~~CHRON: JUNE~~

EQC MEETING 1/14/1977

1/14/1977

OREGON
ENVIRONMENTAL QUALITY
COMMISSION MEETING
MATERIALS

State of Oregon
Department of Environmental Quality

Environmental Quality Commission Meeting

January 14, 1977

Room 602, Multnomah County Courthouse

1021 S.W. Fourth Avenue

Portland, Oregon

9:00 a.m.

A. Minutes of December 20, 1976 EQC Meeting

B. Monthly Activity Report for November 1976

C. Tax Credit Applications

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

9:30 a.m.

D. Georgia Pacific, Toledo Plant - Proposed Compliance Schedule for Liquid Waste Treatment — Sawyer

E. Review of Report to the Fifty-Ninth Legislative Assembly by the Environmental Quality Commission on Its Investigation of the Effectiveness of the Motor Vehicle Emissions Program — Householder

10:30 a.m.

F. Martin Marietta - Application for Modification of Martin Marietta's Air Contaminant Discharge Permit for The Dalles Aluminum Plant — Kowalczyk

G. Discussion of Pending Legislation — Gay

- -

Because of the uncertain time spans involved, the Commission reserves the right to deal with any item, except items D and F, at any time in the meeting.

The Commission will breakfast at 7:30 a.m. at the Congress Hotel and any of the items above may be discussed. The Commission will also have lunch at the Congress Hotel (Propeller Room), 1024 S.W. 6th Avenue.

MINUTES OF THE EIGHTY-SECOND MEETING

of the

Oregon Environmental Quality Commission
January 14, 1977

At 9:05 a.m. on Friday, January 14, 1977, the eighty-second meeting of the Oregon Environmental Quality Commission convened in room 602 of the Multnomah County Courthouse, 1021 S.W. Fourth Avenue, Portland, Oregon.

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

Chairman Richards indicated that Item No. F on Martin Marietta, Inc. would not be presented because he had learned that the Company intended to ask for a deferment of action, and no extended discussion would take place at this time.

MINUTES OF DECEMBER 20, 1976 EQC MEETING

It was MOVED by Commissioner Somers, seconded by Commissioner Hallock and unanimously carried that the minutes of the December 20, 1976 meeting be approved as submitted.

MONTHLY ACTIVITY REPORT FOR NOVEMBER 1976

It was MOVED by Commissioner Somers, seconded by Commissioner Hallock and unanimously carried that the Monthly Activity Report for November 1976 be adopted.

TAX CREDIT APPLICATIONS

It was MOVED by Commissioner Somers, seconded by Commissioner Hallock and unanimously carried that the Tax Credit Applications be approved as presented.

PUBLIC FORUM

No one wished to speak on any subject.

Commissioner Somers then suggested that the Commission skip to Item E on the agenda.

REVIEW OF REPORT TO THE FIFTY-NINTH LEGISLATIVE ASSEMBLY BY THE ENVIRONMENTAL QUALITY COMMISSION ON ITS INVESTIGATION OF THE EFFECTIVENESS OF THE MOTOR VEHICLE EMISSIONS PROGRAM

Mr. Ron Householder presented a review of the Department's report to the Legislature on the Motor Vehicle Emissions Program. Commissioner Somers disagreed with the Department's conclusion that there is little or no evidence that the service industry has engaged in price gouging as a result of the inspection program. Commissioner Somers inquired about meeting with the service industry representatives to inform them of the standards and what needs to be done to automobiles to meet the standards. Commissioner Somers indicated that we owe an obligation to both the public and the service industry to inform the service industry of what has to be done to repair automobiles to meet the standards. Mr. Householder acknowledged that the education of the service industry is a serious matter, but that the Department had been restricted in this area. He did indicate that periodic mailings were made to service industry representatives in an effort to keep them informed. Mr. Householder said that the Department had not gotten into putting on training programs, however it does encourage such programs through the community colleges and other educational facilities.

Mr. Householder then presented the Department's recommendations. Chairman Richards questioned if there had been legislation proposed to support these recommendations. Mr. Householder indicated that legislation was being considered by the Department of Motor Vehicles to return to the one-year licensing program. Chairman Richards also asked if a bill had been presented to expand the program to other metropolitan areas. Mr. Householder said he was not aware of any such legislation. Mr. Householder said that there was not sufficient evidence that the ambient air levels were high enough in other areas of the state to warrant inspection programs. Commissioner Hallock inquired about where EPA stood on the issue of going to annual inspection, and if that was needed to stay in compliance with the Clean Air Implementation Plan. Mr. Householder said that EPA strongly supported annual inspection/ maintenance programs. Mr. Householder said that the program had to operate on an annual basis to achieve full effectiveness in complying with the Clean Air Plan.

Commissioner Somers asked Mr. Householder what his feeling was on the private contractors being banned from doing any repairs on the cars they inspect. Mr. Householder said that the type of contractor they were talking about was a private inspection contractor who would run the same type of program the Department runs at the present time. He said this would not be licensing of private garages to run inspections. Mr. Householder said that there was no indication that the fees would be lower by going to a private contractor, but that there might be some improvement in service. Commissioner Somers wanted it committed to the record that under no circumstances should the same people who inspect the cars be allowed to repair them.

Commissioner Somers MOVED that the Director's recommendation be adopted and in addition that the Commission go on record as reaffirming that no private contractor be allowed to conduct the emissions testing program who repairs automobiles or has any financial interest in any concern that also repairs or adjusts automobiles. Commissioner Hallock seconded the motion. Commissioner Phinney asked what portions of the program the $5.00 fee paid for. Mr. Householder replied that the fees were placed into a special account and could only be used for the purposes of operating the vehicle inspection program. The motion carried unanimously.

GEORGIA-PACIFIC PULP AND PAPER MILL-TOLEDO; REQUEST FOR REVISED COMPLIANCE SCHEDULE TO MEET SECONDARY TREATMENT STANDARDS

Mr. Harold Sawyer presented the staff report on this matter and indicated that an order had been negotiated and drafted to establish a timetable for meeting the federal guidelines.

Mr. Robert Haskins of the State Justice Department, presented some background on the negotiated settlement and also presented the Stipulation and Final Order which becomes part of the record on this matter.

Chairman Richards asked Mr. Sawyer if EPA had reviewed the permit that was issued at the time they spent the $2 million. Mr. Sawyer replied that the Department issues the permit and that EPA has the right of review. Mr. Sawyer said that EPA concurred in the issuance of the permit.

Mr. John Vlastelicia then testified on behalf of the Environmental Protection Agency (EPA). He summarized some of the history of the Georgia-Pacific facility and presented EPA's view that the Department's assessment of a $50 per day penalty was not enough. He cited examples of similar situations in mills in Alaska where EPA had assessed penalties of $250 a day for similar violations.

The matter of assessing additional larger penalties was discussed at some length between Commissioner Somers, Chairman Richards and Mr. Vlastelicia. Commissioner Somers and Chairman Richards both felt that Georgia-Pacific had acted in good faith in installing equipment that unfortunately did not work out and that they had spent $2 million in doing so. They therefore felt that the $50 per day penalty for each day during the period July 1, 1977 through March 21, 1978 and the $2,500 per day penalty from April 1, 1978 until compliance was achieved was sufficient. Mr. Vlastelicia stated that EPA disagreed with this view and urged the Commission to adopt a higher penalty than stated in the Stipulation and Final Order.

Commissioner Crothers MOVED, Commissioner Somers seconded and it was carried unanimously that the Stipulation and Final Order which was drafted and agreed upon between the Department and the applicant be approved.

DISCUSSION OF PENDING LEGISLATION

Dr. Robert L. Gay of the Department's staff discussed the staff report regarding pending legislation. Part of this discussion had been conducted earlier at the breakfast of the Commission. Chairman Richards indicated that the reason this item was on the agenda was to invite public comment on the legislation. Commissioner Crothers inquired as to the background of the bill the Director withheld. It regarded giving EQC the authority to initiate formation of a sanitary authority. Mr. Fred Bolton explained that there had been a problem in Albany of refusing to extend service to outlying areas. He cited another example in Klamath Falls. Mr. Bolton stated that all this proposed bill would have done was to give the Commission the authority to initiate formation of these sanitary authorities, if no other solution was available for sewering areas that municipalities absolutely refused to. Mr. Bolton said that the Commission already has the same authority through the county service districts. He said this proposed bill would have given the Commission another alternative. Commissioner Crothers agreed that it would have just given the Commission the authority to initiate the sanitary authority, but it would still have been up to the people to establish it.

Commissioner Somers questioned the bill that would take away from the Commission the authority to issue air quality permits. Chairman Richards requested more staff analysis on this bill, and suggested that maybe there should be a cutoff point based on the size of the facility. Commissioner Hallock stated that she didn't think a bill was needed at all. She said that if there were insignificant permits that the staff felt needn't go to the Commission, that could be accomplished by rule without changing the statute.

Mr. Harold Patterson stated that the staff was confused because it was not aware of any legislation to change the Commission's permit authority. He stated that the legislation submitted referred to approval of plans and specifications. Chairman Richards clarified that they were talking about notices of construction, and that the Commission needed to be more fully informed as to the reason behind the bill, what the effect would be, and would it be much different than the way the Commission operates at the present time.

MARTIN MARIETTA -- APPLICATION FOR MODIFICATION OF MARTIN MARIETTA'S AIR CONTAMINANT DISCHARGE PERMIT FOR THE DALLES ALUMINUM PLANT

Chairman Richards suggested that Mr. John Kowalczyk not present any recommendations, but instead inform the Commission of the situation as regards the application. Mr. Kowalczyk stated that the matter of the modification of Martin Marietta's air contaminant discharge permit had principally focused on the economics of the type of system that would be needed. Mr. Kowalczyk stated that the Department had concluded that if Martin Marietta wished to change their air pollution control system that it should maintain its collection efficiency of air pollutants at the same level that it presently has (70% SO_2 control efficiency). Mr. Kowalczyk stated that EPA also had jurisdiction in this matter and that they must approve the system in relation to their Prevention of Significant Deterioration Regulation. Mr. Kowalczyk stated that EPA had made a final determination that the 70% SO_2 control efficiency represented best available control technology with regard to the federal requirements. Mr. Kowalczyk stated that the EPA requirement was essentially the same as what the Department required. Mr. Kowalczyk also stated that because this was a final action on the part of EPA, if the Company did not agree with this proposal there was no administrative relief, and the Company would have to seek relief through federal courts.

Mr. Douglas M. Ragen representing Martin Marietta Aluminum, Inc. read a statement on behalf of the Company requesting that the EQC defer action on the modification of the Company's air contaminant discharge permit. Mr. Ragen stated the reasons for this request were the recent EPA ruling; the length of time it has already taken and would take in the future to delay the application process, the costs of equipment etc. He said all of this would require a reevaluation of costs and alternatives. Mr. Ragen stated that the Company's reevaluation is estimated to take approximately one month.

Commissioner Crothers MOVED, Commissioner Hallock seconded, and it was carried unanimously that the Commission honor the request of Martin Marietta.

There being no further business, the meeting was adjourned at 10:45 a.m.

ENVIRONMENTAL QUALITY COMMISSION

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

ROBERT W. STRAUB
GOVERNOR

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item B, January 14, 1977, EQC Meeting

November Program Activity Report

Discussion

Attached is the November 1976 Program Activity Report.

