neither of these reports include any drilling or aquifer test data. Rohleder, 1980 estimates that a potential 0.5mgd of ground water is available from the southern portion of the dune sheet, but again, the report contains little or no quantitive information on aquifer characteristics.

GEOLOGY:
For purposes of this report the Alsea Dune Sheet is defined as all the land situated between Highway 101 and the Pacific Ocean, and between Driftwood Beach Wayside and the southern tip of the Alsea Bay Spit. The entire area is covered with dune sand ranging in thickness from a few feet to more than 100 feet.

The wind blown deposits are underlain by an undetermined thickness of unconsolidated to semiconsolidated Quaternary marine terrace alluvium, that consist of relatively flat lying layers of sand and silty sand. The upper foot or eighteen inches of the terrace deposits commonly contain considerable organic matter. The contact between the dune sands and the underlying marine terrace sediments is exposed along nearly the entire length of the seaward edge of the dune sheet at a height of five to ten feet above the summer beach. However, along the southern portion of the dunes this contact dips below beach level, and the low sea cliff gives way to an active foredune - typical of a coastal sand spit environment.

The bottom contact of these terrace sediments is not exposed in the dune area, but it is anticipated that they have been deposited on a terrace platform cut into the underlying marine sedimentary bedrock.

HYDROLOGY:
There is little or no ponding or runoff of precipitation that falls on a dune surface. As a result, surface water features normally occur only in those areas where the surface of the dune intersects or drops below the water table. The series of lakes along the eastern edge of the Alsea Dune Sheet, and Buckley Creek that drains the northern most of those lakes, are examples of such features.

There are numerous seeps and springs that break out along the sea cliff at the interface between the dune sands and the marine terrace deposits. These discharges feed the small creeks that flow along the sea cliff and across the beach to the ocean. A considerable amount of ground water was being discharged in this manner at the time of my September 1980 visit to the area.

GEOLOGIC PROCESSES:
The Alsea Dune Sheet is an environment in a state of delicately balanced dynamic equalibrium. Geologically, this landform is in its infancy, and constantly changing in response to variations in sediment supply and transport, vegetation patterns, wind and wave action and other natural forces that are not predictable or even clearly understood.

The shoreline, spit, fore, dune, and deflation plains are subject to wind and wave erosion and accretion, and to wave overtopping and flooding from major storm waves or tsunamis. The active upland dune areas are subject to wind erosion and accretion, and the stabilized dune areas can become reactivated if vegetative cover is removed or otherwise destroyed.

HYDROGEOLOGY:
Although there is little specific information available on the Alsea Dune Aquifer, considerable information has been developed on similar dune aquifers along Oregon's coastline.

Approximately 60% of the precipitation that falls on the dunes can be expected to percolate downward to the water table. It is anticipated that the area of highest water table elevation in the Alsea Dune Aquifer is beneath the central, highest portion of the dunes, and that ground water flow is outward in a more or less radial pattern from that area. This results in ground water being discharged to surface water features around the perimeter of the dune sheet.

Along the northern and central Oregon coast, approximately 2mgd of ground water per square mile can be withdrawn from dune aquifers of adequate thickness without upsetting the recharge and discharge balance of the natural ground water system and related surface water features. The thickness of the dune sands and marine terrace sediments that make up the Alsea Dune Aquifer has not been established. However, it is anticipated that a major portion of the .86 square mile dune complex could be developed, with the available ground water supply ranging between .5 and 1.5mgd.

The inherent quality of ground water in Oregon's dunal aquifers is, for the most part, quite good. However, it is probable that existing development (approximately 1 du/acre) on standard subsurface systems has degraded ground water quality in the southern portion of the Alsea Dune Aquifer. This level of development utilizing standard drainfield systems in rapid draining materials can be expected to cause localized problems with elevated levels of nitrate, and bacterial contamination. Since the number of developed lots is less than one-third the number of lots available for development, the problem can be expected to increase significantly if steps are not taken to reduce the potential contaminant load.

cc: Bob Paeth
John Smits
Bill Zekan

VICTOR ATIYEH
GOVERNOR

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. R, January 30, 1981, EQC Meeting

Addendum to Staff Report

After further review of this Agenda Item, staff and legal counsel have concluded that the recommendation is procedurally incorrect. The Department's recommendation would result in the Commission, in effect, waiving some of its rules for subsurface sewage disposal, as they affect the area in question. A waiver of rules is inappropriate. The Commission may adopt, may amend, may repeal, and may grant variances to rules, but they may not grant waivers to rules.

It appears to staff that the appropriate procedure to deal with this situation is a geographic area rule similar to the River Road/Santa Clara area and Florence Dunal Aquifer area rules.

A proposed rule has been developed and is attached as Appendix "A".

The proposed geographic area rule adapts the site suitability proposals set forth in Alternative 3 into the style and language of the new subsurface rule package. In this process, two provisions of Alternative 3 were deleted:

(1) Specific reference to disposal trenches was deleted because their construction is impractical due to the lot size, soil conditions, and line spacing that would be required. The seepage bed would take no more area and should be easier to construction.

(2) The provision eliminating the requirement for a replacement area was deleted because it appears possible to have both the initial system and replacement area on even the smallest lots.

Recommendation

It is recommended that the Director's recommendation in Agenda Item R be amended to read as follows:

Based upon the Summation, it is recommmended that the Commission authorize a public rule making hearing to be held in Waldport, to take testimony on the question of whether to adopt a permanent Geographic area rule for the lands overlaying the Alsea Dunal Aquifer area in Lincoln County, namely proposed rule OAR 340-71-400(3) as set forth in Appendix A.

Bill

William H. Young

Attachment: 1
Appendix A, Proposed Rule 340-71-400(3)

TJO:l
XL274 (1)
229-6218
January 23, 1981

Proposed Rule

340-71-400(3): Lands Overlaying the Alsea Dunal Aquifer.

(a) Within the area set forth in OAR 340-400(3)(c), the Agent may issue a construction permit for a new on-site sewage disposal system or a favorable report of evaluation of site suitability to construct a single on-site system on lots that were lots of record prior to January 1, 1981; or on lots in partitions or subdivisions that have received preliminary planning, zoning, and on-site sewage disposal approval prior to January 1, 1981, providing one of the following can be met:

(A) The lot complies with all rules in effect at the time the permit or favorable report of site suitability is issued; or

(B) The lot is found through site evaluation not to comply with all rules, but does meet all of the following when a pressurized seepage bed is utilized:

(i) Groundwater levels shall not be closer than four (4) feet from the ground surface or closer than three (3) feet from the bottom of the seepage bed.

(ii) The seepage bed shall be constructed in accordance with OAR 340-71-275(4) and (5).

(iii) The seepage bed shall be sized on the basis of two hundred (200) square feet of bottom area per one hundred fifty (150) gallons projected daily sewage flow.

(iv) Projected daily sewage flows shall be limited to not more than four hundred fifty (450) gallons per lot. New systems for lots of record prior to March 1, 1978, which are inadequate in size to accommodate a four hundred fifty (450) gallons per day sizing may be sized on the basis of three hundred (300) gallons per day, plus seventy-five (75) gallons per day for the third bedroom.

(v) All setbacks identified in Table 1 can be met, except that lots of record prior to May 1, 1973, shall maintain a minimum fifty (50) feet separation to surface public waters.

(vi) Sufficient area exists on the lot to install a seepage bed and a replacement seepage bed. The area reserved for replacement may be waived pursuant to the exception in OAR 340-71-150(4)(a)(B).

(C) The lot is found through site evaluation not to comply with all rules, but does meet all of the following when a conventional sand filter without a bottom is utilized:

(i) Groundwater levels shall not be closer than one (1) foot from the ground surface or closer than one (1) foot from the bottom of the sand filter.

(ii) Sewage flows shall be limited to not more than four hundred fifty gallons per day per lot.

(iii) The sand filter bottom area shall be four hundred (400) square feet.

(iv) The conventional sand filter without a bottom shall be constructed in accordance with OAR 340-71-295(3).

(v) All setbacks identified in Table 1 can be met, except that lots of record prior to May 1, 1973, shall maintain a minimum fifty (50) feet separation to surface public waters.

(vi) Sufficient area exists on the lot to install a bottomless conventional sand filter and a replacement bottomless conventional sand filter. The area for replacement may be be waived pursuant to the exception contained in OAR 340- 71 -150(4)(a)(B).

(b) Within the area set forth in OAR 340-400(3)(c), for lots created on or after January 1, 1981, and/or when the on-site system will serve a commercial facility, the Agent may issue a construction permit for a new on-site sewage disposal system or a favorable report of evaluation of site suitability if it is determined that all rules of the Commission can be met.

(c) The Alsea Dunal Aquifer is defined as all the land bounded on the East by Highway 101, the Pacific Ocean on the West, and from Driftwood Beach Wayside South to the southern tip of the Alsea Bay Spit.

XL275 (1)

VICTOR ATIYEH
GOVERNOR

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. S, January 31, 1981, EQC Meeting

208 Plan Recertification

Background

The 208 program has been brought before the Commission on numerous occasions. Important actions taken by the Commission include approval of completed 208 plans in November 1978 (volume V, VI and VII of the Statewide Water Quality Management Plan), and a subsequent update of the 208 plans in August 1979 (Modifications to Volumes V and VI). In each case, following Commission approval, the Governor took formal actions to certify the plans. The formal 208 plan certification by the Governor is an EPA requirement. After the Governor certification, EPA formally approved the plans.

Existing 208 plans are required to be updated periodically. In the future, updates will be made on an annual basis, along with the addition of new plan elements. These plan updates require Commission approval and, again, formal recertification by the Governor.

Several 208 plans have been updated and changes have been noted for Commission approval. The plan updates have been made by the four areawide 208 agencies (Metropolitan Service District--Metro, Mid-Willamette Valley Council of Governments--MWVCOG, Lane Council of Governments--L-COG, and Rogue Valley Council of Governments--RVCOG), and by the three forestry agencies (Oregon State Department of Forestry--OSDF, Bureau of Land Management--BLM, and U.S. Forest Service--USFS).

Plan updates by the areawide agencies are presented in Attachment 1. In each case, the update results from the completion of agreed upon work items or conditions for each plan element which were enumerated through approval of the initial 208 plan. In those cases where all agreed on work items are completed, the recommendation is for full certification of the plan element.

Updates of the forestry agencies' plans do not include any specified changes. The program reviews for each agency, are presented in Attachment 2, along with staff recommendation for recertification.

Evaluation

Following is a description of the various 208 plan updates for the 208 areawide agencies and the forestry agencies:

A. 208 Areawide Agencies--Attachment 1. Attachment 1 presents plan updates for each major planning element and in addition, a summary which shows existing certification status by element and where EQC actions on plan element modifications are requested. Where changes are recommended, the change is from conditional to full certification. In most cases, the requested modifications are "housekeeping" in nature with only minor changes requested.

   1. Metropolitan Service District--Metro

      a. Sewage Works Master Plan. This plan element was given conditional certification with the requirement that the plan be adopted by Metro Council action and further that an analysis of regionalization potential of the Gresham, Troutdale and Multnomah County Sewage Treatment Plants be undertaken. The plan was adopted and the regionalization analysis was completed. The regionalization analysis recommended independent expansion of the Troutdale, Gresham and Multnomah County Sewage Treatment Plants, but that future facility planning for the area should include analysis of potential for regional administration, regional operation and maintenance, and regional sludge disposal and finance.

      b. Sludge Disposal Management. This plan element was conditionally certified with the request that the plan be adopted by Council action and that the Portland sludge disposal program be acceptable to EPA. Both conditions were met.

      c. Combined Sewer Overflows. This plan element was conditioned with the requirement that a consistent policy be agreed on by EPA and DEQ for determining grant eligibility for combined sewer overflow problems. A consistent policy has been established.

d. Public Involvement. The agency was requested to continue public involvement in 208 activities. This condition has been met.