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

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

Recommendation

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

William H. Young

WILLIAM H. YOUNG
Director

RLF:sw
1/4/77

Department of Environmental Quality
Technical Programs

Permit and Plan Actions

November 1976

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air, Water and Solid Waste Management Divisions
(Reporting Unit)

November 1976
(Month and Year)

SUMMARY OF PLAN ACTIONS

	Plans Received		Plans Approved		Plans Disapproved		Plans
	Month	Fis.Yr.	Month	Fis.Yr.	Month	Fis.Yr.	Pending
Air							
Direct Sources	14	61	5	49		1	26
Total	14	61	5	49		1	26
Water							
Municipal	65	508	75	453			34
Industrial	18	59	20	59	1	2	4
Total	83	567	95	512	1	2	38
Solid Waste							
General Refuse	9	26	9	32		1	10
Demolition	2	4		2			3
Industrial	3	11	3	14			3
Sludge		2		2			
Total	14	43	12	50		1	16
Hazardous Wastes		4		4			
GRAND TOTAL	111	675	112	615	1	4	80

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division

November 1976

Plan Actions Completed - 95

County	Name of Source/Project/ Site and Type of Same		Date Rec'd	Date of Action	Action	Time to Complete Action
	Municipal Sources - 75					
10	SUTHERLIN	RAINTREE ESTATES @REVISED*	K102176	110176	PROV APP	11
04	SUN DOWN SD	LAB . CHLORINE BLDG RECONST.	V100776	110176	APPRD060772	24
24	SALEM	HA-MAR ADDITION	K101976	110176	PROV APP	13
10	REEDSPORT	CALCOTE MAIN REVISED	J102876	110176	PROV APP	04
24	SALEM	MOUNTAIN SHADOW ESTATES	J101876	110276	PROV APP	15
03	LAKE OSWEGO	HARVEY WAY TRUNK	V102976	110276	PROV APP	05
24	SALEM	WILLAMETTE CHERRY GROWERS	J102676	110276	PROV APP	07
16	MADRAS	LATERAL B-7	J102676	110276	PROV APP	07
4	ASTORIA	5TH ST. TO 14TH ST.	J101276	110376	PROV APP	22
34	USA / TIGARD	S W PARK ST	K102776	110376	PROV APP	07
22	SWEET HOME	LONG ST EAST OF 24TH AV	K102776	110376	PROV APP	07
3	LAKE OSWEGO	BUCKLEY TOWNHOUSE - MTN PK	K102776	110376	PROV APP	07
10	ROSEBURG	SUNBERRY HILLS 2ND ADD	J102276	110376	PROV APP	12
26	TROUTDALE	SANDEE PALASADES DEVELOPMENT	J101876	110876	PROV APP	31
20	EUGENE	PETERSON STREET	K101876	110876	PROV APP	21
20	EUGENE	HOLLY STREET	K101876	110876	PROV APP	21
20	EUGENE	MARTIN STREET	K101876	110876	PROV APP	21
20	EUGENE	CHERRY@S ADDITION	K101876	110876	PROV APP	21
20	EUGENE	AGATE ST EMERALD ST 26-27 AV	K101876	110876	PROV APP	21
30	PENDLETON	HILLVIEW ADDITION NO.2	J102876	110876	PROV APP	11
26	PORTLAND	SE 103 RD AVE/MT SCOTT BLVD	J101976	110876	PROV APP	20
26	PORTLAND	SE 84TH AVE SE INSLEY ST	J101476	110876	PROV APP	25
6	COOS BAY	PORTA VISTA MOBILE ESTATES	K100876	110976	PROV APP	32
30	HERMISTON	SOUTH HIGHWAY 395 WARLICK	K110176	110976	PROV APP	08
26	PORTLAND	SE RELEIVING INTERCEPTOR	J101576	110976	PROV APP	25
34	USA / ALOHA	TORREYVIEW NO. 2	101876	110976	PROV APP	22
34	USA / ALOHA	KAY JAY SUBD	J101576	110976	PROV APP	25

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division

November 1976

Plan Actions Completed

County	Name of Source/Project/ Site and Type of Same		Date Rec'd	Date of Action	Action	Time to Complete Action
34	USA / ALOHA	NW CORNELL RD/143 RD AVE LIO	J102076	110976	PROV APP	20
21	YACHATS	HABLUCTZEL LATERAL	K100976	111076	PROV APP	38
22	HARRISBURG	PUMP STATION - MOORE APTMNTS	K101876	111076	PROV APP	23
03	CCSD NO 1	BIG A DOON SUBD	J110376	111276	PROV APP	09
29	NORTH TILL SA	CHANGE ORDER B-6	V100876	111276	APPROVAL	35
36	USA / ALOHA	ROCK CREEK VILLAGE	J101476	111276	PROV APP	31
24	SALEM	SUNNYSIDE RD/BATTLE CR./NEAH	J101576	111276	PROV APP	28
26	GRESHAM	VILLA ROMOLD - KELLY CREEK	102776	111276	PROV APP	16
24	WESTRN MODULAR	EFFLUENT STORAGE LAGOON	J100476	111276	PROV APP	39
31	UNION	CHANGE ORDER NO 1	102976	111276	APPROVED	14
26	TROUTDALE	NORTHRIDGE	J102676	111576	PROV APP	21
31	COVE	SEWERS AND STP	091576	111576	PROV APP	51
03	WEST LINN	ROBINWOOD ESTATES II	K100576	111576	PROV APP	21
26	PORTLAND	N EXETER, N. OF N. HUDSON	K110576	111676	PROV APP	05
26	PORTLAND	SW49, SW50 SO. OF GARDEN HM	K110576	111676	PROV APP	05
34	USA / ALOHA	SUMMER CREST SUBD	J102776	111676	PROV APP	20
17	HARBECK FRUIT	ELIASON SUBD	J110176	111676	PROV APP	15
17	GRANTS PASS	OAKVIEW SUBD	J111576	111676	PROV APPROVAL	01
21	YACHATS	R DRIVE ¤SOUTH	K111576	111676	PROV APPROVAL	01
34	USA / DURHAM	SUN VALLE NO 2	K110176	111776	PROV APP	16
24	SALEM	WALT WEST COMMERCIAL ST S.E.	K110276	111776	PROV APP	15
30	MILTON FR H20	17TH AVE AND OAK ST	K110376	111776	PROV APP.	14
20	EUGENE	1ST AVE FROM SENECA RD 650FT	K110376	111776	PROV APP	14
24	SALEM	HARRIS ADD RAYWANDA CT	J110176	111776	PROV APP	16
26	GRESHAM	FAIRVIEW ADDITION	J110276	111776	PROV APP	15
34	USA/DURHAM	CHANGE ORDERS 28 & 29	V100876	111776	APPROVAL	30
24	SILVERTON	FIVE FIR SUBD. ¤REVISED*	J100876	111776	PROV APP	40

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division — November 1976

Plan Actions Completed

County	Name of Source/Project/Site and Type of Same		Date Rec'd	Date of Action	Action	Time to Complete Action
24	SILVERTON	IMELADD DREVISED*	J100876	111776	PROV APP	40
20	WEST COAST TRUCK LINES INC GOSHEN		V102676	111876	PROV APP	24
10	OAKLAND	INDEPENDENCE VILLAGE 9TH&ASH	K111876	111876	PROV APP	00
24	SALEM	ADD # 1 SUNNYSIDE / BTTL CR	V111776	111876	APPROVED	01
22	SWEET HOME	N OF MAIN STREET W OF 15TH	K110276	111876	PROV APPROVAL	16
03	OAKLODGE SD	RELIEF SEWER RIVER ROAD	J100876	112376	PROV APP	46
34	USA/FANNO CR	B & B CONTRACT C ORDERS 1-7	V112276	112376	APPROVED	01
34	USA/FANNO CR	TEEPLES & TH. C.ORDERS 1,2&6	V112276	112376	APPROVED	01
34	USA HILLSBORO	ROCK CREEKS INTERTIE	V110376	112476	VERBAL APP	21
03	CANBY	CLARK AND OLIVER ADD.	J101276	112476	PROV APP	47
18	CHILOQUIN	CHANGE ORDER NO. 3	V112276	112476	APPROVED	02
34	TUALATIN	BUFFALO PLAINS	J101076	112676	PROV APP	37
29	NETARTSOCEAN	SIDE STP & PUMP STATIONS-3-	090776	112676	PROV APP	50
29	NETARS OCEAN	SIDE INT. & COLL. SEWERS	092476	112676	PROV APP	33
26	TROUTDALE	OLD SWEETBRIAR FARM MULTIFAM	J101076	112676	PROV APP	47
34	USA/ROCK CR	DATA ACQUISITION COMPUT SYST	V112376	112676	APROVED	03
24	LABISH	CHANGE ORDERS A,B,D,1&2	V112376	112676	APPROVED	03
36	MCMINNVILLE	RIVER PARK SUBDIVISION	J112276	112676	PROV APP	04
24	KEIZER SALEM	KEPHART ESTATES	J111576	113076	PROV APP	46
24	SALEM	BAXTER PARK SUBD	J111576	113076	PROV APP	46
34	USA	DURHAM CHANGE 25 & 31	V112676	113076	APPROVED	04

Department of Environmental Quality
Technical Programs

Monthly Activity Report

Water Quality Division
(Reporting Unit)

November, 1976
(Month and Year)

PLAN ACTIONS COMPLETED - 95

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
INDUSTRIAL WASTE SOURCES (20)			
Marion	Castle & Cooke - Salem Retort Cooling Water Disposal	11/ 3/76	Approved
Multnomah	Port Services - Portland Import Car Wash Waste Water Treatment	11/ 4/76	Approved
Yamhill	Protein Products - Newberg Waste Water Collection & Storm Water Separation	11/ 4/76	Approved
Douglas	Sun Studs, Inc. - Roseburg Log Pond Water Improvement and Control	11/ 9/76	Approved
Columbia	Kaiser Gypsum - St. Helens Outfall Structure	11/10/76	Approved
Josephine	City of Cave Junction, Water Treatment Plant, Back Wash Treatment	11/15/76	Approved
Washington	Tektronix, Inc. - Beaverton Drain Lines to Chrome Waste	11/15/76	Approved
Linn	Oregon Metallurgical - Albany Oil Removal From Effluent	11/16/76	Approved
Tillamook	Tillamook Creamery Assn. - Tillamook Modification to Oxigest Unit Digester	11/18/76	Approved
Tillamook	Tillamook Creamery Assn. - Tillamook Waste Water Control Instruments	11/18/76	Approved
Tillamook	Tillamook Creamery Assn. - Tillamook Caustic Supply Tank	11/18/76	Approved
Tillamook	Tillamook Creamery Assn. - Tillamook Tilt Station for Hydrogen Peroxide	11/18/76	Approved
Tillamook	Tillamook Creamery Assn. - Tillamook Surge Tank Blower	11/18/76	Approved

Department of Environmental Quality
Technical Programs

Monthly Activity Report

Water Quality Division
(Reporting Unit)

November, 1976
(Month and Year)

PLAN ACTIONS COMPLETED (95)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
INDUSTRIAL WASTE SOURCES - Continued			
Washington	Tektronix, Inc. - Beaverton Waste Water Analysis Equipment	11/18/76	Approved
Washington	Tektronix, Inc. - Beaverton Monitoring Samplers	11/18/76	Approved
Washington	Tektronix, Inc. - Beaverton Industrial Waste Pipe Line Diversion From Beaverton Creek	11/18/76	Approved
Multnomah	Portland Union Stock Yards - Portland, Animal Waste Disposal	11/19/76	Approved
Clatsop	Astoria Plywood Corp. - Astoria Dryer Wash Water To Sanitary Sewer	11/22/76	Approved
Tillamook	Louisiana-Pacific - Tillamook Veneer Dryer Wash Down Waste Disposal	11/26/76	Approved
Douglas	Roseburg Lumber - Dillard Veneer Dryer Waste Water Recirculation	11/29/76	Approved

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division
(Reporting Unit)

November, 1976
(Month and Year)

SUMMARY OF WATER PERMIT ACTIONS

	Permit Actions Received				Permit Actions Completed				Permit Actions Pending		Sources Under Permits		Sources Reqr'g Permits	
	Month		Fis.Yr.		Month		Fis.Yr.							
	*	**	*	**	*	**	*	**	*	**	*	**	*	**
Municipal														
New	0	0	0	2	1	1	7	4	0	5				
Existing	0	0	0	0	0	0	1	2	2	4				
Renewals	4	1	16	2	6	1	26	2	37	1				
Modifications	2	0	13	0	6	1	23	1	9	0				
Total	6	1	29	4	13	3	57	9	48	10	298	58	300	67
Industrial														
New	0	1	3	4	0	1	1	5	4	2				
Existing	0	0	0	1	2	0	4	11	2	0				
Renewals	5	0	22	6	1	1	19	8	31	5				
Modifications	2	0	19	2	9	0	29	0	17	1				
Total	7	1	44	13	12	2	53	24	54	8	427	84	433	86
Agricultural (Hatcheries, Dairies, etc.)														
New	0	0	1	0	1	0	1	1	3	0				
Existing	0	0	0	0	0	0	0	1	0	0				
Renewals	0	0	0	0	0	0	0	0	0	0				
Modifications	0	0	9	0	9	0	11	0	0	0				
Total	0	0	10	0	10	0	12	2	3	0	62	8	65	8
GRAND TOTALS	13	2	83	17	35	5	122	35	105	18	787	150	798	161

* NPDES Permits
** State Permits

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division
(Reporting Unit)

November, 1976
(Month and Year)

PERMIT ACTIONS COMPLETED (40)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Columbia	Department of Fish & Wildlife Trojan Rearing Ponds	11/10/76	NPDES Permit Issued
Coos	Lakeside, City of Sewage Disposal	11/10/76	NPDES Permit Issued
Douglas	Daniel Webb Rice Hill West Lagoon	11/10/76	NPDES Permit Issued
Douglas	Ranch Motel Rice Hill East Lagoon	11/10/76	NPDES Permit Issued
Jackson	Callahan's Siskiyou Lodge Domestic Sewage	11/10/76	NPDES Permit Issued
Lane	Delta Sand & Gravel Aggregate Plant	11/10/76	NPDES Permit Issued
Multnomah	Ameron Pipe Products Concrete Pipe	11/10/76	NPDES Permit Modified
Washington	Tektronics Electroplating Waste	11/10/76	NPDES Permit Modified
Lane	Willamette Poultry Company, Inc. Poultry Processing	11/10/76	NPDES Permit Modified
Clackamas	Crown Zellerbach Corporation Park Lumber - Sawmill	11/10/76	NPDES Permit Modified
Linn	Scio, City of Sewage Disposal	11/12/76	NPDES Permit Issued
Lane	Treplex, Inc. Lumber Mill	11/12/76	NPDES Permit Issued
Columbia	St. Helens, City of Sewage Disposal	11/12/76	NPDES Permit Modified
Linn	Brownsville, City of Sewage Disposal	11/12/76	NPDES Permit Modified
Clatsop	Bumble Bee - Elmore Fish Processing	11/12/76	NPDES Permit Modified

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division (Reporting Unit)   November, 1976 (Month and Year)

PERMIT ACTIONS COMPLETED (40 con't)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Clatsop	Bumble Bee - Hanthorn Fish Processing	11/12/76	NPDES Permit Modified
Clackamas	Oregon City, City of Sewage Disposal	11/12/76	NPDES Permit Modified
Clackamas	West Linn, City of Willamette - Sewage Disposal	11/12/76	NPDES Permit Modified
Clackamas	West Linn, City of Bolton - Sewage Disposal	11/12/76	NPDES Permit Modified
Clatsop	Department of Fish & Wildlife Big Creek Hatchery	11/12/76	NPDES Permit Modified
Linn	Department of Fish & Wildlife Marion Forks Hatchery	11/12/76	NPDES Permit Modified
Lane	Department of Fish & Wildlife Willamette Hatchery	11/12/76	NPDES Permit Modified
Jackson	Department of Fish & Wildlife Butte Falls Hatchery	11/12/76	NPDES Permit Modified
Klamath	Department of Fish & Wildlife Klamath Hatchery	11/12/76	NPDES Permit Modified
Clackamas	Department of Fish & Wildlife Sandy River Hatchery	11/12/76	NPDES Permit Modified
Hood River	Department of Fish & Wildlife Oxbow Hatchery	11/12/76	NPDES Permit Modified
Multnomah	Department of Fish & Wildlife Cascade Hatchery	11/12/76	NPDES Permit Modified
Multnomah	Department of Fish & Wildlife Bonneville Hatchery	11/12/76	NPDES Permit Modified
Linn	Fir Cove Sanitary Corporation Sewage Disposal	11/14/76	State Permit Transferred

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division
(Reporting Unit)

November, 1976
(Month and Year)

PERMIT ACTIONS COMPLETED (40 con't)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Yamhill	Carlton Packing Company Slaughterhouse	11/18/76	State Permit Issued
Yamhill	Knudsen Erath Winery Wine Pressing Waste	11/18/76	State Permit Issued
Deschutes	Redmond, City of Sewage Disposal	11/18/76	State Permit Issued
Deschutes	Brooks Resources Black Butte - Sewage Disposal	11/18/76	State Permit Issued
Malheur	Amalgamated Sugar Nyssa Plant	11/24/76	NPDES Permit Modified
Grant	John Day, City of Sewage Disposal	11/30/76	NPDES Permit Issued
Lane	Lowell, City of Filtration Plant	11/30/76	NPDES Permit Issued
Grant	Prairie City, City of Sewage Disposal	11/30/76	NPDES Permit Issued
Lane	Pacific Resin & Chemical Glue Manufacture	11/30/76	NPDES Permit Modified
Umatilla	Umatilla, City of Sewage Disposal	11/30/76	NPDES Permit Modified
Linn	Willamette Industries, Inc. Duraflake - Particleboard	11/30/76	NPDES Permit Modified

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air Quality
(Reporting Unit)

November 1976
(Month and Year)

PLAN ACTIONS COMPLETED (5)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Direct Stationary Sources (5)			
Multnomah (818)	Precision Castparts, baghouse.	10/29/76	Approved.
Hood River (825)	W. C. Laraway, orchard fan.	11/9/76	Approved.
Multnomah (800)	Cook Industries, Rivergate, modification to new grain terminal.	11/10/76	Approved.
Washington (830)	Andy's Cabinet, spray paint booth.	11/18/76	Approved.
Jackson (831)	SWF, White City, Clarke baghouse for plt 6.	11/29/76	Approved.

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air Quality (Reporting Unit) — November 1976 (Month and Year)

SUMMARY OF AIR PERMIT ACTIONS

	Permit Actions Received Month	Permit Actions Received Fis.Yr.	Permit Actions Completed Month	Permit Actions Completed Fis.Yr.	Permit Actions Pending	Sources under Permits	Sources Reqr'g Permits
Direct Sources							
New	1	13	4	16	7		
Existing	3	27	1	46	27		
Renewals	48	75	3	76	86		
Modifications	--	10	26	76	4		
Total	52	125	34	214	124	2186	2220
Indirect Sources							
New	2	8	1	14	6		
Existing							
Renewals							
Modifications	0	2	1	2	0		
Total	2	10	2	16	6	49	
GRAND TOTALS	54	135	36	230	130	2235	

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air Quality (Reporting Unit) | November 1976 (Month and Year)

PERMIT ACTIONS COMPLETED (36)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Baker	Ellingson Timber Co. 01-0004, (Modification)	10/22/76	Addendum Issued
Benton	Green & White Rock 02-2125, Redi-mix Concrete (New)	11/24/76	Permit Issued
Curry	Brookings Plywood 08-0003 (Modification)	10/22/76	Addendum Issued
Curry	South Coast Lumber Co. 08-0008 (Modification)	10/22/76	Addendum Issued
Deschutes	Brooks Willamette 09-0003 (Modification)	10/22/76	Addendum Issued
Douglas	Nordic Veneer 10-0023 (Modification)	10/22/76	Addendum Issued
Douglas	Woolly Enterprises 10-0028 (Modification)	10/22/76	Addendum Issued
Douglas	Champion International 10-0037 (Modification)	10/22/76	Addendum Issued
Douglas	Superior Lumber Co. 10-0048 (Modification)	10/22/76	Addendum Issued
Douglas	Drain Plywood 10-0054 (Modification)	10/22/76	Addendum Issued
Douglas	Fiberboard Corp. 10-0071 (Modification)	10/22/76	Addendum Issued
Douglas	Champion International 10-0079 (Modification)	10/22/76	Addendum Issued
Grant	Edward Hines Lumber 12-0015 (Modification)	10/22/76	Addendum Issued
Hood River	Champion International 14-0009 (Modification)	10/22/76	Addendum Issued
Jackson	Boise Cascade 15-0004, Addendum	11/4/76	Addendum Issued

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air Quality (Reporting Unit) | November 1976 (Month and Year)

PERMIT ACTIONS COMPLETED (36 con't)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Jackson	Louisiana Pacific 15-0007 (Modification)	10/22/76	Addendum Issued
Jackson	SWF Plywood 15-0012 (Modification)	10/22/76	Addendum Issued
Jackson	Medford Corp. 15-0014 (Modification)	10/22/76	Addendum Issued
Jackson	KOGAP Manufacturing Co. 15-0015, Plywood (Modification)	11/24/76	Permit Issued
Klamath	Boise Cascade 18-0018 (Modification)	10/22/76	Addendum Issued
Klamath	Georgia-Pacific Corp. 18-0019, Sawmill (Change of Ownership)	11/24/76	Permit Issued
Lake	Louisiana Pacific 19-0002 (Modification)	10/22/76	Addendum Issued
Lake	Lakeview Lumber Products 19-0006 (Modification)	10/22/76	Addendum Issued
Lake	Fremont Sawmill 19-0011 (Modification)	10/22/76	Addendum Issued
Linn	Albany General Hospital 22-0022, Incinerator (Renewal)	11/12/76	Permit Issued
Malheur	Holy Rosary Hospital 23-0020, Incinerator (New)	11/12/76	Permit Issued
Marion	Westwood Products, Inc. 24-5774, Mill Work (Renewal)	11-24-76	Permit Issued
Marion	Industry Rock Supply, Inc. 24-0721, Rock Crusher (Renewal)	11/24/76	Permit Issued

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air Quality (Reporting Unit) — November 1976 (Month and Year)

PERMIT ACTIONS COMPLETED (36 con't)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Umatilla	M & T Lumber 30-0022 (Modification)	10/22/76	Addendum Issued
Umatilla	Cel Pril Industries, Inc. 30-0079, Seed Coating (New)	11/24/76	Permit Issued
Wallowa	Boise Cascade 32-0001 (Modification)	10/22/76	Addendum Issued
Wasco	Mountain Fir Lumber Co. 33-0008 (Modification)	10/22/76	Addendum Issued
Yamhill	Reid-Wolf, Inc. 36-7027, Rock Crusher (New)	11/24/76	Permit Issued
Portable	T. L. Freeman 37-0139 (Existing)	10/26/76	Permit Issued
Indirect Sources (2)			
Washington	Washington Square 1000 temporary parking spaces	11/18/76	Permit Modification Issued
Multnomah	First Assembly of God Church 217 space parking facility	11/2/76	Final Permit Issued

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Solid Waste Division (Reporting Unit)

November 1976 (Month and Year)

PLAN ACTIONS COMPLETED (12)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Clatsop	City of Astoria Existing Site Operational Plan	9/23/76	Approved
Hood River	Hood River Sanitary Landfill Existing Site Leachate Control Plan	11/3/76	Provisional approval
Marion	Macleay Transfer Station Existing Site Operational Plan	11/5/76	Approved
Clatsop	Crown Zellerbach Existing Site Operational Plan	11/15/76	Approved
MSD	MSD Recycling Study	11/17/76	Approved
Douglas	Myrtle Creek Disposal Site Existing Site Closure Plan	11/18/76	Approved
Douglas	Oakland Disposal Site Existing Site Closure Plan	11/18/76	Approved
Tillamook	Gienger Wood Waste Site Existing Site Operational Plan	11/19/76	Approved
Lincoln	Publishers Paper Existing Site Operational Plan	11/19/76	Letter of authorization
Deschutes	Riverside Ranch Transfer Station Existing Site Construction & Operational Plan	11/22/76	Approved
Lane	Short Mountain Landfill New Site Construction & Operational Plan	11/29/76	Provisional approval
Multnomah	St. John's Landfill Existing Site Expansion Plan	11/30/76	Provisional approval

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Solid Waste Division (Reporting Unit) — November 1976 (Month and Year)