2. Mid-Willamette Valley Council of Governments--MWVCOG

a. Municipal Waste Treatment. This plan element was conditionally certified contingent on a plan update consistent with new population projections and LCDC approved urban growth boundaries. The MWVCOG is meeting this condition by updating sewerage plans as urban growth boundaries are adopted by LCDC.

b. Individual Waste Disposal. This element was conditionally certified with the requirement that an acceptable plan be prepared for a community sewage collection and treatment system at Grand Ronde. This conditon has been met by the formation of a sanitary district in Grand Ronde and the submittal of a 201, Step 1, grant application to DEQ.

c. Erosion and Sediment Control. This plan element was conditionally certified with the provision that management agencies at the state and local level be designated for implementing agricultural nonpoint source control programs. This condition has substantially been met.

d. Public Involvement. The MWVCOG was required to continue public involvement in 208 activities. This condition has been met.

3. Lane Council of Governments--L-COG

a. Municipal Waste Treatment. This plan element was conditionally certified with the requirements that a viable program be established to solve septic system problems in Dexter and that L-COG aid Lowell in evaluation of facility plan options. The condition has been met through creation of the Dexter Sanitary District and adoption by the City of Lowell, of a compliance plan to upgrade their sewage treatment facility.

b. Water Quality Protection. This plan element was conditionally certified with the requirement that water quality planning be coordinated with other urban and suburban planning such as population density and land use. This requirement is being met on an ongoing basis by L-COG's involvement in review of local comprehensive plans and through L-COG's involvement in local water quality problems.

c. Public Involvement. L-COG was required to continue public involvement in 208 activities. This condition has been met.

4. Rogue Valley Council of Government--L-COG

a. Ashland Watershed Management. This plan element was conditionally certified with the requirement that RVCOG insure that the U.S. Forest Service adopt and implement long-range plans for the management of the Ashland Watershed by 1981. RVCOG has been relieved of this responsibility by EPA. The City of Ashland is now working directly with the U.S. Forest Service to insure that the Forest Service adopts a management program which will endeavor to protect Ashland's water supplies.

b. Public Involvement. The RVCOG was required to continue public involvement in 208 activities. This condition has been met.

B. Forestry Agencies--Attachment 2 Attachment 2 includes three reports describing the Department's annual review of programs carried out by the Oregon State Department of Forestry (OSDF), Bureau of Land Management and U.S. Forest Service. In each case a full recertification of agency programs is recommended.

1. Review of Oregon State Department of Forestry (OSDF) Silviculture Program.

A field review of the OSDF program was carried out by a technical work group consisting of staff from OSDF, DEQ, and Department of Fish and Wildlife. The conclusions of the work group are as follows:

a. Forest operators are satisfactorily complying with the Forest Practices rules.

b. The Forestry Department effectively administers the Forest Practices rules and program.

c. Compliance with the Forest Practices Rules meet, to a high degree, Oregon's water quality goals.

d. Current rules and program administration deal adequately with real and potential impacts of forest practices on water quality and fishery habitat conditions.

2. Review of Bureau of Land Management (BLM) Program.

An all-day review meeting was scheduled with BLM and DEQ staff. The DEQ staff evaluated the BLM's Water Resources Management Plan, the inventory, planning and implementation programs, the Best Management Practices, and the water quality monitoring program. The DEQ staff consensus is that the BLM is meeting the requirements of state law (ORS 468) and federal law (PL95-217, the Clean Water Act as amended).

3. Review of U.S. Forest Service (USFS) Program.

A lengthy review meeting was scheduled with DEQ and USFS staff to evaluate the USFS program. The DEQ evaluated the USFS Water Quality Management Plan, the inventory of water quality problems, planning and implementation program, identified Best Management Practices and the water quality monitoring program. The DEQ staff consensus is that the USFS is meeting the requirement of state law (ORS 468) and federal law (PL95-217 as amended).

Summation

1. The Commission approved the initial 208 plans as Volumes V, VI, and VII, of the Statewide Water Quality Management Plan, in November 1978.

2. The Commission approved an update of the 208 plans as amendments to Volumes V and VI, in October 1979.

3. The 208 plans prepared by 208 areawide agencies and by state and federal forestry agencies are proposed for recertification.

4. Attachment 1 summarizes the major 208 areawide agency plan elements along with proposed modifications.

5. Attachment 2 presents a review of forestry agency programs, along with staff recommendations for recertification.

6. The Commission must approve the recertification actions prior to transmittal to the Governor.

7. The 208 plan recertification must be transmitted by the Governor to EPA for approval.

Director's Recommendation

The Director recommends that the Commission:

1. Approve Attachments 1 and 2 as recertification of 208 areawide agency plans and state and federal forestry agency programs.

2. Authorize the Director to submit the recertification documents to the Governor for transmittal to EPA for approval.

Bill

William H. Young

Attachments: 2
Attachment 1. 208 Areawide Agencies' Proposed Recertification Action
Attachment 2. Designated Forestry Management Agencies, Program Evaluation Reports and Proposed Recertification Action

Thomas J. Lucas:l
229-5284
January 6, 1981
TL189 (1)

Attachment 1

208 AREAWIDE AGENCIES

PROPOSED RECERTIFICATION ACTIONS

Metropolitan Service District

Summary of Proposed Recertification Actions

	Plan Element	Existing Certification Status as per EQC Action November 1978	Requested Modification
1.	Sewage Works Master Plan	Conditional	Full Certification
2.	Sludge Disposal Management	Conditional	Full Certification
3.	Urban Stormwater Runoff	Conditional	None
4.	Combined Sewer Overflows	Conditional	Full Certification
5.	Septic Tank Management	Not Applicable	None
6.	Construction	Not Applicable	None
7.	Nonpoint Sources (Tualatin River)	Full Certification	None
8.	Nonpoint Sources (Silviculture)	Not Applicable	None
9.	Nonpoint Sources (Agriculture)	Not Applicable	None
10.	Mining	Not Applicable	None
11.	Hydrologic Modification	Not Applicable	None
12.	Saltwater Intrusion	Not Applicable	None
13.	Public Participation	Conditional	Full Certification

Areawide -	Metro
Plan Element-	Municipal Waste Treatment
Certification Status -	Conditional Certification
Conditions/Work Commitments -	1. Adopt Sewerage Works Master Plan - June, 1978. 2. Complete analysis of proposals for STP consolidation and regionalization. 3. Adopt effluent disposal plan for Washington County - June, 1978. 4. Adopt management agency designations - June, 1978. 5. Adopt treatment and collection system service areas - June, 1978.
Accomplishments -	1. Sewerage works Master Plan adopted by Metro - October, 1978. 2. Sewer consortium (Multnomah County, Gresham, Troutdale) formed in December 1977. An evaluation was carried out comparing the capital and O & M costs of a regional STP against independent expansion of existing STP's in the region. The cost differences between the two alternatives were insignificant. The independent expansion alternative was found to be superior according to the criteria of implementability. The independent expansion alternative was adopted by Metro Council action in December 1980. 3. Effluent disposal plan adopted by Metro - October, 1978. 4. Management agency designations adopted by Metro - October, 1978. 5. Treatment and collection system service areas - adopted by Metro - October, 1978.
Work to be Completed -	None under Section 208. An additional work plan task should be added to Sewer Consortium Section 201 Feasibility Study to evaluate the potential of regional administration, operation, sludge disposal and finance for the three independent plants.
Recommendation -	Full Certification.

Areawide -	Metro
Plan Element -	Sludge Disposal Management
Certification Status -	Conditional
Conditions/Work Commitments -	1. EPA acceptance of Portland sludge disposal plan.
	2. CRAG adopt Sludge Disposal Management component of Sewerage Works Master Plan - June, 1978.
Accomplishments -	1. Approved by EPA, March, 1979; City of Portland to proceed with implementation.
	2. Adopted by CRAG - June, 1978; Adopted by Metro - October, 1980.
Work to be Completed -	None
Recommendation -	Full Certification

Areawide -	Metro	
Plan Element -	Urban Stormwater Runoff	
Certification Status -	Conditional Certification	
Conditions/Work Commitments -	1.	USGS to complete final interpretive report covering rainfall/runoff monitoring.
	2.	Metro has initiated a recent urban runoff study which will not be completed until December, 1981.
Accomplishments -	1.	The Technical Supplement #4 completed in 1978 and titled "Analysis of Urban Stormwater Quality From Seven Basins in the Portland Area, Oregon."
Work to be Completed -	1.	Complete the present urban runoff project on Johnson Creek.
Recommendation -	Conditional Certification	

Areawide -	Metro
Plan Element -	Combined Sewer Overflows
Certification Status -	Conditional Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	Resolve the following issues: 1. EPA policy in construction grants to abate pollution from combined sewer overflow. 2. DEQ Policy on combined sewer overflow as a part of its statewide waste quality management program.
Recommendation -	Full certification based upon the combined sewer overflow policy implemented through the 201 construction grants program.

Areawide -	Metro
Plan Element -	Nonpoint Sources (Tualatin River)
Certification Status -	Full Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommended -	Full Recertification

Areawide -	Metro
Plan Element -	Public Participation
Certification Status -	Conditional Certification
Conditions/Work Commitments -	None
Accomplishments -	Integration of public involvement in all new planning elements.
Work to be Completed -	Continue to integrate public involvement activities.
Recommendation -	Full Certification

Mid Willamette Valley Council of Governments

Summary of Proposed Recertification Actions

	Plan Element	Existing Certification Status as per EQC Action November 1978	Recommended Requested Modification
1.	Municipal Waste Treatment	Conditional	Full Certification
2.	Individual Waste Disposal	Conditional	Full Certification
3.	Erosion and Sediment Control	Conditional	Full Certification
4.	Urban Runoff	Conditional	None
5.	Public Participation	Conditional	Full Certification
6.	Industrial Wastes	Full Certification	None
7.	Infiltration/Inflow	Full Certification	None
8.	Sludge Disposal Management	Full Certification	None
9.	Construction	Not Applicable	None
10.	Saltwater Intrusion	Not Applicable	None
11.	Mining	Not Applicable	None
12.	Silviculture	Not Applicable	None
13.	Hydrologic Modification	Not Applicable	None

Areawide -	Mid Willamette Valley Council of Governments
Plan Element -	Municipal Waste Treatment
Certification Status -	Conditional Certification
Conditions/Work Commitments -	DEQ Conditions 1. Review projections as urban growth boundaries are adopted locally and approved by LCDC. 2. Review service areas as urban growth boundaries are adopted locally and approved by LCDC. 3. Review and update the Master Plan on an annual basis through MWVCOG Board Action. Revision to include new construction grant priority criteria adopted by the EQC May, 1978. EPA Condition 1. Develop and adopt a schedule and procedure for city and county adoption of the Master Sewer Plan and incorporation of the Master Sewer Plan into their comprehensive plans.
Accomplishments -	1. Population projections have been submitted to EPA. 2. Master plan is being updated as local governments complete their comprehensive plans. 3. Procedure for referencing Master Plan established with local communities.
Work to be Completed -	Review and update the Master Plan when population projections are finalized.
Recommendation -	Full Certification

Areawide -	Mid Willamette Valley Council of Governments
Plan Element -	Individual Waste Disposal
Certification Status -	Conditional Certification
Conditions/Work Commitments -	EPA Conditions
	1. Develop and obtain community acceptance of financial plan for constructing, operating and maintaining a community sewage collection and treatment system for Grande Ronde.
	2. Develop management mechanisms and propose a countywide septic tank program (inspection and maintenance) for county adoptions.
Accomplishments -	1. Established Sanitary District in Grande Ronde and the submittal of a Step 1 Grant to the DEQ.
	2. Model inspection/maintenance ordinance formally discussed by each county.
Work to be Completed -	None
Recommendation -	Full Certification

Areawide -	Mid Willamette Valley Council of Governments
Plan Element -	Erosion and Sediment Control
Certification Status -	Conditional Certification
Conditions/Work Commitments -	EPA Conditions 1. DEQ shall, in the context of the statewide agricultural program, determine and assign planning and implementation responsibilities for conducting an agricultural control program in the MWVCOG area by March 1, 1979. 2. DEQ shall ensure the completion and implementation of the Soil Erosion and Sediment Control subplan (including Marion County) in conformance with the statewide agriculture program by FY 1980.
Accomplishments -	Designation of the State Soil and Water Conservation Commission as the State Agriculture NPS Management Agency. COG is now working to designate the local management agencies.
Work to be Completed -	Designation of the local management agency.
Recommendation -	Full certification upon designation and approval of the local management agencies.