SUMMARY OF SOLID AND HAZARDOUS WASTE PERMIT ACTIONS

	Permit Actions Received		Permit Actions Completed		Permit Actions	Sites Under	Sites Reqr'g
	Month	Fis.Yr.	Month	Fis.Yr.	Pending	Permits	Permits
General Refuse							
New		5		4	3		
Existing			1	14	34 (*)		
Renewals	1	5	2	9	2		
Modifications	1	3	1	7			
Total	2	13	4	34	39	191	194
Demolition							
New		2		3			
Existing				1			
Renewals		1	1	1	1		
Modifications							
Total	0	3	1	5	1	13	13
Industrial							
New		2	1	5			
Existing			1	3	9 (*)		
Renewals		4	2	6	3		
Modifications		1		2			
Total	0	7	4	16	12	88	91
Sludge Disposal							
New		2		2			
Existing							
Renewals				2			
Modifications		1		1			
Total	0	3	0	5	0	9	9
Hazardous Waste							
New							
Authorizations	8	40	11	44			
Renewals							
Modifications							
Total	8	40	11	44	0	1	1
GRAND TOTALS	10	69	20	104	52	302	308

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

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Solid Waste Division — (Reporting Unit)

November 1976 — (Month and Year)

PERMIT ACTIONS COMPLETED (20)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
General Refuse (Garbage) Facilities (4)			
Lake	Paisley Disposal Site Existing facility	11/3/76	Permit issued
Lane	McKenzie Bridge Landfill Existing facility	11/5/76	Permit issued (renewal)
Umatilla	Rahn's Sanitary Landfill Existing facility	11/5/76	Permit issued (renewal)
Klamath	Chiloquin Landfill Existing facility	11/25/76	Permit amended
Demolition Solid Waste Facilities (1)			
Multnomah	Don Obrist, Inc. Existing facility	11/22/76	Permit issued (renewal)
Sludge Disposal Facilities (0)			
Industrial Solid Waste Facilities (4)			
Jackson	Kogap Manuf. Existing facility	11/3/76	Permit issued
Lane	Cascade Landfill New facility	11/5/76	Permit issued
Lane	Priceboro Landfill Existing facility	11/5/76	Permit issued (renewal)
Lincoln	Publishers Forest Prod. Existing facility	11/18/76	Letter Authorization issued (renewal)

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Solid Waste Division
(Reporting Unit)

November 1976
(Month and Year)

PERMIT ACTIONS COMPLETED (continued)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Hazardous Waste Facilities (11)			
Gilliam	Chem-Nuclear Systems, Inc. Existing facility	11/1/76	Disposal Authorization approved.
"	" " " "	11/3/76	" "
"	" " " "	11/15/76	" "
"	" " " "	11/16/76	Two (2) disposal authorizations approved and one (1) amended.
"	" " " "	11/17/76	Disposal authorization amended.
"	" " " "	11/26/76	Disposal authorization approved.
"	" " " "	11/29/76	One (1) disposal authorization approved and one (1) amended.
"	" " " "	11/30/76	Disposal authorization amended.

STATE OF OREGON 1859

ENVIRONMENTAL QUALITY COMMISSION

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

ROBERT W. STRAUB
GOVERNOR

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. C, January 14, 1977, EQC Meeting

Tax Credit Actions

Attached are requests for tax credit action. The recommendations of the Director are summarized in the attached table.

Director's Recommendation

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

1. Issue Pollution Control Facility Certificate for T-852.
2. Revoke Peerless Pattern Works Certificate No. 319 and reissue new certificate to Grafton Pattern, Inc. because of change of ownership (authorizing letter attached).
3. Revoke Boise Cascade Corporation Certificate No. 470 and reissue to Georgia Pacific Corporation because of change of ownership (authorizing letters attached).

William H. Young
WILLIAM H. YOUNG
Director

/cs
1-5-77
Attachments

TAX CREDIT SUMMARY

Proposed January 1977 Totals:

Air Quality	$15,890
Water Quality	0
Solid Waste	0
	$15,890

Calendar Year Totals to Date:
(excluding January totals)

Air Quality	$16,258,206.27
Water Quality	14,547,524.15
Solid Waste	7,032,799.08
	$37,838,529.50

Total Certificates Awarded (monetary values)
Since Inception of Program (excluding
proposed January certificates)

Air Quality	$128,585,115.07
Water Quality	106,039,981.93
Solid Waste	27,342,526.55
	$261,967,533.55

TAX CREDIT APPLICATIONS

lant Location	Appl. No.	Facility	Claimed Cost	% Allocable to Pollution Control	Di Rec
Ackerman	T-852	Tropic Breeze Wind Machines	$15,890	100%	
attern Works	T-380	Shaving & sawdust collection system	12,732	100%	Rev rei Gra bec own
ade Corp.	T-529	Wigwam waste burner modification	59,248		Rev rei Geo bec own

Appl T-852

Date 1/5/77

State of Oregon
Department of Environmental Quality

Tax Relief Application Review Report

1. Applicant

George M. Ackerman
Route 6, Box 465
Hood River, Oregon 97031

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

2. Description of Facility

The facility claimed in this application consists of two Tropic 8reeze Wind Machines. The facility cost consist of:

a. Tropic Breeze Wind Machines numbered 16697 and 16698 with 86 HP fan. $15,890.00

Specifications for model GP-300-G wind machine including the concrete pad and an aero-photo map showing the location of the machines are in file T-852.

Construction of the claimed facility was started in April 1976 and completed in May 1976. The facility was placed in operation in May 1976. A "Notice of Construction and Application for Approval" was filed and was approved by the Department on April 26, 1976.

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

Facility cost: $15,890.00 (Accountant's certification was provided).

3. Evaluation of Application

The wind machines utilize warm air inversions normally present above the orchard during frosty nights. The fan on the tower operates in this layer of air, forcing warm air to mix with cold air at ground level, thereby providing frost protection on approximately 8 acres of orchard per machine.

These machines eliminate or significantly reduce the need to control frost with diesel fired heaters which pollute the air with smoke.

During the 1976 season, these machines effectively protected the orchard from frost without additional heat from diesel heaters.

The operating cost of the claimed facility is greater than the value of the diesel fuel oil saved and of the labor cost incurred with diesel heaters. It is concluded that 100% of the cost of this facility is allocable to air pollution control.

4. Directors Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $15,890.00 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Credit Application No. T-852.

RP:ds
1/6/77

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
DEC 20 1976
AIR QUALITY CONTROL

December 15, 1976

P.B.B.

Mr. Peter Bosserman
Department of Environmental Quality
1234 S. W. Morrison Street
Portland, Oregon 97205

Dear Mr. Bosserman:

Peerless Pattern Works was granted an Anti-Pollution Control Facility Certificate (No. 319). At that time Peerless Pattern Works elected to take the Oregon tax credit relief rather than the property tax relief. Peerless Pattern Works has recently changed ownership and this certificate should now be transferred to the new owners.

The new corporation, Grafton Pattern, Inc., took over ownership October 16, 1976. According to the accounting records, Peerless Pattern Works took the maximum credit allowed of 5% per year of the total cost for the years 1972, 1973, 1974 and 1975. That would allow Grafton Pattern, Inc. to use the maximum allowable credit available per year for the next six years.

Please notify Grafton Pattern, Inc. when the certificate has been transferred to them. The address is:

Grafton Pattern, Inc.
2236 Reed Street
Portland, Oregon 97210

Sincerely yours,

H. T. Swigert
Secretary-Treasurer
Peerless Pattern Works

/sf

cc: Mr. Howard Grafton - Grafton Pattern, Inc.
Mr. John Shepherd - ESCO
Mr. David R. Jubb - Coopers & Lybrand (Portland)

Georgia-Pacific Corporation

900 S.W. Fifth Avenue
Portland, Oregon 97204
Telephone (503) 222-5561

December 14, 1976

Ms. Carol A. Splettstaszer
Administrative Assistant
1234 S.W. Morrison Street
Portland, OR 97205

Dear Ms. Splettstaszer:

Georgia-Pacific Corporation hereby applies for tax credit on a pollution control facility purchased from Boise Cascade Corporation on March 30, 1976. This asset was approved by the Department of Environmental Quality on Certificate Number 470, dated February 22, 1974.

As outlined in Oregon Law, this certificate should be revoked and a new certificate issued to Georgia-Pacific. This will enable Georgia-Pacific to properly apply the remaining allowable credit against future Oregon income taxes.

Sincerely,

R. M. Crockford

R. M. Crockford
Controllers Department

RMC/ls

JUL 21 1976

General Offices

One Jefferson Square
Boise, Idaho 83728
(208) 384-6161
Cable: BOCASCO

Boise Cascade Corporation

July 16, 1976

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

RE: Boise Cascade Corporation
Pollution Control Tax Relief
Certificate No. 470

Gentlemen:

Effective March 30, 1976, certain assets owned by Boise Cascade Corporation including those covered under the above certificate were sold to Georgia Pacific Corporation.

This letter is to notify the Department of Environmental Quality of that sale in accordance with paragraph 4 of O.R.S. 307.405. A copy of the certificate is attached for ease of reference.

Sincerely,

Pete L. Wilson
Western Property Tax Administrator
PLW/dh
Enc.
cc: Mr. Robert Oslund - Georgia Pacific Corporation

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6572A
6

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

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

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. D, January 14, 1977, EQC Meeting

Georgia-Pacific Pulp and Paper Mill - Toledo
Request for Revised Compliance Schedule to
Meet Secondary Treatment Standards

Background

Georgia-Pacific Corporation has notified the Department that it will be unable to meet the more stringent effluent limitations required on May 31, 1977, as specified in their NPDES Waste Discharge Permit. These effluent limitations for BOD-5 are 9,500 pounds per day (monthly average) and 19,700 pounds per day (daily maximum). Georgia-Pacific has proposed a revised compliance schedule which would extend the date for meeting these BOD-5 effluent limitations to April 1, 1978.

At the December 21, 1972 EQC meeting, the Commission approved an expansion of the Georgia-Pacific Toledo Mill. The expansion included improvements to the mill which would permanently eliminate the discharge of waste to Yaquina Bay and would reduce the discharge of waste to the Pacific Ocean to Federal effluent guideline limits by December 31, 1974. The proposed improvements to the waste water control system were all in-plant (some not tried before in Oregon) and included recycle of white water from the primary clarifier, reduction of liquor losses by improved spill control facilities, and treatment of foul condensates by steam stripping.

In September, 1974, Georgia-Pacific realized it would not be able to meet Federal effluent guideline limits by June 1, 1975 with the waste control facilities originally proposed, though all discharges to Yaquina Bay had been permanently eliminated. (The original December 31, 1974 date was extended to June 1, 1975 in the permit because of delays in issuing the permit.) Steam stripping of the foul condensates was found to be ineffective at reducing BOD-5 and was abandoned. A program for reusing the foul condensates as pulp wash water was initiated, but this created some odor problems. Foul condensates for wash water could only be used in the modified kraft process (MKP) washers where the odors could be controlled. The remaining condensate had to be sewered.

In addition to several other in-plant controls, the Company proposed to meet the June 1, 1975 limits by installing a short-detention time, aerated lagoon to reduce BOD-5. The proposed lagoon was to be installed prior to June 1, 1975. Plans for the lagoon were approved by the Department in December, 1974.

In April, 1975, Georgia-Pacific notified us that the lagoon could not be installed and operational by June 1, 1975 and requested an extension until June 1, 1976. The extra year would allow them to install the lagoon, stabilize their in-plant controls and attain the Federal effluent guideline limits. Since we had expected that Georgia-Pacific would be unable to meet the June 1, 1975 date when we approved the lagoon plans, we approved the extension and issued a modified permit in August, 1975.

In May, 1976, Georgia-Pacific again notified us that, though they could meet the Federal guideline limitations for pH and suspended solids, they could not meet the BOD-5 limitations. In-plant controls for recycling wastes had not reduced the organic wastes. these wastes ultimately ended up in the plant's effluent in quantities which the small aerated lagoon could not handle.

At this point in time, after expenditures of approximately $1.75 to 2.0 million, Georgia-Pacific was unsure if it wanted to continue pursuing a program based on in-plant reduction or install a conventional secondary treatment system similiar to systems operated by other pulp mills. After several months of evaluation, Georgia-Pacific has notified the Department that they intend to install a conventional secondary treatment system. Corporate Headquarters has approved expenditure of $4.0 to 4.5 million for the system. The proposed system could be installed by April 1, 1978.

Discussion

It is obvious that numerous dates have come and gone without Georgia-Pacific complying with its schedule for reducing its waste discharges. Nevertheless, the staff feels the Company has attempted in good faith to meet each revised time schedule. The attempt to achieve Federal guidelines with in-plant control relied heavily on previously untried technology. The Department has supported in-plant control technology (even though much of it is experimental) primarily because it would provide the better, overall solution for protecting the environment. Further, the current discharge of effluent from the Toledo Mill has had no significant impact on the water quality of the Pacific Ocean. Because there was no water quality problem, the Department felt the risk of trying to develop new technology was minimal.

Conclusion

July 1, 1977 is the statutory date established by the Congress of the United States for meeting the first round of Federal effluent guidelines. Consequently, the Department cannot modify the NPDES Permit to contain a compliance schedule (for meeting the Federal effluent guidelines) which extends beyond this date. Therefore, it appears that an order of the EQC will be necessary to establish a revised enforceable schedule at the state level.

Director's Recommendation

It is recommended that the Environmental Quality Commission issue an order to Georgia-Pacific Corporation, Toledo Pulp Mill, to install waste water control facilities and meet Federal effluent guidelines in accordance with the following time schedule:

a) Submit detailed plans by April 1, 1977.

b) Start construction by June 1, 1977.

c) Submit progress report by November 1, 1977.

d) Complete construction by March 1, 1978.

e) Achieve operational level by April 1, 1978.

William H. Young
WILLIAM H. YOUNG
Director

RJN:ts
12/22/76

ENVIRONMENTAL QUALITY COMMISSION

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

ROBERT W. STRAUB
GOVERNOR

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. E, January 14, 1977, EQC Meeting

Review of Report to the Fifty-ninth Legislative Assembly by the Environmental Quality Commission on Its Investigation of the Effectiveness of the Motor Vehicle Emissions Program

The House Task Force on Auto Emissions Control, established by the Speaker of the House of Representatives and Chaired by Representative Jim Chrest, recommended that the Environmental Quality Commission conduct an investigation of the effectiveness of the motor vehicle emission program and submit to the Fifty-ninth Legislative Assembly a report containing the results of its investigation and make appropriate recommendations. The Task Force also recommended that the Environmental Quality Commission study and consider contracting with the private sector for operation of the motor vehicle emission testing program.

Attached is a report prepared by the Department for your consideration for submission to the Fifty-ninth Legislative Assembly.

William H. Young

WILLIAM H. YOUNG
Director

RCH:mg
December 28, 1976

INTRODUCTION

This report is formatted into three basic sections. The Summary section presents a brief overview of the Motor Vehicle Testing Program operations and effects. This is followed by Conclusions and Recommendations based upon the Department's experience with and evaluation of the program to date. The last section is a series of appendices which provide more detailed information upon various facets of the program than can be presented in a summary report.

SUMMARY

PROGRAM DEVELOPMENT AND OPERATIONS
(Ref. Appendices A, B, C, D, E)

The 1975 Oregon Legislative Assembly enacted legislation implementing a mandatory biennial motor vehicle emission control inspection program. This legislation requires that vehicles registered within the Metropolitan Service District around the City of Portland must show evidence of compliance with emission control requirements prior to license renewal. The Motor Vehicles Division is directed to not renew the registration of such vehicles after July 1, 1975, unless a completed Certificate of Compliance is received with the renewal request. Certificates of Compliance are issued ($5.00 fee) at the Department of Environmental Quality operated inspection facilities to vehicles tested and determined to comply with specified emission control standards.

Previously, the Oregon legislature had enacted enabling legislation for an annual emission control inspection program. This program operated on a voluntary basis during 1974 and 1975 until the mandatory program operations began July 1, 1975. Over 105,000 voluntary emission control tests were conducted during this time period.

At the beginning of 1976, the Speaker of the Oregon House of Representatives established the House Task Force on Auto Emissions Control to gather information and make recommendations concerning the administration and operation of the motor vehicle emission testing program. Task Force hearings were held in March and April of 1976, and a report was published in late April. The recommendations of the Task Force are presented in Appendix B.

PROGRAM EFFECTIVENESS
(Ref. Appendices F, G, H, I, J)

The goal of the Motor Vehicle Emission Testing Program is to assist in achieving compliance with national air pollution standards. Automotive-related pollutants exceed the national standards in the Portland metropolitan area. Specifically, the objective is to reduce carbon monoxide and hydrocarbon gas emissions from in-use motor vehicles through improved maintenance.

To ascertain the effectiveness of the Motor Vehicle Emission Testing Program, several evaluation methods have been utilized. One evaluation means is to determine the changes that have occurred in idle readings of carbon monoxide and hydrocarbon gases at the exhaust of vehicles going through the inspection system. In this evaluation, the test results obtained during the voluntary program operation in 1974 were assumed to be representative of the general emission control condition of vehicles when an inspection/maintenance program is not operative. This baseline data was then compared to the same type of data collected during the mandatory program operation in 1976. The effect of 1976 model year cars was removed from this analysis so the observed changes were not biased by inclusion of a new class of vehicles. This analysis showed reductions in idle emission readings of 25% for carbon monoxide and 15% for hydrocarbon gases. A sizable reduction in the number of vehicles emitting gross amounts of carbon monoxide has also been noted in the comparisons of the 1974 and 1976 data sets.

The ambient air pollution levels have also been analyzed to determine the impact and trends of various factors upon measured changes. The number of occurrences in which the ambient air carbon monoxide standards is being exceeded at the monitoring stations has been reduced significantly. In 1972, the continuous air monitoring station on Burnside Street in Portland recorded 120 days in which the national ambient air standards for carbon monoxide was exceeded. The number of such violations began declining steadily thereafter, and in 1976 only 30 days were recorded in which the carbon monoxide standards were exceeded at the Burnside station. The monitoring station on Sandy Boulevard in the Hollywood District of Portland has also shown an improvement in carbon monoxide air quality levels. Other sampling sites in Portland have not been in continuous operation long enough to determine trends in emission levels at those locations; however, an analytical survey of roads and streets in the Portland Air Quality Maintenance Area showed that over 540 miles of streets are likely violators of carbon monoxide standards during air stagnation periods.

The Air Quality Program's analysis of the Portland ambient sampling data concludes that the measured ambient carbon monoxide reductions have occurred as a result of traffic flow improvements and the motor vehicle emission testing program. At the Burnside Station, approximately one-third of the carbon monoxide level reduction is attributed to the inspection program. A larger proportion of the reduction in the Hollywood District is attributed to the inspection program. An increase in carbon monoxide levels is projected in 1977, since, due to the two year licensing and inspection cycle, relatively few vehicles will be subject to the emission testing requirements during 1977. The Department's analysis indicates that an inspection/maintenance program can accelerate attainment of standards by two to six years, depending upon whether a biennial or annual inspection cycle is implemented.

Recently, EPA published its official position on the subject of inspection/maintenance programs for controlling motor vehicle emissions. Some of the more important conclusions reached by EPA are: 1) emission deterioration from cars on the road is greater than previously expected; 2) inspection and maintenance programs will, in a cost effective manner, reduce pollutants from in-use vehicles; 3) the short emission tests now developed can readily identify high polluting vehicles; and 4) most failed vehicles can be repaired at a reasonable cost.

The EPA has concluded that a fully developed annual inspection/maintenance program can achieve stabilized emission reduction of 41% and 25% for carbon monoxide and hydrocarbon gases respectively after several years of operation, due in large part to the capability of service industry to properly perform emission control maintenance. The consensus, thus, is that the Oregon motor vehicle emission testing program has reduced carbon monoxide emissions by about 15% during its first full year of operation in 1976, and that this benefit could be increased almost three-fold if the program could be operated for several years on an annual inspection cycle basis.

The Oregon Clean Air Implementation Plan Transportation Control Strategy (TCS) for Portland was designed to attain carbon monoxide and oxidant air quality in Portland. The I/M program is an important element of the TCS plan. The marginal nature of carbon monoxide and oxidant air quality standard violations in the Eugene-Springfield and Salem areas indicate than an Inspection/Maintenance (I/M) Program is not justified at this time. Recent discovery of ambient CO standard violation in Medford will require a carbon monoxide control strategy for the Medford area. Hopefully, the CO strategy can probably best be solved by a parking and traffic circulation plan for downtown Medford.

CONSUMER COST
(Ref. Appendix K)

One area of concern often expressed is that of the cost of maintenance or repair for vehicles which exceed the emission control limits. The Department surveys on this subject, together with one conducted by KXL radio station and one by the Oregon Automobile Dealers Association, concluded that repair costs are typically in the area of $20 to $25. Over one-half of the vehicle owners responding to the Department surveys reported repair or adjustment costs of less than $10. Other cost surveys have shown similar repair information, although the New Jersey program is reporting an average repair cost of about $33.

In the Oregon surveys, 2% of the respondents reported repair costs of over $100, as compared to 3% in Arizona and almost 6% in New Jersey. Arizona has enacted an upper limit on repair costs for non-complying vehicles. For pre-1968 vehicles this limit is $25, and for newer vehicles, $75 or 10% of market value, whichever is lower. A specified low emission tuning procedure must be followed for these vehicles, and there are reported to be numerous inherent difficulties with this repair cost limitation.

CROSS BOUNDARY TRAFFIC AND TRUCK TRAFFIC
(Ref. Appendices L, M)

Another aspect of the program operations which is often questioned is the impact upon pollutant levels from vehicles operating in the area which are registered outside the metropolitan service district. The Department has studied the trends in vehicle registrations and traffic patterns in an attempt to define this impact. From a study of Oregon registered vehicles observed in parking lots located within the MSD area, and a separate Department study of Highway Division traffic tables, the Department has estimated that the Oregon program is restricted by the boundary limitations to approximately 90% of full effectiveness.

Approximately 5% of all motor vehicles operating on the roads in the Portland area are trucks. As the pollution contribution from light duty vehicles is reduced, the pollution from heavy duty gasoline vehicles becomes more important. There are, however, certain statutes which cloud the applicability of the inspection to pro-rated and apportioned licensed vehicles, as well as fixed load licensed vehicles.

PROGRAM CIRCUMVENTION
(Ref. Appendix N)

Also a factor in reducing program effectiveness is circumvention of proper emission control maintenance. One means of accomplishing this is through falsification of the vehicle registration to an address outside the district. While the Motor Vehicles Division is aware that some falsification of registration is occurring, they are not able to quantify the impact. In a Department parking lot survey of 300 vehicles, only one was found which clearly appeared to have been falsely registered.

Operating with expired license plates is an additional means of avoiding, or at least delaying, the inspection requirement. In a Department highways survey, 3-7% of the vehicles operating on the highways were observed to have expired plates. Contact with the police found that prior to implementation of the mandatory inspection program, approximately 2½% of the registered vehicles in the state had been cited or issued a warning for operating with expired plates. As this latter number would represent less than the total number of vehicles on the road with expired plates, the Department has concluded that the number of people attempting to totally circumvent the inspection process using expired plates is very small.

One of the most common reported methods used to circumvent the inspection intent is to readjust the vehicle after it has passed the emission test. A radio station survey of the service industry in the Portland metropolitan area concluded, as reported to the House Task Force on Auto Emissions, that 21% of the cars tuned to pass the DEQ test later returned for readjustment. The Department has concluded that this figure is not out of line with its own apprisal of the situation during the first inspection cycle. The reasons for these occurrences arise from two major factors as follows: 1) the inexperience of the service industry, or the motorist performing his own maintenance, improperly diagnosing and correcting emission control defects in the modern automobile; and 2) inability or unwillingness of some motorists to have proper maintenance performed, thus resulting in some cases of the engine being readjusted "rich" in an attempt to mask the actual defects. It should be noted that EPA projects increased benefits from an inspection/maintenance program with increasing operational experience. One of the reasons for this is the projected improvement in emission control maintenance, as both the service industry and the motoring public gain experience with the requirements and benefits of proper emission control maintenance.