Areawide -	Mid Willamette Valley Council of Governments
Plan Element -	Urban Runoff
Certification Status -	Conditional Certification
Conditions/Work Commitments -	None
Accomplishments -	Initiated urban runoff study
Work to be Completed -	Complete the present 208 urban runoff study being conducted by the City of Salem.
Recommendation -	Conditional Certification until present urban runoff study is completed and the implementation plan is adopted.

Areawide -	Mid Willamette Valley Council of Governments
Plan Element -	Public Participation
Certification Status -	Conditional Certification
Conditions/Work Commitments -	None
Accomplishments -	Integrated public involvement program into new planning projects.
Work to be Completed -	Continue to integrate public involvement into all new planning projects.
Recommendation -	Full Certification

Areawide -	Mid Willamette Valley Council of Governments
Plan Element -	Industrial Wastes
Certification Status -	Full Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommendation -	Full Recertification

Areawide -	Mid Willamette Valley Council of Governments
Plan Element -	Sludge Disposal Management
Certification Status -	Full Certification. Future sludge disposal planning, management and implementation can be adequately covered under 201 facilities plans.
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommendation -	Full Recertification

Areawide -	Mid Willamette valley Council of Governments
Plan Element -	Infiltration/Inflow
Certification Status -	Full Certification. Infiltration/inflow planning, management, and implementation covered under 201 facilities plans.
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommendation -	Full Recertification.

Lane Council of Governments

Summary of Recertification Actions

Plan Element		Existing Certification Status as per EQC Action November 1978	Requested Modification
1.	Municipal Waste Treatment (Eugene-Springfield Metro)	Full Certification	None
2.	Comprehensive Sewerage (Facility Review)	Conditional	None
3.	Municipal Waste Treatment (Lowell-Dexter)	Conditional	Full Certification
4.	Municipal Waste Treatment (Coburg Facilities Plan)	Conditional	None
5.	Sludge Disposal	Full Certification	None
6.	Infiltration/Inflow	Full Certification	None
7.	Industrial Wastes	Conditional	None
8.	Individual Waste Disposal	Conditional	None
9.	Water Quality Protection	Conditional	Full Certification
10.	Nonpoint Source (Silviculture)	Not Applicable	None
11.	Mining	Not Applicable	None
12.	Nonpoint Sources (Agriculture)	Conditional	None
13.	Hydrologic Modifications	Not Applicable	None
14.	Construction	Not Applicable	None
15.	Urban Runoff	Conditional	None
16.	Public Participation	Conditional	Full Certification

Areawide -	Lane Council of Governments
Plan Element -	Municipal Waste Treatment (Eugene-Springfield Metro)
Certification Status -	Full Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommendation -	Full Recertification

Areawide -	Lane Council of Governments
Plan Element -	Comprehensive Sewerage Facility Review
Certification Status -	Conditional Certification
Conditions/Work Commitments -	Investigation of regional O & M alternatives. Action dependent on revision of construction priorities and 1977 Clean Water Act Amendments. Complete O & M Alternative Study by October, 1978. Develop wasteload projections for municipal and industrial point sources in FY 79. Prepare a community by community waste treatment (sewerage) update including needs identification for small unincorporated communities. Where priority needs are identified, planning will be completed and corrective decisions made.
Accomplishments -	Investigation of regional O & M alternatives complete in 1978. Community by community waste treatment update including needs identification is complete in draft form. Final report scheduled for January, 1981. Construction grant priority needs and nonpoint source control needs updated on annual basis. Projects are initiated as 208 funds are available.
Work to be Completed -	Complete wasteload projections for municipal and industrial point sources, consistent with urban growth boundaries, in FY 1981.
Recommendation -	Conditional Certification

Areawide -	Lane Council of Governments
Plan Element -	Municipal Waste Treatment (Lowell-Dexter)
Certification Status -	Conditional Certification
Conditions/Work Commitments -	Assist Lane County efforts to find a viable solution to existing septic system problems in Dexter. Aid Lowell in evaluation of facility plan and regionalization options at appropriate (5 year) intervals.
Accomplishments -	Creation of the Dexter Sanitary District. Adoption by the City of Lowell of a "Compliance Plan" in mid-1980 which will lead to the step wise upgrading of their facility.
Work to be Completed -	None
Recommendation -	Full Certification

Areawide -	Lane Council of Governments
Plan Element -	Municipal Waste Treatment (Coburg Facilities Plan)
Certification Status -	Conditional Certification
Conditions/Work Commitments -	Investigate with City of Coburg the possible methods for implementation of the management ordinance and produce a management plan.
Accomplishments -	The investigation was performed and recommendations made to the City.
Work to be Completed -	Implement management plan.
Recommendation -	Conditional Certification

Areawide -	Lane Council of Governments
Plan Element -	Sludge Disposal
Certification Status -	Full Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommendation -	Full Recertification

Areawide -	Lane Council of Governments
Plan Element -	Infiltration/Inflow
Certification Status -	Full Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommendation -	Full Recertification

Areawide -	Lane Council of Governments
Plan Element -	Industrial Wastes
Certification Status -	Conditional Certification
Conditions/Work Commitments -	1. Investigation of industrial runoff impacts. 2. Integrate industrial runoff management into Urban Runoff planning.
Accomplishments -	Not Applicable
Work to be Completed -	The present urban runoff project is completing the evaluation of several urban runoff elements including industrial nonpoint sources.
Recommendation -	Conditional Certification

Areawide -	Lane Council of Governments
Plan Element -	Individual Waste Disposal
Certification Status -	Conditional Certification
Conditions/Work Commitments -	1. Complete O & M Manual by October, 1978. 2. Develop and adopt enabling ordinance for community management of septic and alternative on-site systems by October, 1978. 3. Develop program for groundwater investigation and protection in River Road/Santa Clara; subject to federal funding. Work to begin about October, 1978 and complete by April, 1980.
Accomplishments -	1. The River Road and Santa Clara Groundwater Study was completed in April, 1980. 2. Intergovernmental Agreement signed between the EQC and Lane County identifying the actions necessary to protect the aquifer. 3. Lane County published a Septic Tank Management booklet for the general public.
Work to be Completed -	None
Recommendation -	Full Certification

Areawide -	Lane Council of Governments
Plan Element -	Water Quality Protection (Continuing Planning)
Certification Status -	Conditional Certification
Conditions/Work Commitments -	Coordinate water quality planning with comprehensive metropolitan and suburban plans.
Accomplishments -	L-COG, DEQ and EPA met in April of this year and reviewed planning and implementation. L-COG submitted its annual certification review report in October. L-COG has an ongoing interest to coordinate water quality management planning with comprehensive metropolitan planning which ranges from considerations of population density and urban runoff to the effect of urban service boundaries on development of protection measures for the Riverwood/Santa aquifer.
Work to be Completed -	Coordinate comprehensive planning and water quality protection. Develop basin specific protection plans as needed.
Recommendation -	Full Certification

Areawide -	Lane Council of Governments
Plan Element -	Nonpoint Sources (Agriculture)
Certification Status -	Conditional Certification
Conditions/Work Commitments -	None
Accomplishments -	1. The Governor has designated the State Soil and Water Conservation Commission as the Statewide Agriculture NPS management agency. 2. BMP review and approval process has been established by DEQ.
Work to be Completed -	The future planning needs include: 1. Define problems and establish priorities based on data. 2. Coordination of State DEQ, SCS/SWCD, and RC&D 208 roles. 3. Development and implementation of agriculture BMP's.
Recommendation -	Conditional Certification

Areawide - Lane Council of Governments

Plan Element - Urban Runoff

Certification Status - Conditional Certification

Conditions/Work Commitments -

1. Inventory existing and potential special problems, control options,jurisdictions and responsibilities.

2. Inventory existing management practices, e.g., street cleaning.

3. Develop recommended BMPs and urban runoff policies.

4. Agreements for designation of management agencies.

5. Adopt BMPs for urban runoff by FY 1980.

6. Develop basin specific management plans by FY 1980.

7. Adopt special management plans for construction and industrial runoff by FY 1981.

Accomplishments -

1. Extensive monitoring of base and storm runoff water quality at twenty sites in Eugene and Springfield. Flow gauging at the above sites. Water sample analysis includes, metals, pesticides, organic carbon and oil and grease as well as standard water quality parameters. Four rain gauges provide information on spatial variation of rainfall.

2. Installation and monitoring of BMP pilot practices for vegetation management and sediment detention in Eugene and oil removal from industrial runoff in Springfield.

3. Construction and erosion control ordinances have been analyzed by a consultant. This analysis includes evaluation of permit and enforcement processes and potential improvements in the process of benefit to water quality.

4. Samples were taken to analyze the constituents of street dirt as well as its contribution to runoff and air quality problems in Springfield. The effectiveness of current street sanitation practices was evaluated also.

5. A consulting firm was hired to help Eugene and Springfield develop a financial management program to provide implementability to cost effective city wide programs for reducing pollution from urban storm runoff.

6. The 208 AAC formed a subcommittee to develop Public Service Announcements and other information to increase awareness of urban runoff pollution and of individual actions that can be taken at home and business to reduce pollution. Another subcommittee will follow the financial management plan development.

7. Basic watershed information and model selection criteria were developed to increase the ability to use computers in urban runoff management decision making.

Work to be Completed - Beyond the specific accomplishments listed, LCOG still needs to complete the work tasks listed in its present urban runoff project which embodies the work commitments listed.

Recommendations - Conditional Certification

Areawide -	Lane Council of Governments
Plan Element -	Public Participation
Certification Status -	Conditional Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	Continue to integrate public involvement into all new planning elements.
Recommendation -	Full Certification

Rogue Valley Council of Governments

Summary of Recertification Actions

	Plan Element	Existing Certification Status as per EQC Action November 1978	Requested Modification
1.	Municipal Waste Treatment	Conditional	None
2.	Individual Waste Disposal (Subsurface)	Conditional	None
3.	Sludge Disposal Management	Full Certification	None
4.	Alternative Waste Disposal Systems	Full Certification	None
5.	Infiltration/Inflow	Full Certification	None
6.	Mining	Not Applicable	None
7.	Saltwater Intrusion	Not Applicable	None
8.	Hydrologic Modification	Not Applicable	None
9.	Construction	Conditional	None
10.	Nonpoint Source Runoff	Conditional	None
11.	Water Quality Monitor Program	Not Applicable	None
12.	Silviculture	Not Applicable	None
13.	Ashland Watershed Management	Conditional	Full Certification
14.	Management of Reeder Reservoir	Conditional	None
15.	Public Participation	Conditional	Full Certification

Areawide - Rogue Valley Council of Governments

Plan Element - Municipal Waste Treatment

Certification Status - Conditional Certification

Conditions/Work Commitments -

1. Review and adopt municipal and industrial waste load projections when urban growth boundaries are adopted.

2. Review and adopt service area boundaries when urban growth boundaries are adopted.

3. Revise and update the Master Plan on an annual basis through the Water Quality Review Committee. First report due July 1, 1979. Revision to include new construction grant priority list, utilizing criteria adopted by the EQC May, 1978.

Accomplishments -

1. All urban growth boundaries have been agreed upon among individual cities and Jackson County except for Central Point.

2. The preliminary 1980 census summary is in substantial agreement with the population projections in the Waste Treatment Master Plan.

3. RVCOG coordinated all local input into the state Sewerage Grant Priority List.

Work to be Completed -

1. RVCOG requests that waste load projections be delayed until final 1980 census data can be compared to the WTMP.

2. RVCOG requests that the review and adoption of service area boundaries be delayed until mid-1981 by which time the Central Point urban growth boundary should be resolved. All other UGBs will be adopted by RVCOG as required.

3. When the population projection, waste load projections, and urban growth boundaries are finalized and adopted by RVCOG the Waste Treatment Master Plan will be updated to reflect these changes.

Recommendation - Conditional Certification

Areawide -	Rogue Valley Council of Governments
Plan Element -	Individual Waste Disposal
Certification Status -	Conditional Certification
Conditions/Work Commitments -	The following outputs to be completed and adopted by March 1, 1979: 1. A recommended county-wide on-site small community waste disposal management program. 2. A draft ordinance which can be adopted and implemented by Jackson county. 3. An administrative framework for implementing the program.
Accomplishments -	1. RVCOG submitted the On-Site and Small Community Waste Water Master Plan in August, 1980 which included: A. Recommended county-wide on-site small community waste disposal management program. B. A draft ordinance which can be adopted and implemented by Jackson County. C. An administrative structure for program inplementation.
Work to be Completed -	RVCOG presently has a proposed FY 81 208 Project which deals directly with individual system failures, priority failure areas and identifying appropriated corrective methods.
Recommendation -	Conditional Certification

Areawide -	Rogue Valley Council of Governments
Plan Element -	Sludge Disposal Management
Certification Status -	Full Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommendation -	Full Recertification. Future sludge disposal planning management and implementation can be adequately covered under 201 facilities plans.

Areawide -	Rogue Valley Council of Governments
Plan Element -	Alternative Waste Disposal Systems
Certification Status -	Full Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommendation -	Full Recertification. The DEQ has adopted rules and regulations governing alternative systems.

Areawide -	Rogue Valley Council of Governments
Plan Element -	Infiltration/Inflow
Certification Status -	Full Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	None
Recommendation -	Full Recertification. Infiltration/inflow planning, management and implementation covered under 201 facilities plans.

Areawide -	Rogue Valley Council of Governments
Plan Element -	Construction
Certification Status -	Conditional Certification
Conditions/Work Commitments -	None
Accomplishments -	Not Applicable
Work to be Completed -	RVCOG will assist the City of Medford with the works on its project to study this problem.
Recommendation -	Conditional Certification based upon the uncompleted work under the nonpoint source program element.

Areawide -	Rogue Valley Council of Governments
Plan Element -	Nonpoint Source Runoff
Certification Status -	Conditional Certification
Conditions/Work Commitments	By July 1, 1978 RVCOG should complete the following: 1. An agriculture management plan including Best Management Practices, identified management agencies, and a regulatory program. 2. Basic data report for on-farm study. 3. Draft interpretive report for monitoring program. 4. Basic data report for urban runoff study. By September 30, 1978 RVCOG should complete the following: 1. Preliminary urban stormwater runoff management plan including structural and non-structural alternatives, identification of management agencies and a regulatory program.
Accomplishments -	1. Agriculture management plan has been adopted and the Jackson Soil and Water Conservation District designated as lead agency. 2. Basic data report for on-farm study was completed. 3. Draft interpretive report for monitoring was completed. 4. Basic data report for urban runoff was completed.
Work to be completed -	1. Complete present agriculture component of the nonpoint source project by January 31, 1981. 2. Complete the passive treatment project.
Recommendation -	Conditional Certification

Areawide -	Rogue Valley Council of Governments
Plan Element -	Ashland Watershed Management
Certification Status -	Conditional Certification
Conditions/Work Commitments -	1. By October, 1978 the Forest Service should complete the short-range (interim plan). Adoption of interim plan by December 30, 1978. 2. By 1981 the Forest Service should complete the long-range Comprehensive plan, including and expanded monitoring program.
Accomplishments -	RVCOG asked to be relinquished of this responsibility and it was granted by EPA in 1980.
Work to be Completed -	None
Recommendation -	Full Certification

Areawide -	Rogue Valley Council of Governments
Plan Element -	Management of Reeder Reservoir
Certification Status -	Conditional Certification
Conditions/Work Commitments -	1. Because no realistic environmental alternative to discharging the sediment from Reeder Reservoir was prepared, EPA will develop an environmental impact assessment. 2. Ashland and DEQ must complete negotiations on the new NPDES permit. 3. After completion of the environmental impact assessment and the NPDES permit negotiations Ashland should implement a specific reservoir management program.
Accomplishments -	Environmental Impact Assessment was completed.
Work to be Completed -	1. Ashland needs to respond to EPA on what cleaning options it will select. 2. Implement selected alternative
Recommendation -	Conditional Certification

Areawide -	Rogue Valley Council of Governments
Plan Element -	Public Participation
Certification Status -	Conditional Certification
Conditions/Work Commitments -	RVCOG should document carefully the impact of public involvement on 208 plan development and the completed 208 plan.
Accomplishments -	Public involvement program has been integrated into new planning elements.
Work to be Completed -	Continue to implement public involvement program.
Recommendation -	Full Certification

TD188

ATTACHMENT 2

DESIGNATED FORESTRY MANAGEMENT AGENCIES

PROGRAM EVALUATION REPORTS AND PROPOSED

RECERTIFICATION ACTIONS

Attached are three reports describing the Department's annual review of the Designated Water Quality Management agencies for forest land management activities. The Department's recommended action in each case is to recertify the present programs. It should be specifically noted that both federal agencies (Bureau of Land Management and U.S. Forest Service) welcome the suggestions to carry out field reviews during the next annual review and this activity will now be scheduled for this coming summer.

TS205

1980 REVIEW OF THE OREGON SILVICULTURE PROGRAM

Under Section 208 of P.L. 95-217

September 1980

A Cooperative Assessment by the Oregon State Departments of

Environmental Quality

Fish and Wildlife

Forestry

SUMMARY

In 1979, the U.S. Environmental Protection Agency (EPA) certified the Oregon Forest Practices Act, and associated rules, as Best Management Practices under Section 208 of the 1977 Clean Water Act (P.L. 95-217) for controlling nonpoint source pollution from silvicultural activities on forest land. By letter, the Oregon Department of Environmental Quality agreed with EPA to periodically evaluate Oregon's 208 silvicultural program.

The 1980 assessment was jointly conducted by the Oregon State Departments of Environmental Quality, Fish and Wildlife, and Forestry. This year, the assessment was conducted in the Southern Oregon Forest Practices Region. Thirty-one operations were reviewed by a technical working group (TWG). The operations reviewed represented: 1) a range of environmental sensitivity and, 2) categories of rules regulating activities that might adversely impact water quality or other fishery habitat conditions.

The technical working group concluded that:

1. Forest operators are satisfactorily complying with the Forest Practices rules.
2. The Forestry Department effectively administers the Forest Practices rules and program.
3. Compliance with the Forest Practices Rules meet, to a high degree, Oregon's water quality goals.
4. That current rules and program administration deal adequately with real and potential impacts of forest practices on water quality and fishery habitat conditions.

Like all programs of this magnitude and complexity, there are some areas for improvement. To achieve these improvements, the TWG recommends that:

1. The Forestry Department Forest Practices Program administration increase the number of pre-operation inspections of environmentally sensitive areas.
2. All Forest Practices Forester recommendations to operators be written.
3. The Class I stream definition be changed to include those portions of Class II streams significantly affecting Class I streams.
4. The Board of Forestry consider adopting a harvesting rule that requires a prior plan from operators in areas of critical concern.
5. The Board of Forestry examine alternatives for decreasing the damage caused by a few recalcitrant operators.

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1980 ANNUAL REVIEW OF THE OREGON SILVICULTURE PROGRAM

Under Section 208 of P.L. 95-217

September 1980

INTRODUCTION

In 1971, the Oregon Legislature passed the Oregon Forest Practices Act. The purpose of the Act was twofold:

1) To assure the continuous growing and harvesting of forest tree species and to protect the soil, air, and water resources; and,

2) To achieve coordination among state agencies which are concerned with the forest environment.

The Forestry Department administers approximately 140 administrative rules, through the Forest Practices Program, to achieve the purposes of the Forest Practices Act. The Act and rules apply directly to approximately 9 million acres of private forest land. The 1979 level of private forest landowner activity included harvesting 76,000 acres, constructing 900 miles of new road, using mechanical methods to prepare 35,000 acres for tree planting, applying chemicals (fertilizer, insecticides, and herbicides) to 211,383 acres, and reforesting nearly 68,000 acres. This magnitude of work occurred through 9,900 separate operations (an operation means a series of activities related to the growing, harvesting, or processing of forest tree species).

In 1979, the rules were approved by the U.S. Environmental Protection Agency (EPA) as Best Management Practices (BMP's) to control nonpoint source pollution on forest land. By letter dated March 5, 1979, the Oregon Department of Environmental Quality (DEQ) agreed with EPA to periodically evaluate Oregon's Forest Practices Rules. The purpose of the review is to insure that the rules are effectively implemented to meet state water quality goals. There are six categories of State Forest Practice Act rules regulating activities that might adversely impact water quality or other fishery habitat conditions. These are: road construction and maintenance, harvesting, application of chemicals, leakage or accidental spillage of petroleum products, surface mining, and reforestation (site preparation).

The 1980 evaluation was made by a technical work group (TWG) composed of staff members from the State Departments of Forestry (DOF), Fish and Wildlife (FW), and DEQ.

The 1980 TWG members were:

Louis Fredd - Fisheries Scientist - FW
James Brown - Forester - DOF
Charles Stone - Forester - DOF
Robert Paeth - Soils Scientist - DEQ
Glen Carter - Water Quality Analyst - DEQ

The TWG was charged with making four basic determinations about the implementation and administration of the Forest Practices Program:

1. Whether forest operators are satisfactorily complying with the rules.

2. Whether the rules are effectively administered by the DOF.

3. Whether compliance with the rules results in meeting state water quality goals.

4. Whether the rules deal adequately with real and potential impacts of forest practices on water quality and fishery habitat conditions.

METHODS

During the 1980 review, all Forest Practices rules regulating activities that might adversely impact water quality were evaluated in one Forest Practices Region. This procedure was keeping with 1979 TWG recommendations. For 1980, the Southern Oregon Region was selected for evaluation.

During Fiscal Year 1979, there were 2,969 operations in the Southern Oregon Region: 18% were high priority1/ operations, 33% were medium priority operations and 52% were low priority operations.

District Fisheries Biologists and district Forest Practices Foresters cooperatively selected 31 sites for evaluation. They included operations (activities) that fell within each of the major role categories. 58% were high priority, 22% were medium priority, and 20% were low priority. Two of the sites were on county lands and the remaining 29 were on private lands. Eight sites were in Josephine County, 14 were in Douglas County, and 9 were in Coos County.

TWG members used a five-point grading system to rate separately, both the operator's compliance with applicable rules and the DOF administration of the applicable rules. The selected numerical grading numbers denote the following levels of operator compliance or DOF administrative effectiveness:

Grade	
5	Operation and/or administration proceeded according to the rules and provided excellent water quality and fisheries habitat protection - sometimes going beyond the rule requirements.
4	Operation and/or administration met rule requirements, resulting in adequate protection for water quality and fisheries habitat conditions.
3	Operation and/or administration had minor departures from the intent of rules, but resulted in no significant hazard to water quality or fishery habitat.
2	Operation and/or administration did not comply with the rules. Some degree of water quality and/or fishery habitat damage have either already occurred or can reasonably be expected to occur.
1	Operation and/or administration grossly neglected the rule requirements, resulting in major water quality problems or devastation of fisheries habitat.

1/ The Forestry Department assigns a priority for field inspection to each notification based upon potential for environmental damage.

In addition to giving the operations and administration a numerical rating, the TWG members were encouraged to record other observations that would be useful in either describing a situation or leading to improved administration. Only the 5 TWG members were allowed to rate the operations and administrative processes.

The 208 Review tour was held the four successive days September 9 through 12, 1980. Each day the TWG members were joined by the local agency staff members who are responsible for DOF and FW adminstrative matters relating to the individual forest operations. In most cases, these latter persons were also the ones who selected operations for evaluation.

Before visiting each operational site, the TWG members were given a folder of site-specific information from the DOF files. It included the operator's prior notification of intent, administrative site inspection records, and records of any other pertinent communications or operator/DOF actions.