PRIVATE CONTRACTOR OPERATION
(Ref. Appendices O, P)

The Department has reviewed the situation of private contractor operation of the inspection program and has concluded that independent contractor operation of the Oregon program is a viable alternative to state operation provided the program is converted to an annual cycle. There appears to be no reason to expect that a lower inspection fee would be realized; however, customer service should be improved since a contractor could make large scale capital investment in inspection facilities. In order to obtain independent contractor interest, it appears that a contract of five to six year minimum duration would be necessary.

In order to further pursue independent contractor operation of the Oregon program, specific legislation would be necessary to provide authority for contractor operation and to accommodate proper transition from state operation. Funding would be necessary for the cost of preparing and issuing a request for proposals to operate the Oregon Program and for evaluating contractor proposals. In view of the significant commitment involved, the legislature should carefully review the proposals prior to any bid award. Also, consideration should be given to providing for continued state operation in the event a satisfactory contract is not obtainable.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Air Quality

1. The air pollution caused by motor vehicles in the Portland metropolitan area continues to exceed national ambient standards.

2. The inspection program is an effective means of controlling air pollution caused by motor vehicles.

3. The current inspection program has reduced carbon monoxide and hydrocarbon emissions by 14% and 7% respectively during the first inspection cycle.

4. The effectiveness of a biennial program is considerably less than that of an annual program. The EPA has concluded that an annual inspection/maintenance program can reduce carbon monoxide emissions by 41% and hydrocarbon emissions by 25%.

Program Boundaries

1. The evidence is insufficient at this time to indicate that the expansion of the program into other metropolitan areas can be justified based solely on their air quality measurements.

2. The effectiveness of the current program is reduced to 90% of maximum by the effect of vehicles operating within the area that are registered outside the boundaries.

Heavy Duty and Commercial Vehicles

1. The heavy duty vehicle will contribute an increasing proportion of the total motor vehicles air pollution problem as control of emissions from light and medium duty vehicles are improved.

2. The current legislation is unclear as to whether or not commercial vehicles operating under reciprocity agreements and fixed load vehicles need be inspected.

3. The efforts to implement an inspection program for heavy duty trucks will be hindered until the status of those vehicles operating under reciprocity agreements is decided.

Vehicle Maintenance

1. The average cost of repairing a vehicle which has failed the inspection is not normally an undue burden on vehicle owners. Average repair cost is estimated at less than $25.

2. The evidence to show that the automotive service industry has engaged in price gouging as a result of the inspection program is not available. There are indications that incomplete or incorrect adjustments which are the result of improper diagnosis and the unwillingness of some customers to authorized needed repairs have taken place.

Private Contracting of Inspection Program

1. The service to the customer might be improved by using a private contractor for the inspection program. There is no evidence that the fee will be lower.

2. The implementation of a privately operated program can take place only with direction from the legislature.

Recommendations

1. The legislature should continue the motor vehicle inspection program in the Portland Metropolitan area.

2. Legislation should be enacted to implement an annual test cycle.

3. The legislature should not expand the boundaries of the inspection program into other metropolitan areas at this time.

4. The legislature should act to clarify the applicability of the inspection requirements for commercial vehicles operating under reciprocity agreements and for fixed load vehicles.

5. The legislature should act to require motor vehicles licensed by the government and which do not require registration renewal to meet inspection requirements.

6. The legislature should consider the alternative of having a private contractor operate the inspection program.

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ENVIRONMENTAL QUALITY COMMISSION

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

ROBERT W. STRAUB
GOVERNOR

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. E, January 14, 1977, EQC Meeting

Review of Report to the Fifty-ninth Legislative Assembly by the Environmental Quality Commission on Its Investigation of the Effectiveness of the Motor Vehicle Emissions Program

The House Task Force on Auto Emissions Control, established by the Speaker of the House of Representatives and Chaired by Representative Jim Chrest, recommended that the Environmental Quality Commission conduct an investigation of the effectiveness of the motor vehicle emission program and submit to the Fifty-ninth Legislative Assembly a report containing the results of its investigation and make appropriate recommendations. The Task Force also recommended that the Environmental Quality Commission study and consider contracting with the private sector for operation of the motor vehicle emission testing program.

Attached is a report prepared by the Department for your consideration for submission to the Fifty-ninth Legislative Assembly.

William H. Young

WILLIAM H. YOUNG
Director

RCH:mg
December 28, 1976

INTRODUCTION

This report is formatted into three basic sections. The Summary section presents a brief overview of the Motor Vehicle Testing Program operations and effects. This is followed by Conclusions and Recommendations based upon the Department's experience with and evaluation of the program to date. The last section is a series of appendices which provide more detailed information upon various facets of the program than can be presented in a summary report.

SUMMARY

PROGRAM DEVELOPMENT AND OPERATIONS
(Ref. Appendices A, B, C, D, E)

The 1975 Oregon Legislative Assembly enacted legislation implementing a mandatory biennial motor vehicle emission control inspection program. This legislation requires that vehicles registered within the Metropolitan Service District around the City of Portland must show evidence of compliance with emission control requirements prior to license renewal. The Motor Vehicles Division is directed to not renew the registration of such vehicles after July 1, 1975, unless a completed Certificate of Compliance is received with the renewal request. Certificates of Compliance are issued ($5.00 fee) at the Department of Environmental Quality operated inspection facilities to vehicles tested and determined to comply with specified emission control standards.

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PROGRAM EFFECTIVENESS
(Ref. Appendices F, G, H, I, J)

The goal of the Motor Vehicle Emission Testing Program is to assist in achieving compliance with national air pollution standards. Automotive-related pollutants exceed the national standards in the Portland metropolitan area. Specifically, the objective is to reduce carbon monoxide and hydrocarbon gas emissions from in-use motor vehicles through improved maintenance.

To ascertain the effectiveness of the Motor Vehicle Emission Testing Program, several evaluation methods have been utilized. One evaluation means is to determine the changes that have occurred in idle readings of carbon monoxide and hydrocarbon gases at the exhaust of vehicles going through the inspection system. In this evaluation, the test results obtained during the voluntary program operation in 1974 were assumed to be representative of the general emission control condition of vehicles when an inspection/maintenance program is not operative. This baseline data was then compared to the same type of data collected during the mandatory program operation in 1976. The effect of 1976 model year cars was removed from this analysis so the observed changes were not biased by inclusion of a new class of vehicles. This analysis showed reductions in idle emission readings of 25% for carbon monoxide and 15% for hydrocarbon gases. A sizable reduction in the number of vehicles emitting gross amounts of carbon monoxide has also been noted in the comparisons of the 1974 and 1976 data sets.

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(Ref. Appendices O, P)

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Recommendations

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2. Legislation should be enacted to implement an annual test cycle.

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APPENDIX B

HOUSE TASK FORCE ON AUTO EMISSIONS CONTROL

At the beginning of 1976, the Speaker of the Oregon House of Representatives established the House Task Force on Auto Emissions Control and appointed Representative Jim Chrest, Portland, as Chairman. The Task Force membership also included:

Representative Lloyd Kinsey, Portland
Representative Tom Marsh, Washington County
Representative Glenn Otto, East Multnomah County
Representative Glen Whallon, Clackamas County

Five public hearings were held by the Task Force during March and April to gather information concerning the administration and operation of the motor vehicle emission testing program. A report was published in late April and the recommendations included in this report were:

Recommendation 1 That all gasoline-powered motor vehicles which are over 8,400 pounds and principally garaged, registered, or operated within the MSD be required to meet emission standards adopted by the EQC.

Department Discussion To fully implement Recommendation 1, legislative changes are necessary as current law refers only to vehicle registration. The Department has begun development of test procedures and standards for vehicles rated over 8,400 pounds, as discussed further in Appendix M.

Recommendation 2 That the Environmental Quality Commission conduct an investigation of the effectiveness of the motor vehicle emissions program and submit to the Fifty-ninth Legislative Assembly a report containing the results of its investigation and make appropriate recommendations.

Department Discussion Report attached.

Recommendation 3 That the Environmental Quality Commission study and consider contracting with the private sector for operation of motor vehicle emissions testing and certification and that the Commission include the results of such study and its recommendations in a report to be included in and made a part of the report described in recommendation #2 above.

Department Discussion Report attached.

Recommendation 4 That the Environmental Quality Commission work with the Regional Planning Council of Clark County to develop a mutually acceptable program to encourage the owners of Washington-registered motor vehicles regularly operated in the Portland metropolitan area to voluntarily submit their vehicles to emission control inspections by the EQC.

Department Discussion The Department has had initial staff contact with the Regional Planning Council of Clark County regarding a voluntary and educational program. Washington vehicles, as all others, can currently receive free voluntary testing; however, a large scale effort to increase this testing during this budget period could reduce Oregon customer service.

Recommendation 5 That the EQC be authorized to designate by rule, equipment and devices which may be installed in a motor vehicle without violation of the tampering law (ORS 483.825).

Department Discussion The Department has attempted to satisfy the apparent intent of this recommendation by regulation. OAR Chapter 340, Section 24-320(4) refers to adjustments, alterations, and non-original equipment aftermarket parts. If additional legislation is to be considered, the Department will be available for resource information.

Recommendation 6 That all motor vehicles operated within the MSD (inlcuding those originating from any other state such as Washington) be required to pass emissions test or be subject to a penalty such as a fine or the requirement that a pollution permit be obtained. Vehicles being operated solely on the interstate freeway system for the sole purpose of obtaining repairs, fuel, meals, or rest stops as part of a trip through the MSD would be exempt.

Department Discussion This raises questions of enforceability and legislation would be needed to establish a policing and enforcement mechanism. The Department (or private contractor) budget would be impacted as an expanded system would be necessary. Confidence in projected fee income would be impacted by enforcement capability. The Department will be available to provide resource information during the consideration of the legislative changes necessary to implement this recommendation.

Recommendation 7 That DEQ be statutorily authorized to permit any city to use DEQ personnel and equipment where such city has adopted an ordinance establishing a vehicle emissions control inpsection program which meets certain requirements.

Department Discussion This could have significant budgetary impact and legislation would be needed to allow expansion of the program and provide a mechanism for recovery of costs.

Recommendation 8 That the Emergency Board honor the DEQ request for supplemental funding in order to allow DEQ to participate in the EPA analysis

Department Discussion Accomplished. EPA is ready to award the contract for this analysis. This is discussed further in Appendix J.

Recommendation 9 That DEQ make a stronger effort informing the public of the operating hours of test stations and the fact that expensive repairs are not necessarily needed to pass.

Department Discussion The Public Information Office has undertaken a stronger effort of informing the public about the program. Many of the previous efforts of the information office have begun to bear real results. It is now concluded that the existing staff has gained sufficient experiences in this particular area that their continuing efforts will achieve even more effective future benefits.

Recommendation 10 That the intricate problems of the low-income elderly and the poor, faced with extensive auto repair bills, needs signicant study by the next session of the Legislature.

Department Discussion Legislation is required to address this problem.

APPENDIX C

SUMMARY
OREGON PROGRAM OPERATIONS

During 1972, the Department assigned two full time engineering positions to study and develop proposals for controlling motor vehicle air pollution. The approved proposals called for annual emission control inspection of motor vehicles. Following legislative authorization and funding of $1,000,000, a voluntary program was initiated in late 1973.

In December, 1973, five inspector and one supervisory positions were filled, with two more being filled in January and February, 1974. During this time, the program staff installed, de-bugged, and developed procedures using prototypical exhaust emission analyzer equipment in an Oregon Highway Division owned facility at 1905 N. W. Thurman Street, Portland. This equipment included two mechanically calibrated and two gaseous calibrated exhaust gas analyzers, two water brake and two friction brake above ground dynamometers.

Voluntary testing of the public's vehicles began in February, 1974. Idle and dynamometer loaded mode emission test data was obtained for engineering studies. These studies included the determination of emission distributions, emission characteristics of vehicle classes, the variations of idle results during various test cycles, the effect of dynamometer operation, and the evaluation of test equipment parameters. The participating public was provided with actual emission test readings and "pass" or "fail" information was provided based upon City of Chicago test criteria. The Department also initiated an "Information Bulletin" mailing for the automotive service industry in the area so that they might be kept informed on program objectives and operations.

Two small, used vans were purchased from the U. S. Post Office in February, and initially one was outfitted with an exhaust gas analyzer and related equipment. This unit was then sent to Salem for demonstration of idle emission testing procedures to interested legislators. Other demonstrations using the vans were also arranged, and in 1974, testing of governmental and private fleets at the fleet site was initiated.

During July, 1974, the testing location was moved to a vacant tire store at 57th and East Burnside Street, Portland. This move allowed the Department to have a location that was more accessible to the public, provided better facilities for the staff, and an adequate staging and maintenance area for the mobile units.

In August, 1974, an additional Supervisor was employed to replace one that was promoted within the program. At the same time, twelve additional Inspectors were employed and placed in a Department-developed pilot training program. The training of these and the currently employed consisted of one week of classroom and three weeks of on-the-job training.

Classroom training provided the Inspectors an orientation to the Department and State of Oregon employment, the reasons for the Inspection program, applicable rules and regulations, vehicle identification, preparation of necessary forms and reports, the various types of emission control equipment and devices used by auto manufacturers, dealing with and handling of the public, and familiarization of the use and maintenance of the existing test equipment used at the stations. The on-the-job training, where a new Inspector was assigned to work with a more experienced Inspector, was closely monitored by the Field Supervisors to insure that the Insepctor's development was consistent with the program's expectations of its Inspectors. As scheduling allowed, all of the Inspectors and the two Supervisors were given a one day short course in exhaust emissions at Oregon State University, Corvallis; a one day first aid training class, a one-half day class in fire control, and an audiological evaluation of the Inspector's hearing.

After the completion of this training, the program expanded its days of operation from the normal state operation of five days a week to seven days a week. This change allowed the Inspector to work four 10 hour days in a work week and enabled the Department to provide even greater service to the public and so be capable of testing more of the public's and fleets' vehicles.

In September and October, 1974, two surplus step-vans were purchased from OLCC and taken to Oregon State Penitentiary, Salem, for engine and body repair and repainting. These larger vans, which are still in use, were necessary in the upcoming mandatory inspection program, as the smaller Post Office-obtained vans were not adequate to contain sufficient back-up testing equipment or to tranport necessary amounts of Inspectors to the testing sites. Consequently, the voluntary program was able to be expanded by having the mobile units testing the public's vehicles in shopping centers and at the community colleges throughout this area.

Eleven digital readout exhaust gas analyzers, which had been manufactured to Department specifications, were received in December, 1974, and installed in the Mobile Units and at the permanent site. Four additional Inspectors were employed so that we could increase the services offered to the public.

DEQ's first permanent, specifically designed inspection station, was built on leased Highway Division property in the Mt. Hood Freeway corridor, and opened in March, 1975. This allowed the facility on East Burnside to be closed for testing, but it was retained as a staging and a maintenance area for the mobile units until June, 1975. Four Inspectors were employed to fill the remaining authorized vacant Inspector positions.

Approximately 105,000 tests were conducted during the voluntary program operations through June 30, 1975, and over $150,000 of the original program appropriation was returned to the State Treasury. A factor which appeared to contribute to the success of the voluntary program was the issuance of bumper stickers to vehicles passing the test that declared "THIS CAR PASSED DEQ'S CLEAN AIR TEST". Over 20,000 of these were issued and requests for them continued well after supplies had been depleted. A major factor in the program's success is contributed to the convenience provided the public. Inspection facilities were operated seven days a week and between 10:00 am and 8:00 pm. The mobile units tested until 6:00 pm and conducted demonstrations and tests at schools and shopping areas throughout the testing district.

The 1975 Legislative Assembly reviewed implementation of the vehicle emission inspection program and at the very end of the session, after approving a program budget based upon an annual inspection changed the laws so that an emission inspection would be required only every other year with the vehicle license renewal as of July 1, 1975. Subsequently, the State Emergency Board approved a new budget reflecting the reduced fee income resulting from bi-annual inspection of vehicles registered within the Metropolitan Service District boundaries. The cyclic workload of having relatively few vehicles required to be tested during those months of the biennium occurring in calendar years 1975 and 1977, and a large number of vehicles required to be tested during calendar year 1976, was recognized in the approved budget. This cycle situation results from implementation of the two-year license plate legislation in January, 1974. Consequently, few vehicles required licenses or renewal in 1975. A total of 84 program positions were approved, but these positions were to be reduced as the cyclic workload reduced in 1977.

Mandatory program testing operations began July 1, 1975, operating under the criteria, procedures, and standards adopted by the Environmental Quality Commission. These standards, unlike the City of Chicago standards used during the voluntary program account for differing vehicle designs and thus are more equitable, while still capable of achieving significant emission reductions. Exhaust gas concentrations of carbon monoxide and hydrocarbons are measured at an idle speed and compared to the appropriate standard. Smoke, exhaust gas dilution, and excessive idle speed are also checked.

Two additional vans, a surplus General Services and a new one ordered to specification, were obtained in August, 1975. In the following month, these were equipped by the program staff with testing equipment and placed in use as Mobile Units #5 and #6.

Additional permanent testing sites were sought and obtained during the second half of 1975. The major obstacle was finding a property owner who had a vacant building which was suitable to the program needs or could be modified, and was willing to sign a short-term lease through June, 1977, with the Department. Such lease situations were found in Milwaukie, in Northwest Portland, and the Rockwood area. Mobile Units have been permanently assigned to leased land locations in Tigard and Hillsboro. Two other mobile units continued to be assigned to various shopping centers throughout the area. Specifications were updated and released for 18 additional exhaust gas analyzers.

From October to the end of the year, 47 individuals were employed and placed in training, and at the completion required to be licensed in accordance with ORS 491.190(2), ORS 468.390, and OAR 340, 24-340. A third field supervisor was promoted from within the currently employed inspectors in November. Of the 75 authorized inspector positions, it was determined after consultation with Personnel Division, Executive Department, that 49 of these positions would be designated as "Seasonal." At that time, it was felt that this procedure would alleviate the Department having to go through a "bumping" process for each Inspector when the time came for destaffing all but 20 positions. Although the then-current job market may have had an influence, the Department was able to employ a sufficient amount of individuals that were willing to take a "seasonal" position. The "bumping" process would be required for all permanent Inspectors.

November, 1975, was the beginning of the heavier testing workload impact, as many customers were taking advantage of being allowed to have the vehicle tested as far as three months ahead of the expiration date. The workload continued to climb monthly through March, 1976, when 55,211 vehicles were tested. (See attached summaries.) Ten additional Inspectors were employed and trained in January, and nine more in March, 1976. The last of the 75 vacant authorized positions were filled in April, 1976.

A leveling off of the testing workload took place in the second quarter of 1976. Although the workload remained steady during this quarter, a trend was beginning to show that less vehicles were being tested than MVD had originally projected would be subject to testing. As a result, consideration had to be given to how the program could be operated within given budget restraints.

Effective July 1, 1976, program operations were reduced by closing all of the testing stations on Sunday and Monday and reducing Inspector staffing to 55 positions. This action also allowed for two of the Supervisors to be primarily responsible for the Inspection Units within a certain area, while the third Supervisor relieved them on their day off and was assigned additional responsibilities with the Fleet Inspection Program.

Since the beginning of the program, through November, 1976, 96 individuals have been employed and placed in the Department's Inspector Training Program; 730,000 mandatory and voluntary vehicle tests have been performed; 370,000 Certificates of Compliance have been issued; and nearly two million dollars of revenue has been received. (See attached summaries.)

During November and December, 1976, and continuing through January, 1977, further destaffing of Inspector positions will be accomplished in an effort to retain only 20 positions after February, 1977. At the beginning of December, 1976, only four permanent stations and the two permanently assigned Mobile Units were in operation and are tentatively planned to remain in this status until July, 1977.

APPENDIX D

FLEET SELF-INSPECTION PROGRAM

The regulations adopted by the Environmental Quality Commission to govern operation of the motor vehicle emission testing program, include provisions for self-inspection by qualified fleet operations. To be considered for licensing as a self-inspection fleet, the fleet must have 100 or more Oregon registered light duty vehicles. A total of fourteen fleets, including governmental, have been licensed with many more expressing interest when the program expands to cover heavy duty vehicles. A listing of presently licensed fleets is shown in Table 1.

It should be noted that current legislation specifies that a Certificate of Compliance is required only for vehicle licensing renewal. Most governmental vehicles are initially issued non-expiring licenses, and thus there is little legal impact in the inspection program upon governmental units. Nevertheless, many governmental fleets have fully cooperated with the program requirements.

Participating non-governmental fleets have been very active in support of the inspection program objective, and it appears that the emission inspection is being used as an additional quality assurance check on the caliber of vehicle maintenance performed. As an example, Portland General Electric requires emission control complinace from all of its light duty vehicles in the state and Bell Telephone uses the inspection to complement the company's ongoing vehicle inspection policy. As also seen during the voluntary program studies, fleet operated vehicles appear to be significantly lower in emissions than those of the general public. Presumably, this is a result of better maintenance.

There are several economic incentives for a fleet operation to self-inspect. The equipment used is owned by the company, the inspectors are their employees, travel and waiting time is eliminated as inspections are conducted on the fleet's premises and there is a pro-rated fee structure of \$2.00 instead of \$5.00 for each Certificate of Compliance issued.

To reduce or eliminate any improprieties on the part of the fleet, a thorough surveillance program has been carried out by the Department. This has been accomplished by making unannounced on-site inspections of each fleet's operation. The inspection has consisted of verification by our staff of the gaseous calibration record of the exhaust gas analyzer, reviewing their testing procedures by requiring their licensed inspectors to perform inspections on randomly selected vehicles, reviewing of the test forms used, and reviewing the control and accounting of the retained Certficates of Compliance.

To date, only minor variances have been detected in the fleets' testing procedures. All of the fleets have been cooperative in insuring that these are immediately eliminated. As a result, the implementation of the fleet inspection program has played a large role towards the Department's accomplishment of its objectives.

DEQ LICENSED LIGHT DUTY EMISSION INSPECTION FLEETS AND LISTING OF TOTAL CERTIFICATES ISSUED BY THESE FLEETS AS OF NOVEMBER 30, 1976

Fleet No.	Fleet	Certificates Issued
1	Oregon Dept. of General Services, Motor Pool	15
2	Canteen Company of Oregon	59
3	City of Portland	97
4	U. S. Postal Service	0
5	Oregon State Highway Division	0
6	Washington County Department of Public Works	7
7	General Telephone Company of the Northwest	195
8	U. S. General Services Admin., Motor Pool	8
9	Northwest Natural Gas Company	146
10	Portland General Electric	409
11	Pacific Northwest Bell	232
12	Clackamas County Department of Public Works	31
13	Multnomah County Department of Public Works	21
15	Port of Portland	0
	TOTAL	1,230

APPENDIX E

VEHICLE INSPECTION PROGRAM
SPECIAL ENGINEERING PROJECTS

The Department of Environmental Quality operates a Vehicle Inspection Program in the Portland Metropolitan Area. The actual operation of the program covers three general areas of responsibility: adminstration, day-to-day operations, and engineering. The engineering activity generally includes design, procurement, and maintenance of the equipment and facilities; the design of the test procedure and criteria for the inspection process; the evaluation of the data to document program effectiveness; and the development of program improvements to assist on strengthening overall program operations. While much of the work is of an ongoing nature, there have been several projects which have provided input to the program operation. The following is a summary of the more significant projects.

OSHA and Safe Working Conditions

Throughout the development and implementation of the inspection program, the maintenance of safe working conditions at the test sites has been a major concern. Periodically, the various sites have been monitored by Department staff to measure the carbon monoxide levels at the test sites and to determine if these locations were in compliance with OSHA and OSEA. This was confirmed by extensive monitoring by Oregon's Workmen's Compensation Board personnel. The Department has recently procured full time industrial ambient monitors for installation at all of the permanent stations. These will be used to provide continuous monitoring for carbon monoxide and also be used to activate the ventilation systems. Surveys at mobile locations also indicated no problem with excessive CO exposure at any of the mobile units.