RESULTS

The TWG felt that operations selected for review were a good representation of the varied geographical locations, water-related conditions, and rules under review. The composite TWG ratings of these forest operations and corresponding DOF administrative actions are grouped for presentation in tables according to the operation's geographic location in DOF administrative districts. Thus, for each administrative district there are two tables, i.e. A and B, with corresponding operation identification numbers. Table "A" shows TWG ratings of operator activities and table "B" shows TWG ratings of DOF administrative activities. DOF administrative districts and corresponding tables are identified as follows:

TABLES	DISTRICT
1A-1B	Southwest Oregon
2A-2B	Coos
3A-3B	Douglas
4A-4B	Western Lane

Forestry Department Administration

The Forestry Department administers the Forest Practices Act, and associated rules, through the Forest Practices Program. The Program uses prevention and enforcement measures to achieve program goals. The key Forest Practices Program administration elements are shown below. Opposite each element appears a description of the element plus the TWG's summary of findings (also see Table 5) on the Department's administration of the 31 operations.

Key Program Elements	Element Description	TWG Findings on 31 Operations
1. Notification	Notifications are required by statute and rule 15 days prior to operation commencement. Notification must be on forms provided by the State Forester.	Prior notification was received for all operations. All of the 31 notices gave adequate information.
2. Pre-operation Inspection	Forestry Dept. policy calls for pre-operation inspection of the site when an area is determined to be of high priority or critical concern.	Twenty-one operations (16 high priority and 5 medium priority) received inspections before the operation started. Fourteen received written recommendations and five received verbal recommendations.
3. Prior Plan	Prior plans may be required when the Forest Practice Rules require written approval of the State Forester.	11 prior plans were required: 10 on high and 1 on medium priority operations.

4. Inspection	Forestry Dept. policy calls for a minimum of one inspection of medium and two of high priority operations after commencement.	All operations, whether having high, medium or low priority, received the required number of inspections, or more. The 31 operations received a total of over 129 inspections.
5. Recommendations	Forestry Dept. policy calls for written recommendations when there is potential for stream or water quality impact.	14 operations had written recommendations from the DOF. The Forest Practices Foresters said verbal recommendations had been given on an additional four operations.
6. Enforcement	Enforcement action is required whenever a significant violation of the Forest Practice rules is observed or significant resource damage occurs as a result of a violation.	The TWG noted what they believed to be 9 operations in violation of Forest Practices Rules. Of these nine, DOF recorded 3 enforcement actions. Of the remaining 6 operations, three did not cause significant water quality impact and three did cause significant adverse impact. In the 3 cases where significant damage occurred and no enforcement action was taken, the Forest Practices Forester did not recognize the damage in one case and in the other two cases the Forest Practices Forester first saw the damage the same day as the TWG.

Table 6 shows a summary of TWG numerical ratings of DOF administration for 31 operations. The Table shows that Forest Practices Foresters effectively administered the Forest Practices Act and associated rules on all 31 operations.

Operator Compliance with Rules

Of the 31 operations evaluated, 25 operators conducted their operations so as to meet or exceed the intent of the Forest Practices rules (Table 7). Nine operations violated Forest Practices rules. In one of these nine cases, the damaged caused was not significant and in two other cases no damage had occurred, but was expected to occur. The remaining six operations did cause some significant damage.

Table 8 shows the number of operations violating Forest Practices rules by rule category. A review of this table shows that harvest operations and road construction/maintenance operations account for most of the water quality/fishery habitat impacts. Chemical applications appear to be very well planned and conducted to prevent unwanted damages. Leakage or spillage of petroleum products was not observed and is considered to be a rarity. Surface mining is generally confined to obtaining coarsely crushed stone for road surfacing. Quarries are sparsely located and usually well managed to prevent wastes from entering waterways. Reforestation (mechanical site preparation) seldom encroaches upon waterways.

1980 Cost of Silvicultural Program Assessment

The cost of the 1980 silvicultural program assessment was about $21,000. This includes advanced planning, the evaluation tour, and preparing the final report. There are other allied costs to individual agencies that cannot be accurately estimated.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the activities performed, the TWG has concluded that the DOF effectively administers the Forest Practices Program. In addition, operators, as a whole, comply with the Forest Practices rules. This results in meeting, to a high degree, the State's water quality and fishery habitat protection objectives on forest lands. The TWG revealed no significant weaknesses within DOF management of the Forest Practices Program or operator performance in rules application.

Specific strengths identified include:

- The Forest Practices notification process and 15 day waiting period are working well. Forest Practices Foresters use this information to determine the environmental sensitivity of operations. They use the 15 day waiting period to make pre-operation inspections and recommendations to operators for preventing resource damage.

- Forest Practices Foresters are making good to excellent technical recommendations to operators for preventing resource damage.

- There appears to be good on-the-ground cooperation between DOF Forest Practices Foresters and Department of Fish and Wildlife Fisheries Biologists.

- Most operators met or exceeded the Forest Practices rules or their intent. Frequently operators submitted good prior plans and then followed them to achieve water quality and fisheries habitat goals. The TWG finds this significant since the operations visited by TWG were generally more environmentally sensitive then the normal distribution of operations in the Southern Oregon Region.

- Forest Practices Foresters work hard to prevent resource damage, but when necessary they appropriately use enforcement action through the criminal (fines) and civil (damage repair) processes.

Like any program of this magnitude there are both strengths and areas for improvement. Areas needing improvement to help better meet water quality and fisheries habitat objectives that deserve comment as well as some general observations are:

Area of Comment: Preoperation inspections.

Finding: In environmentally sensitive areas, preoperation inspections, and associated recommendations by the Forest Practices Forester, appear to greatly help operators reduce resource damage during operations. Of the 31 operations reviewed by the TWG, preoperations inspections had been conducted on 89% of the high priority operations and 71% of the medium priority operations. In contrast, 1979 Forestry Department statistics show that preoperation inspections were conducted on 52% of the high priority operations and

37% of the medium priority operations in Southern Oregon. This comparison shows that the high and medium priority operations reviewed by TWG received more preoperation inspections than normally occurs in day-to-day Forest Practices Program administration.

Recommendation: In order to help further reduce damage the Forestry Department should increase the number of preoperation inspections of operations occurring in environmentally sensitive areas.

Area of Comment: Written recommendations.

Finding: As stated previously, Forest Practices Foresters made good to excellent technical recommendations to operators for preventing resource damage. Written recommendations were made for 14 of the 21 operations receiving a preoperation inspection. Verbal recommendations were made for an additional five preoperation inspections. Out of the 31 operations evaluated by the TWG, 18 received written recommendations during the normal inspection process and 4 received verbal recommendations.

Recommendation: All recommendations to operators should be written. The TWG believes the potential for resource damage can be greatly reduced when the operator clearly understands what is expected of him to protect the resource.

Area of Comment: Stream classifications.

Finding: Fisheries biologists did not believe that current Forest Practices rules adequately protect those Class II streams having significant impacts on Class I streams. Current rules allow operators to remove vegetation adjacent to Class II streams. The current Class I stream definition precludes classifying these Class II sections of streams as Class I.

Recommendation: The TWG recommends changing the Class I stream definition to include those portions of Class II streams that significantly affect Class I streams. The TWG believes this rule change would be more workable than adding a third class of streams.

Area of Comment: Areas of critical concern.

Finding: The 1980 Forest Practices assessment examined several harvesting operations in geomorphologically sensitive zones. Specifically, these operations were in the high rainfall zones of western Coos and Douglas Counties which have steep slopes with thin soils over smooth sandstone. This combinatin of physical conditions is extremely difficult to cope with in forest management without having some adverse impact on fishery streams. The TWG noted that resource damage was minimized when operators provided to DOF and then followed a prior plan for harvesting. (Note to Reader: Prior plans can be, and frequently are, required for road building in environmentally sensitive areas.)

Recommendation: The Board of Forestry consider adopting a harvesting rule requiring operators to provide DOF a prior plan before conducting harvesting operations in areas identified by the State Forester as being of critical concern.

Area of Comment: Operators ignoring Forest Practices Foresters recommendations and/or Forest Practices rules.

Finding: The TWG noted that most operators followed the Forest Practices Foresters recommendations and/or the Forest Practices rules. As a result, the resource was well protected. However, in six operations evaluated by the TWG, the respective operators chose to ignore the Forest Practices Forester's recommendations. In three of the six operations, significant resource damage resulted. It is the TWG's opinion that significant resource damage would not have occurred had the recommendations been followed by the operator.

When an operator significantly violates a Forest Practices rule and/or causes significant resource damage as a result of a rule violation the State Forester may initiate criminal proceedings (penalty) and/or civil action (repair resource damage). However, the TWG believes that litigation of damages is not an effective way to manage water quality and/or fishery habitat. This problem is compounded by some district attorneys unwillingness to prosecute and some judges to convict an operator on criminal charges for violating an environmental rule. As a result, there is little motivation for a very few operators to prevent resource damage.

Recommendation: The TWG sees no easy answer to solving the problem of the recalcitrant operator. However, the TWG believes the Board of Forestry, the Regional Committees, and the Forestry Department should examine and evaluate alternative courses of action to help solve this problem.

APPENDIX

TABLE 1A

OREGON SILVICULTURE PROGRAM REVIEW UNDER SECTION 208, PL-95-217

TECHNICAL WORKING GROUP RATINGS OF OPERATOR ACTIVITIES IN SOUTHWEST OREGON REGION

DISTRICT: Southwest

COUNTY: Josephine

Operation Number	Applicable Rules	Rules Violations?	Rules Violated	TWG Rating	TWG Comments
1	Harvest	No	--------	4	Light skid-road system, good water bars.
2	Harvest	No	--------	4	Very light thinning harvest.
3	Harvest	No	--------	4	Site conversion to residential.
4	Harvest	No	--------	5	Good buffer strip.
5	Harvest-Roads	No	--------	5	Thinning harvest, good water bars. Good road drainage
6	Harvest	No	--------	5	Full suspension of logs over creek. Good buffer strip
7	Harvest-Roads	No	--------	3	Precarious road location near creek. Tractor logging on steep ground. Section of road may wash out in high water.
8	Harvest	Yes	629-24-646(2) 629-24-646(4)	2	Yarding through Class I stream, destroyed buffer strip.

TABLE 1B

DISTRICT: Southwest

COUNTY: Josephine

OREGON SILVICULTURE PROGRAM REVIEW UNDER SECTION 208, PL-95-217

TECHNICAL WORKING GROUP RATINGS OF FORESTRY DEPARTMENT ADMINISTRATION

IN SOUTHWEST OREGON REGION

Operation No.	Operator Notification Adequate	FPA Priority	Prior Plan Required?	Prior Site Inspection?	Prior Water-quality Recommendations?	Number of On-site Inspections	On-site Water Quality Recommendations?	Enforcement Actions?	Significant Adverse Water Quality Impact?	Not Covered By Rules?	TWG Rating of DOF Program Administration	TWG Comments
1	Yes	L	No	No	No	4	Yes	No	No	No	4	Gentle slopes, no streams through site.
2	Yes	L	No	No	No	3	Yes	No	No	No	4	Thinning harvest of very few trees.
3	Yes	H	No	No	No	2	Yes	No	No	No	4	No harvest activity near creek.
4	Yes	M	No	No	Not written	1	No	No	No	No	4	No harvest activity near creek.
5	Yes	L	No	No	No	1	No	No	No	No	4	Residential site preparation.
6	Yes	H	Yes	Yes	Yes	3	No	No	No	No	4	Excellent stream protection.
7	Yes	H	No	Yes	No	1	Yes	No	No	No	4	Good job of minimizing potential problems on very difficult ground.
8	Yes	H	No	No	No	16	Yes	Yes	Yes	No	5	Very good record keeping and persistent inspection of a recalcitrant operator.

TABLE 2A

OREGON SILVICULTURE PROGRAM REVIEW UNDER SECTION 208, PL-95-217

TECHNICAL WORKING GROUP RATINGS OF OPERATOR ACTIVITIES IN SOUTHWEST OREGON REGION

DISTRICT: Coos

COUNTY: Coos

Operation Number	Applicable Rules	Rules Violations?	Rules Violated	TWG Rating	TWG Comments
1	Harvest	Yes	629-24-646(6) 629-24-641(4)	2	Extensive soil disturbance and stream channel damage - landowner ignored Forest Practices Forester recommendations.
2	Roads	No	-------------	4	Excellent stream crossing on rocked bed.
3	Roads	No	-------------	5	Repair of road slump area where soils previously were allowed to enter the river.
4	Roads	Yes	629-24-624	2	Operator did not repair failing road section as recommended by the Forest Practices Forester, thus a major earth slide went into the river.
5	Harvest	Yes	629-24-645(1)	3	Minor buffer strip damage, inadequate stream cleaning.
6	Harvest	Yes	629-24-645(1) 629-24-646(4)	2	Buffer strip damage, inadequate stream cleaning.
7	Harvest-Reforestation	No	-------------	5	Excellent stream crossing, buffer strip protection and soil protection
8	Reforestation, Roads, Chemicals	No	-------------	3	Operator removed some trees from previously agreed to buffer strip.
9	Roads	Yes	629-24-622(3) 629-24-623(1)(3) (2)(5)	3	Forest debris in road fill, inadequate drainage, sidecasting of soil to Class II stream, wash-out of cut-bank likely with winter rains.

TABLE 2B

OREGON SILVICULTURE PROGRAM REVIEW UNDER SECTION 208, PL-95-217
TECHNICAL WORKING GROUP RATINGS OF FORESTRY DEPARTMENT ADMINISTRATION
IN SOUTHWEST OREGON REGION

DISTRICT: Coos
COUNTY: Coos

Operation No.	Operation Notification Adequate?	FPA Priority	Prior Plan Required?	Prior Site Inspection?	Prior Water-Quality Recommendation?	Number of On-Site Inspections	On-Site Water Quality Recommendations?	Enforcement Actions?	Significant Adverse Water Quality Impact?	Not Covered by Rules?	TWG Rating of DOF Program Administration	TWG Comments
1	Yes	M	No	Yes	Not written	4	Not written	No	Expec-ted	No	3	Operator was not held to proper compliance with rules - recommendations should be written.
2	Yes	H	No	Yes	Not written	2	Yes	No	No	No	5	Good working program between operator and Forest Practices Forester.
3	Yes	M	No	Yes	Yes	2	Yes	No	No	No	5	Mainline log hauling road difficult to maintain in winter rain period.
4	Yes	M	Yes	Yes	Yes	4	Yes	Yes	Yes	No	4	Operator did not heed Forest Practices Forester's recommendations.
5	Yes	H	No	Yes	Yes	1	Not written	No	Yes	No	4	No prior plan for conduct of harvest to prevent stream and buffer strip damages. Operator didn't follow recommendations.
6	Yes	H	Yes	Yes	Yes	2	Not written	No	Yes	No	4	Prior plan to prevent buffer strip and stream damage not adhered to.
7	Yes	H	Yes	Yes	Yes	7	Yes	No	No	No	5	Excellent prior plan carefully adhered to.
8	Yes	H	Yes	Yes	Yes	many	Yes	No	No	No	5	Disagreement over 10 foot buffer strip rule between operator and forester.
9	Yes	H	Yes	Yes	Not written	3	Yes	No	Expec-ted	No	3	Forest Practices Forester should have made additional recommendations to the operator for preventing resource damage.

TABLE 3A

OREGON SILVICULTURE PROGRAM REVIEW UNDER SECTION 208, PL-95-217

TECHNICAL WORKING GROUP RATINGS OF OPERATOR ACTIVITIES IN SOUTHWEST OREGON REGION

DISTRICT: Douglas

COUNTY: Douglas

Operation Number	Applicable Rules	Rules Violations?	Rules Violated	TWG Rating	TWG Comments
1	Roads	No	----------	5	Excellent paving and maintenance of mainline log hauling road.
2	Chemicals	No	----------	5	Excellent planning and conduct of chemical application program.
3	Surface Mining	No	----------	3	Some gravel spillage to creek - needs further water bars.
4	Harvest	Yes	629-24-642 629-24-646(2)(3)	2	Some destruction of buffer strip and minor breakdown of stream bank.
5	Chemicals	No	----------	5	Excellent protection of Class I stream.
6	Harvest	No	----------	4	Good use of low ground pressure equipment by operator.
7	Reforestation, Chemicals	No	----------	5	Excellent chemical and site preparation operation.
8	Roads-Channel Change	No	----------	5	Excellent design and construction to protect water quality and fishery habitat.
9	Roads	No	----------	3	Extensive side casting of soils to steep slopes above waterways; side cast has potential for erosion/slumpage in winter rains.

TABLE 3B

OREGON SILVICULTURE PROGRAM REVIEW UNDER SECTION 208, PL-95-217

TECHNICAL WORKING GROUP RATINGS OF FORESTRY DEPARTMENT ADMINISTRATION

IN SOUTHWEST OREGON REGION

DISTRICT: Douglas

COUNTY: Douglas

Operation No.	Operator Nofitication Adequate?	FPA Priority	Prior Plan Required?	Prior Site Inspection?	Prior Water-Quality Recommendations?	Number of On-Site Inspections	On-site Water Quality Recommendations	Enforcement Actions?	Significant Adverse Water Quality Impact?	Not Covered by Rules?	TWG Rating of DOF Program Administration	TWG Comments
1	Yes	L	No	No	No	many	No	No	No	No	4	A good example of fine road maintenance.
2	Yes	H	Yes	Yes	Yes	many	No	No	No	No	5	Good planning and conduct of chemical application.
3	Yes	L	No	No	No	many	No	No	Expected	No	3	Needs recommendations for better drainage control.
4	Yes	H	No	Yes	Not written	5	Yes	No	Yes	No	3	Forest Practices Forester changed stream Class from II to I in mid-operation. Stream classification should have been recognized before operation began.
5	Yes	H	No	Yes	Not written	many	Not written	No	No	No	5	Well controlled spray program.
6	Yes	H	No	Yes	Not written	3	Yes	No	No	No	4	Good Forest Practices Forester and Fish & Wildlife Biologist communications.
7	Yes	L	No	No	No	4	No	No	No	No	4	
8	Yes	H	Yes	Yes	Yes	2	Yes	No	No	No	5	Excellent stream damage prevention program laid out by State Forester.
9	Yes	M	No	Yes	No	5	No	No	Expected	No	3	There appears to be a potential for erosion of cut-banks and fills that may eventually reach a Class I stream. Additional recommendations needed.

TABLE 4A

OREGON SILVICULTURE PROGRAM REVIEW UNDER SECTION 208, PL-95-217

TECHNICAL WORKING GROUP RATINGS OF OPERATOR ACTIVITIES IN SOUTHWEST OREGON REGION

DISTRICT: Western Lane

COUNTY: Douglas

Operation Number	Applicable Rules	Rules Violations?	Rules Violated	TWG Rating	TWG Comments
1	Harvest	No	-------------	5	Excellent buffer strip - used best management practices available to minimize potential damage on unstable ground.
2	Harvest-Roads	No	-------------	5	Gentle slope, easy to manage operations.
3	Harvest, Chemicals, Reforestation	No	-------------	4	Excellent buffer strip - minor debris in Class II stream.
4	Roads	Yes	629-24-623(8)	3	Failure to maintain road during construction though this represents a rule violation distance from Class I streams precludes significant impact.
5	Harvest-Roads	Yes	629-24-643(1) 629-24-645 629-24-645(2)	1	Yarding logs in bottom of Class II streams - excessive soil disturbance due to improper log yarding across ridge tops, "blind hillsides," and steep headwalls - side cast road wastes to slump areas - poor location of landings at head of ravines - debris left in Class II waterways - major debris and mud slide into Class I stream - partial destruction of buffer strip.

TABLE 4B

OREGON SILVICULTURE PROGRAM REVIEW UNDER SECTION 208, PL-95-217

TECHNICAL WORKING GROUP RATINGS OF FORESTRY DEPARTMENT ADMINISTRATION

IN SOUTHWEST OREGON REGION

DISTRICT: Western Lane
COUNTY: Douglas

Operation No.	Operator Notification Required	FPA Priority	Prior Plan Required?	Prior Site Inspection?	Prior Water-Quality Recommendations?	Number of On-site Inspections	On-site Water Quality Recommendations?	Enforcement Action?	Significant Adverse Water Quality Impact?	Not Covered by Rules?	TWG Ratings of DOF Program Administration	TWG Comments
1	Yes	M	No	No	No	3	No	No	No	No	4	This is a very steep, sensitive geomorphic zone.
2	Yes	M	No	Yes	Yes	3	Yes	No	No	No	4	Excellent buffer strips left along creek.
3	Yes	H	Yes	Yes	Yes	12	Yes	No	No	No	5	
4	Yes	H	Yes	Yes	Yes	21	Yes	No	No	No	4	Operator's failure to follow Forest Practices Forester's recommendations for controlling side casted soil will likely result in winter erosion.
5	Yes	H	Yes	Yes	Yes	10	Yes	Yes	Yes	No	5	This is a situation where the operator chose to ignore both the intent of the rules and the Forest Practices Forester's recommendations.

TABLE 5

NUMERICAL SUMMARY OF DOF ADMINISTRATIVE INFORMATION
ON 31 OPERATIONS IN THE 1980 OREGON SILVICULTURAL PROGRAM ASSESSMENT

No. of Operations Evaluated	31
No. of Operation Applications Adequate	31
No. of High Priority Operations	18
No. of Medium Priority Operations	7
No. of Low Priority Operations	6
No. of Operations with Prior Plan Required	11
No. of Operations with Prior Site Inspection	21
High Priority 16	
Medium Priority 5	
Low Priority 0	
No. of Operations with Prior Water Quality/Stream Protection Recommendations	19
14 operations with written recommendations	
5 operations with verbal recommendations	
Total No. of Operations Inspections After Commencement of Operation (on five operations, Forest Practices Foresters recorded the number of inspections as many)	over 129
No. of Operations Receiving On-site Water Quality/Stream Recommendations After Operation Commencement	22
18 operations with written recommendations	
4 operations with verbal recommendations	
No. of Operations with Rule Violations	9
No. of Operations with Significant Water Quality/Stream Impacts	10
6 operations - damage already occurred	
4 operations - damage expected to occur	
No. of Adverse Water Quality/Stream Impacts Not Covered by Rules	0

TABLE 6

SUMMARY OF TWG NUMERICAL RATING OF DOF FOREST PRACTICES PROGRAM ADMINISTRATION FOR 31 OPERATIONS

	Incidence of Rating				
TWG Rating Scale*	1	2	3	4	5
DOF Program Administration	0	0	5	16	10

TABLE 7

SUMMARY OF TWG NUMERICAL RATINGS OF OPERATOR ACTIVITIES FOR 31 FOREST OPERATIONS

	Incidence of Rating				
TWG Rating Scale*	1	2	3	4	5
Operator Activity	1	5	7	6	12

* See Page 3 for rating scale.

TABLE 8

SUMMARY OF OPERATIONS VIOLATING FOREST PRACTICES RULES

BY RULE CATEGORY

Rule Category	Number of Operations
Road Construction & Maintenance	3
Harvesting	6
Application of Chemicals	0
Leakage or Accidental Spillage of Petroleum Products	0
Surface Mining	0
Reforestation (site preparation)	0
TOTAL	9

1980 Review of the Bureau of Land Management Water Quality Management Program Under Section 208 of PL 95-217

Introduction

The Bureau of Land Management was designated by the Governor as the Water Quality Management Agency for the lands under its jurisdiction in December, 1978. This action culminated a year of joint 208 planning between the DEQ, the Oregon State Forestry Department, and the BLM. During this period the state reviewed and compared the BLM's forest management practices against the approved state Best Management Practices. This evaluation determined that the practices utilized by BLM met or exceeded the state minimum practices. After this determination, the BLM developed a document that was later certified as the Water Quality Management Plan (WQMP) which described the program for implementing these BMPs on lands under BLM jurisdiction.

Annually, after the Governor's designation and EPA's approval of the program the Department is to complete a review of the BLM Water Quality Management Program. The following report describes the interagency agreement between DEQ and the BLM and the work completed this year to review and recertify the BLM Program.

Interagency Agreement:

In December, 1978, the U.S. BLM and DEQ signed a memorandum of understanding to delineate responsibilities and activities of each agency in the implementation of the Oregon Statewide Water Quality Management Plan on lands administered by the BLM.

The Statewide Water Quality Management Plan was developed to meet the requirements of state law (ORS Chapter 468) and federal Law (PL 92-500, the Federal Water Pollution Control Act. as amended by PL 95-217, the Clean Water Act).

The Federal Land Policy and Management Act of 1976 provides BLM authority for inventory and comprehensive planning for all public lands and resources under its jurisdiction. An integral part of this process is water quality consideration with the mandate that BLM will provide compliance with applicable state and federal pollution control laws. The Act prescribes close coordination between BLM and state and local resource planning and implementation agencies.

Under ORS Chapter 468 the DEQ has broad authority and responsibility to protect beneficial uses of water, identify sources of water pollution, develop plans, promulgate and enforce rules, and implement pollution control measures. Under this memorandum of understanding BLM and DEQ mutually agree to provide the necessary coordination, preventing duplication of efforts, to meet the implementation requirements of the Clean Water Act.

There are six major components in BLM's implementation program, including:

1. Non-point source problem identification, which is divided into two categories:

   A. Identifying geographic areas or terrain risk areas that are potential water quality hazard areas.

   B. Identifying basins which have critical instream water quality problems which may require restoration.

2. Best Management Practices: the Oregon Forest Practice Rules have been certifies as BMPs for silvicultural activities, and it has been determined that the BLM forest practices meet or exceed the state BMPs.

3. Public involvement: the Clean Water Act emphasizes the need to insure public involvement in the development and implementation of the standards, plans, and programs which it mandates.

4. Implementation mechanisms: the initial water quality management plan has been and will be periodically revised, updated and refined into a more specific agency water quality management plan during the ongoing continuous planning process and implementation of the 208 water quality program.

5. Monitoring: there are two objectives; first, to determining how well prescribed BMPs are being implemented and; second, how effective are the prescribed BMPs.

6. Program Review, Evaluation and Updating: the BLM and DEQ agree to meet annually to evaluate the program and the progress being made.

On the basis of this memorandum the DEQ will recommend that the Governor either formally designate or withdraw designation of BLM as the implementing agency for non-point source pollution control on lands under its jurisdiction.

<u>Annual Review, Evaluation, and Recertification:</u>

As stated in the memorandum of understanding between the BLM and the DEQ, the two agencies agree to meet annually to evaluate the BLM's Water Quality Management Plan, and the progress being made. DEQ staff evaluation of the plan and progress is to provide the information to decide annually whether to recertify the BLM as the implementing agency for non-point source pollution on land under its jurisdiction.

The Memorandum of Understanding states that the annual meeting is to be held prior to October 15 each year, but due to time constraints within the DEQ the 1980 meeting was held on December 17. The memorandum also outlines the specific items to be addressed at the annual meeting. These include:

1. Available BLM and DEQ monitoring information will be reviewed to determine if program goals are being met.

2. BLM will provide DEQ a written annual report on program implementation and planning activities for areas under its jurisdiction.

3. Any proposed revisions or additions of BMP's will be reviewed.

4. Constraints of manpower and funds on more immediate and effective program implementation will be discussed.

The 1980 Annual Review Meeting:

The 1980 meeting was held at on December 17 at 10 a.m. in BLM's offices at 729 NE Oregon, Portland. Participants included Bill Brooks, Bob Metzger, Byron Thomas, Neil Armantrout, Reginald Ross, Bill Cowan, and Warren Sandau of the BLM; Neil Mullane, Peter Ressler and John Jackson of the DEQ; and Dave Degenhardt of the State Department of Forestry.

The meeting agenda topics and summary of the material covered are described below:

I. BLM's Water Resources Management Program: the purpose is to create an awareness of the water resource, to provide guidance to Bureau hydrologists to help them understand what their functions and responsibilities are, and to provide the basic framework for implementing a comprehensive, statewide water management program. The objectives of the program are to protect, maintain, and enhance the water resource, supply water for all resource activities, establish and maintain a continuing inventory of the water resource, provide the skills for conducting water inventories and provide hydrological information to management, coordinate BLM water activities with other groups and agencies, provide training in water resources, and ensure compliance with applicable federal, state and local water resources requirements.

   This program is in the final draft review and should be the official BLM Water Quality Management Plan by early 1981.

II. Water Quality Problem areas addressed in 1980:

   a) Malheur Basin: a mining discharge to Willow Creek via Basin Creek was identified. Through a cooperative effort by the BLM and State Department of Geology and Mineral Resources, discharge from mining sources to Willow Creek were eliminated. Study of siltation problems in these two creeks is continuing.

b) Umpqua Basin: problem of roadside erosion was identified. Correction is being achieved by using the Oregon Forest Practices act BMPs and by restructuring of funding.

III. Future Water Quality Priority Areas: based on identification of non-point source pollution problems, BLM has established a list of Priority I and Priority II streams. This list is under continuous updating through data obtained in BLM's inventory and monitoring process. The current list is as follows:

I. First Priority Areas

	Stream	DEQ Basin	District
1.	Malheur River Malheur	Malheur River Basin	Vale, Burns
	A. Middle Fork Malheur		
	B. North Fork Malheur		
	C. Bully Creek		
	D. South Fork Malheur		
2.	Malheur Lake Basin	Malheur Lake Basin	Burns
	A. Donner & Blitzen Rivs.		
	B. Silver Creek		
	C. Silvies River		
3.	Crooked River System	Deschutes Basin	Prineville
	A. Bear Creek		
	B. Camp Creek		
	C. South Fork Crooked R.		
4.	Rogue River	Rogue Basin	Medford
	A. Applegate Creek		
	B. Evans Creek		
	C. Mainstream Rogue		
	D. Little Butte Creek		
	E. Illinois River		
	F. Deer Creek		
5.	Umpqua River	Umpqua Basin	Roseburg
	A. South Umpqua River		
	B. North Umpqua River		
	C. Elk Creek		

II. Second Priority Areas

1.	Burnt River	Powder River Basin	Baker
2.	Powder River	Powder River Basin	Baker

3.	Owyhee River	Owyhee Basin	Vale
	A. Succor Creek		
	B. Jordan Creek		
	C. Upper Owyhee River		
4.	Alvord Basin	South Alvord Basin	Burns, Vale
	A. Trout Creek		
	B. Willow Creek		
	C. Whitehorse Creek		
	D. Antelope Creek		
	E. Twelvemile Creek		
5.	John Day River	John Day Basin	Burns, Prineville
	A. South Fork John Day		
	B. Lower John Day River		
6.	Silver Lake	Goose & Summer Lakes Basin	Lakeview
	A. Buck Creek		
	B. Bridge Creek		
	C. Silver Creek		
	D. Chewancan River		
7.	Warner Lakes	Goose & Summer Lakes Basin	Lakeview
	A. Honey Creek		
	B. Snyder Creek		
	C. Twelvemile Creek		
	D. Deep Creek		
	E. Camas Creek		
	F. Twentymile Creek		
8.	Klamath River	Klamath Basin	Medford
9.	Coquille River	South Coast Basin	Coos Bay
10.	Siuslaw River	Mid Coast Basin	Eugene
11.	Nestucca River	North Coast Basin	Salem
12.	Upper Yamhill River	Willamette Basin	Salem
13.	Molalla River	Willamette Basin	Salem
	A. Upper Molalla River		
	B. Table Rock Creek		
14.	Quartzville Creek	Willamette Basin	Salem
	A. East Fork Packer's Gulch		
15.	West wind River	Willamette Basin	Salem
16.	McDermitt Creek	Owyhee Basin	Vale

IV. Best Management Practices: The State Department of Forestry rules have been certified through DEQ and by the Governor as BMPs for silvicultural activities. The BLM BPMs must be equivalent to or better than the state BMPs. An initial comparison was made with BLM forest practices. It was determined that the BLM forest practices meet or exceed the State Forest Practices Act BMPs. There have been no changes in 1980.

BMPs for grazing activities on BLM rangelands are being developed by the BLM in their document entitled "Managing the Public Rangelands" which is currently in public review draft. A committee representing the BLM, DEQ, SCS, ASCS, USFS, ODOF, and SSWCC will be formed to compile, evaluate, and recommend grazing BMPs for all rangelands in Oregon. The timeframe for accomplishing this is June, 1981.

V. BLM WQ monitoring: Intensive monitoring of streams is implemented with decision documents from environmental impact statements (EIS). Currently BLM has cooperative monitoring programs with and in Malheur and Douglas Counties. A monitoring program is being developed from the Drewsey EIS, and the Ironside EIS. The Jackson/Klamath Timber sales EIS monitoring plan is being implemented. A monitoring plan development will come up for the South Coos County EIS. Baseline date in Harney County for an EIS is being gathered.

DEQ Evaluation of BLM:

Staff evaluated BLM's Water Resources Management Plan, the inventory, planning and implementation programs, the BMP's and the WQ monitoring program. The staff consensus is that the BLM is meeting the requirements of state law (ORS 468) and federal law (PL 92-500, the Federal Water Pollution Control Act, as amended by the Clean Water Act PL 95-217) and is implementing the Water Quality Management Plan (WQMP).

DEQ and BLM Work Plan for 1980:

The DEQ through its 208 Federal Agency Coordinator and the BLM through its Division of Resources Hydrologist will coordinate the following items in 1981:

A. Review of the State's on-site sewage disposal and sewage holding facility pumpout rules, and BLM's current practices in these areas. The objective is to ensure BLM's awareness of and compliance with Oregon's Sewage Disposal Regulations.

B. Detailed exchange of information, of DEQ's and BLM's WQ monitoring plans, techniques and locations. The objective is to coordinate and interface with the two agencies WQ monitoring program. This will avoid duplication and allow compensation for lack of monitoring by either agency in certain areas due to budgeting reasons; and will allow exchange of data. A meeting will be scheduled with personnel the two agencies' monitoring programs.

C. A committee representing the BLM, DEQ, SSWCC, SCS, ASCS, USFS, and ODOF will be formed to compile, develop, and recommend BMPs for grazing activities on federal rangelands in Oregon.

D. As recomended by DEQ's PAC a field review of silvicultural activities on BLM lands will be scheduled for late spring 1981. A review committee representing DEQ, ODF and WL, ODOF, BLM, and USFS will be formed.

E. A field review of grazing activities on BLM rangelands will be scheduled for late 1981 or spring 1982. A review committee will be formed, similar to the proposed silvicultural activities field review committee.

F. An ongoing or open line of communication will be established and maintained between the DEQ s 208 contact and the BLM's contact person.

Staff Recommendations

The staff recommends that the Bureau of Land Management Water Quality Management Planning Program be recertified.

TN179

1980 Review of the U.S. Forest Service

Program Under Section 208 of PL 95-217 Water Quality Management

Introduction

The U.S. Forest Service was designated by the Governor as the Water Quality Management Agency for the lands under its jurisdiction in December, 1978. This action culminated a year of joint 208 planning between the DEQ, the Oregon State Forestry Department, and the U.S. Forest Service. During this period the state reviewed and compared the USFS forest management practices against the approved State Best Management Practice (BMP). This evaluation determined that the practices utilized by USFS met or exceeded the state minimum practices. After this determination, the USFS developed a document that was later certified as the Water Quality Management Plan (WQMP) which described the program for implementing these BMPs on land under its jursdiction. Annually, after the Governor's designation and EPA's approval of the program the Department is to complete a review of the USFS Water Quality Management Program. The following report describes the interagency agreement between DEQ and the USFS and the work completed this year to review and recertify the USFS program.

<u>Interagency Agreement:</u>

In December, 1978, the USFS and DEQ signed a memorandum of understanding to delineate responsibilities and activities of each agency in the implementation of the Oregon Statewide Water Quality Management Plan on lands administered by the USFS.

The Statewide Water Quality Management Plan was developed to meet the requirements of state law (ORS Chapter 468) and federal Law (PL 92-500, the Federal Water Pollution Control Act. as amended by PL 95-217, the Clean Water Act).

Congress, through various legislative directions, has assigned the responsibility for managing the Public National Forest lands to the Forest Service. Some of these same legislative directions provide for water quality recognition in the management of these lands. The cooperation and participation of the USFS will be in harmony with the Federal legislation and subsequent regulation.

Under ORS Chapter 468 the DEQ has broad authority and responsibility to protect beneficial uses of water, identify sources of water pollution, develop plans, promulgate and enforce rules, and implement pollution control measures. Under this memorandum of understanding USFS and DEQ mutually agree to provide the necessary coordination, preventing duplication of efforts, to meet the implementation requirements of the Clean Water Act.

There are six major components in the USFS implementation program, including:

1. Non-point source problem identification, which is divided into two categories:

   A. Identifying geographic areas or terrain risk areas that are potential water quality hazard areas.

   B. Identifying basins which have critical instream water quality problems which may require restoration.

2. Best Management Practices: the Oregon Forest Practice Rules have been certifies as BMPs for silvicultural activities, and it has been determined that the USFS forest practices meet or exceed the state BMPs.

3. Public involvement: the Clean Water Act emphasizes the need to insure public involvement in the development and implementation of the standards, plans, and programs which it mandates.

4. Implementation mechanisms: the non-point source water quality management plan has been and will be periodically revised, updated and refined into a more specific agency water quality management plan during the ongoing continuous planning process and implementation of the 208 water quality program.

5. Monitoring: there are two objectives; first, to determining how well prescribed BMPs are being implemented and; second, how effective are the prescribed BMPs.

6. Program Review, Evaluation and Updating: the USFS and DEQ agree to meet annually to evaluate the program and the progress being made.

On the basis of this memorandum the DEQ will recommend that the Governor either formally designate or withdraw designation of USFS as the implementing agency for non-point source pollution control on lands under its jurisdiction.

<u>Annual Review, Evaluation, and Recertification:</u>

As stated in the memorandum of understanding between the USFS and the DEQ, the two agencies agree to meet annually to evaluate the USFS's Water Quality Management Plan, and the progress being made. DEQ staff evaluation of the plan and progress is [redacted] to provide the information needed to decide annually whether to recertify the USFS as the implementing agency for non-point source pollution on land under its jurisdiction.

The Memorandum of Understanding states that the annual meeting is to be held prior to October 15 each year, but due to time constraints within the DEQ the 1980 meeting was held on December 12. The memorandum also outlines the specific items to be addressed at the annual meeting which include:

1. Available USFS and DEQ monitoring information will be reviewed to determine if program goals are being met.

2. USFS will provide DEQ a written annual report on program implementation and planning activities for areas under its jurisdiction.

3. Any proposed revisions or additions of BMP's will be reviewed.

The 1980 Annual Review Meeting:

The 1980 meeting was held December 12 at 10 a.m., in USFS's offices at 319 SW Pine, Portland. Participants included Gerald Swank, Clarence Alman, Dallas Hughes, and Tom Nygren of the USFS; Tom Lucas, Glen Carter, Peter Ressler, Jim Agee, Andy Schaedel and John Jackson of the DEQ; Jim Brown of the State Department of Forestry; and Dick Dearsley of EPA Region X.

The meeting agenda and review covered the following areas:

I. USFS's Water Quality Management Plan: as quoted in USFS's "Implementation Plan for Water Quality Planning on Forest Lands in the Pacific Northwest", the purpose is to: (1) describe the Forest Service's role in the management of public lands and resources and provisions for addressing water quality considerations in its land use planning system; (2) demonstrate that the Forest Service has the authority, capacity, and necessary implementation processes to insure that water quality management planning will be in concert with ongoing development of the State's Section 208 water quality management plan; (3) provide the basis for an interagency agreement whereby the Governor of the State of Oregon may designate the Forest Service as the water quality management agency on lands under its jurisdiction. Basically the plan is designed to correct or prevent non-point source pollution. The key program elements are problem identification, best management practices and an implementation program. The elements are currently being developed and integrated through the 208 planning process into a coherent water quality management plan.

II. Water Quality Problem areas addressed in 1980: the following list, by basin and dollar spent, are the soil, water and fisheries restoration projects on USFS lands in 1980:

Basin	Soil & Water Dollars[1]	Fisheries Dollars[2]	Forest(s)
Deschutes River	69,600	-	Deschutes
	39,000	-	Ochoco
	13,700	15,000	Mt. Hood
	122,300	15,000	

Goose & Summer Lakes	83,200	-	Fremont
Klamath River	32,700	-	Winema
	10,000	-	Rogue River
John Day, Malheur, & Malheur Lake	66,100	58,000	Malheur
	39,000	-	Ochoco
	50,000	17,000	Umatilla
	-	-	Wallowa-Whitman
	155,100	75,000	
Powder River	14,000	-	Wallowa-Whitman
Grand Ronde River	14,000	-	Wallowa-Whitman
	6,000	-	Umatilla
	20,000		
Umatilla River	7,100	-	Umatilla
Hood River	13,700	20,000	Mt. Hood
Willamette River	-	-	Siuslaw
	54,100	-	Willamette
	50,000	23,000	Mt. Hood
	100,000	17,000	Umpqua
	204,100	40,000	
North and Mid-Coast	16,400	-	Siuslaw
Umpqua River	23,400	18,000	Umpqua
	17,400	36,000	Siuslaw
	40,800	54,000	
South Coast	60,400	16,000	Siskiyou
	-	35,000	Siuslaw
	60,400	51,000	
Rogue River	60,400	16,000	Siskiyou
	32,900	-	Rogue River
	93,300	16,000	
Grand Total	873,100	271,000	

The following kinds of work are included under the soil and water work shown:

Lakeshore Stabilization - Revetment, rip-rap, bank revegitation and shaping, etc.

Streambank and channel stabilization	- revetment, rip-rap, gully plugs, small check-dams, realignment, revegitation, and reshaping of banks, etc.
Revegitation	- grass or shrub seeding and planting, fertilizing, water spreading, etc., of bare or poorly revegitated soils
Old road restoration	- barracading or closure, ripping, reshaping, revegitation, culvert removal, etc.
Debris removal	- woody debris removal with some revegitation where needed
Slide stabilization	- Excavation and removal, drainage facilities, revetment, and rip-rap, revegitation, channel structures, etc.

The following kinds of work are included under the fisheries work shown:

Fishery ladders, pool creation, bank stabilization, riparian habitat restoration, etc.

III. Future Water Quality Priority Areas: Identification of problem areas in need of restoration to improve water quality are accomplished through periodic watershed restoration inventories which are then incorporated into the program planning and budget system. Priorities are assigned by the Forests annually, based on cost effectiveness and environmental and and social well-being benefits. Detailed plans for each project are prepared on the Forests. Some major projects may have an environmental assessment made. More detailed plans are then developed for most projects.

When a priority list of problem areas and restoration projects is formed the DEQ is advised of the proposed projects for input. Budget and manpower constraints dictates the number of projects implemented.

IV. Best Management Practices: The Oregon Forest Practice Rules have been certified by DEQ and by the Governor of the State as BMPs for silvicultural activities in Oregon. An initial comparison was made with USFS forest practices. It was determined that the USFS forest practices meet or exceed the State Forest Practices Act BMPs. There have been no changes in 1980.

BMPs for grazing activities on USFS lands are contained within the Forest Service Manual and Handbook System. A committee representing the USFS, DEQ, SCS, ASCS, BLM, ODOF, and SSWCC will be formed to compile, evaluate, and recommend grazing BMPs for all rangelands in Oregon. The timeframe for accomplishing this is June, 1981.

V. USFS WQ Monitoring Program: The main goal of water quality monitoring is to provide the forest's resource manager with information regarding the effects of management activities on the water resource. Water quality monitoring information can be used to evaluate the effectiveness of BMP's. Water quality standards are the criteria or "yardstick" against which the effectiveness is tested. If, through monitoring, we find that BMP's do not meet prescribed standards, then information is available to modify either the BMP's for future management, or the standards, or both.

There are several management needs and legislative requirements which necessitate effective monitoring of water quality. Some of these items are:

1. To insure public health and safety.

2. Monitoring the effects of land management plans on the water resource.

3. The National Forest Management Act states that the USFS will determine any impairment of site productivity.

4. Executive Orders and legislation provide that the USFS will meet State water quality standards, control, and abate pollution.

As information regarding the effectiveness of the BMP's in preventing water quality degradation becomes available through monitoring efforts, the information is incorporated into the land management planning process through periodic updates. Since planning is a continuing process, the opportunities for refinement or change of the BMPs are readily available.

Four types of water quality monitoring are recognized (1) project, (2) inventory, (3) Source search, and (4) long term trend. This is also the order for priorities.

U.S. Forest Service -- Region 6
Water Quality Monitoring (non-point)
Oregon Forests

Forest	F.Y. 81--Plan Thousands of $	Accomplishment F.Y. 80 Monitoring Stations
Deschutes	25	30
Fremont	20	26
Malheur	20	?

Forest	F.Y. 81--Plan Thousands of $	Accomplishment F.Y. 80 Monitoring Stations
Mt. Hood	206[1]	22
Ochoco	2	20
Rogue River	40	4
Siskiyou	50	60
Siuslaw	?	83
Umatilla	56	?
Umpqua	32	44
Wallowa-Whitman	64	?
Willamette	86	60
Winema	4	19
Total	605+	368+

[1]Include $121 M for monitoring Bull Run watershed
[2]Includes barometer waterhshed

Appointment Monitoring Breakdown

Project	56%	Timber related	60%
Inventory	23%	Recreation	15%
Long Term Trend	19%	Grazing	7%
Source Search	2%	Other (monitoring	18%
	100%	Admin. fares)	100%

DEQ Evaluation of USFS:

Staff evaluated USFS's Water Quality Management Plan, the inventory, planning and implementation programs, the BMP's and the WQ monitoring program. Staff's consensus is that the USFS is meeting the requirements of state law (ORS 468) and federal law (PL 92-500, the Federal Water Pollution Control Act, and as amended by the Clean Water Act PL 95-217) and is successfully implementing the Quality Management Plan.

DEQ and USFS Work Plan for 1981:

The DEQ through its 208 staff and the USFS will coordinate the following items in 1981:

A. Review of the State's on-site sewage disposal and sewage holding facility pumpout rules, and USFS's current practices in these areas. The objective is to ensure USFS's awareness of and compliance with Oregon's Sewage Disposal Regulations.

B. Detailed exchange of information, of DEQ's and USFS's WQ monitoring plans, techniques and locations. Objective is to coordinate and interface with the two agencies WQ monitoring program to compensate for lack of monitoring in certain areas due to budgetary reasons, and to exchange data of beneficial use by either agency. A meeting will be scheduled with personnel from both agencies monitoring programs.

C. A committee representing the USFS, DEQ, SSWCC, SCS, ASCS, BLM, and ODOF will be formed to compile, develop, and recommend BMPs for grazing activities on federal rangelands in Oregon.

D. As recommended by DEQ PAC, a field review of silvicultural activities on USFS lands will be scheduled for late spring 1981. A review committee representing DEQ, ODF and WL, ODOF, BLM, and USFS will be formed.

E. A field review of grazing activities on USFS rangelands will be scheduled for late 1981 or spring 1982. A review committee will be formed, similar to the proposed silvicultural activities field review committee.

F. An ongoing or open line of communication will be established and maintained between the DEQ s 208 contact and the USFS's contact person.

Staff Recommendation

The staff recommends that the U.S. Forest Service Water Quality Management Planning Program be recertified.

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