Waiting Time Survey

A six week study was conducted to determine the average waiting time at the various inspection stations. The results of the study indicated that overall average system waiting time was slightly over 15 minutes. Individual station average waiting times during September were:

Powell	20.4 minutes
Tigard	13.2 minutes
Rockwood	6.6 minutes
Milwaukie	15.7 minutes
St. Helens Road	8.3 minutes
Lloyd Center	21.7 minutes
Hillsboro	5.8 minutes

Station activity at Powell is shown in Figure 1. Waiting times are a function of station loading and activity during the day. By minimizing lines, waiting times are kept to a minimum and the customer is better served.

Repeatability Survey

Exhaust analyzer repeatability between inspection stations is of major importance in maintaining accuracy of the emission test. To supplement normal hourly calibration of the analyzers as well as document station-to-station repeatability, a cross-reference check is performed periodically on an unscheduled basis.

The cross-reference procedure simulates an automobile exhaust tailpipe by the introduction of a reference gas through the analyzer sample intake. The same reference gas is used on each analyzer. Two different gas blends were used during the year. These gases contain a blend of carbon monoxide, carbon dioxide, and propane. Propane is a stable hydrocarbon gas and is used in calibration to measure the accuracy of the analyzers to hydrocarbon responses. All analyzers that are operational or in back-up status are checked. Each test station in the system is visited in one day. Adjustments to the equipment are not permitted before the reference check.

Tables 1 through 7 list the findings of surveys conducted during 1976. Only scattered occurrences of analyzer inaccuracy have been detected during the reference check since most analyzer malfunctions are apparent during the scheduled hourly span check by the inspection personnel. Table 8 summarizes the results of the cross-reference surveys and lists the average readings of each survey along with the standard deviation of each group of analyzer readings. The system-wide standard deviation has remained within design specifications in each survey. In fact, the standard deviation is narrowing showing improvement in calibration technique by personnel resulting in better analyzer-to-analyzer comparability.

The unscheduled surveys have been successful in assuring the exhaust analyzers have been calibrated properly, and will be continued. This method of cross calibration has effectively documented the accuracy and repeatability of the testing equipment.

Filter Media Study

In the Department's exchange of information with EPA, there was an observed difference in average hydrocarbon levels between Oregon and New Jersey vehicles on a model year basis. There were a number of explanations for the differences between these values. Among them are the differences in the vehicle mix, the crude oil and fuel composition, test procedure, and equipment differences. In a month long study, the Department evaluated the differences between the ceramic filter material used in Oregon and the paper filter material used in New Jersey. No differences affecting hydrocarbon readings or any test results were found. The reason for the difference in average hydrocarbon levels was the vehicle mix.

TABLE 1
CARBON MONOXIDE AND HYDROCARBON
CROSS-CALIBRATION SURVEY OF MAY 13, 1976
AT DEQ INSPECTION STATIONS

Reference Gas LY2604

Analyzer	Carbon Monoxide, %	Hydrocarbons, ppm
Y	3.6	1697
O	3.7	1691
X	3.7	1719
P	3.6	1651
Q	3.7	1723
B	3.5	1638
W	3.7	1663
G	3.75	1669
R	3.9	1716
CC	3.7	1716
E	3.4	1620
AA	3.75	1707
N	3.7	1698
M	3.7	1710
D	3.7	1694
C	3.6	1660
Average	3.67	1685
Std. Deviation	0.113	31
2% F. S. Allowance	0.20	80

TABLE 2
CARBON MONOXIDE AND HYDROCARBON
CROSS-CALIBRATION SURVEY OF JUNE 16, 1976
AT DEQ INSPECTION STATIONS

Reference Gas LY2604

Analyzer	Carbon Monoxide, %	Hydrocarbons, ppm
Q	3.75	1695
X	3.8	1710
P	3.55	1632
B	3.5	1610
W	3.6	1644
F	3.75	1708
O	3.7	1682
Y	3.7	2120
G	3.7	1688
CC	3.95	1707
R	3.75	1688
H	3.25	1610
Z	3.65	1694
L	3.6	1672
I	3.6	1657
AA	3.7	1726
N	3.65	1708
M	3.7	1694
C	3.65	1660
D	3.75	1694
Average	3.67	1699
Std. Deviation	0.137	104
2% F. S. Allowance	0.20	80

TABLE 3
CARBON MONOXIDE AND HYDROCARBON
CROSS-CALIBRATION SURVEY OF JUNE 24, 1976
AT DEQ INSPECTION STATIONS

Reference Gas LY2604

Analyzer	Carbon Monoxide, %	Hydrocarbons, ppm
S	3.8	1738
Y	3.75	1700
X	3.7	1710
P	3.7	1710
Q	3.7	1673
T	3.7	1692
U	3.6	1664
CC	3.9	1720
R	3.75	1664
G	3.65	1692
Z	3.35	1710
H	3.6	1645
L	3.5	1757
N	3.85	1654
AA	3.75	1495
M	3.7	1710
B	3.7	1673
V	3.7	1729
Average	3.69	1693
Std. Deviation	0.12	30
2% F. S. Allowance	0.20	80

TABLE 4
CARBON MONOXIDE AND HYDROCARBON
CROSS-CALIBRATION SURVEY OF AUGUST 20, 1976
AT DEQ INSPECTION STATIONS

Reference Gas LY2605

Analyzer	Carbon Monoxide, %	Hydrocarbons, ppm
Q	2.3	1073
P	2.5	1097
X	2.3	1079
W	2.5	1099
V	2.5	1099
J	2.3	1108
R	2.4	1085
G	2.2	1000
Y	2.3	1069
I	2.3	1021
Z	2.3	1077
H	2.3	1058
AA	2.4	1075
M	2.3	1065
N	2.4	1084
T	2.4	1067
U	2.4	1139
O	2.4	1019
L	2.4	1078
E	2.3	1065
Average	2.36	1072
Std. Deviation	0.08	31
2% F. S. Allowance	0.20	80

TABLE 5
CARBON MONOXIDE AND HYDROCARBON CROSS-CALIBRATION SURVEY OF SEPTEMBER 9, 1976 AT DEQ INSPECTION STATIONS

Reference Gas LY2605

Analyzer	Carbon Monoxide, %	Hydrocarbons, ppm
X	2.4	1089
P	2.4	1071
W	2.5	1109
V	2.4	1081
CC	2.4	1075
R	2.4	1066
Y	2.3	1004
I	2.5	1058
Z	2.2	1041
H	2.2	1043
AA	2.4	1075
M	2.4	1081
N	2.4	1084
D	2.5	1151
BB	2.4	1180
E	2.3	1101
K	2.4	1103
O	2.4	1084
Average	2.38	1083
Std. Deviation	0.08	40
2% F. S. Allowance	0.20	80

TABLE 6
CARBON MONOXIDE AND HYDROCARBON
CROSS-CALIBRATION SURVEY OF OCTOBER 21, 1976
AT DEQ INSPECTION STATIONS

Reference Gas LY2605

Analyzer	Carbon Monoxide, %	Hydrocarbons, ppm
X	2.35	1070
P	2.35	1080
W	2.35	1066
V	2.35	1062
B	2.3	1045
R	2.4	1075
CC	2.35	1094
H	2.25	1052
Z	2.3	1077
S	2.55	1065
I	2.45	1076
M	2.35	1071
L	2.35	1050
N	2.35	1082
D	2.25	1020
BB	2.35	1384
F	2.4	1067
E	2.3	1037
K	2.3	1094
O	2.4	1084
Average	2.35	1066
Std. Deviation	0.06	19
2% F. S. Allowance	0.20	80

TABLE 7
CARBON MONOXIDE AND HYDROCARBON
CROSS-CALIBRATION SURVEY OF DECEMBER 9, 1976
AT DEQ INSPECTION STATIONS

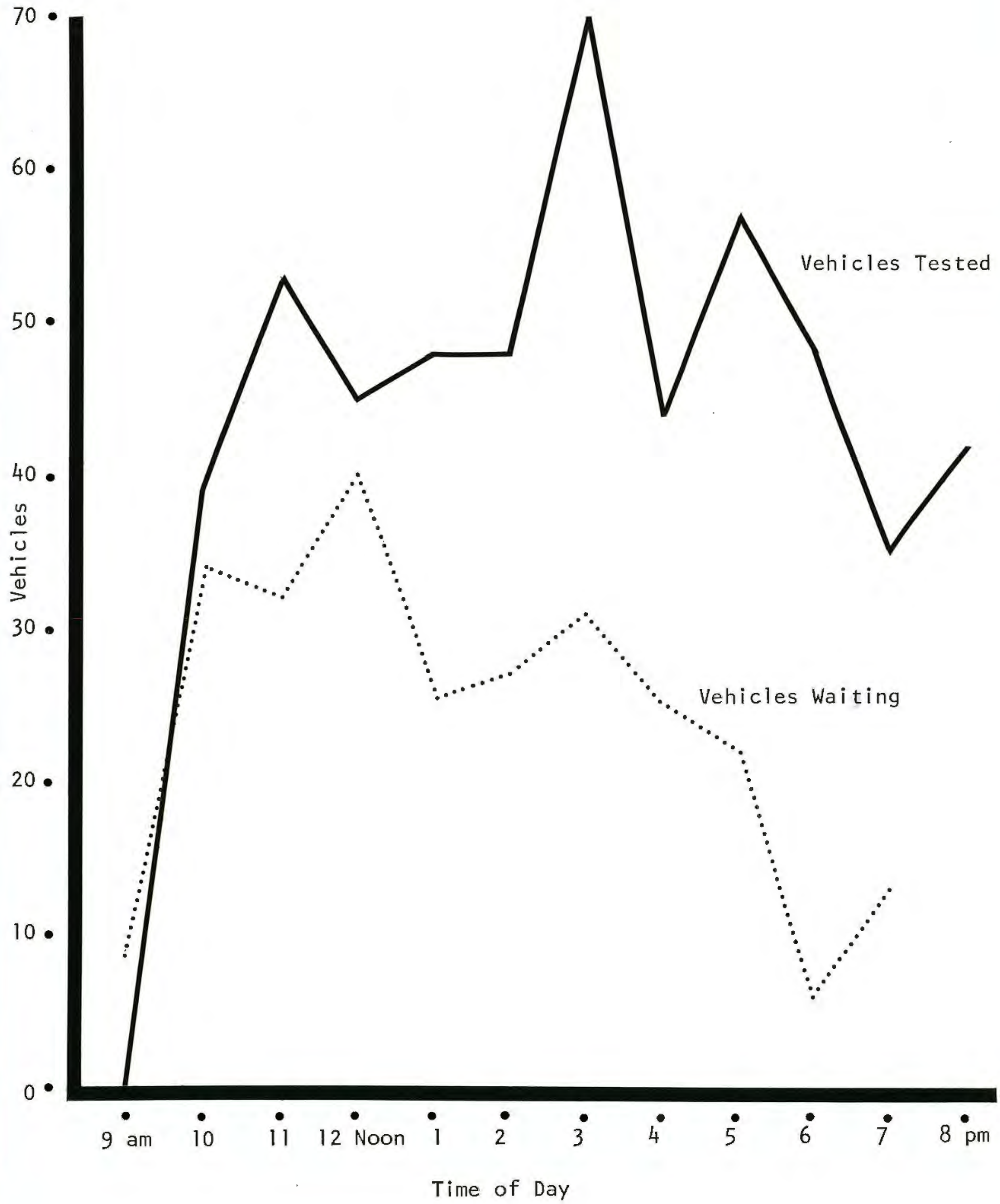
Reference Gas LY2605

Analyzer	Carbon Monoxide, %	Hydrocarbons, ppm
AA	2.3	1084
N	2.35	1073
M	2.35	1071
H	2.25	1042
Z	2.3	1058
S	2.5	1056
I	2.3	1058
R	2.4	1075
G	2.3	1056
CC	2.45	1084
T	2.35	1066
L	2.35	1181
W	2.45	1085
V	2.35	1090
F	2.45	1097
O	2.35	1093
K	2.35	1103
Average	2.35	1080
Std. Deviation	0.07	30.8
2% F. S. Allowance	0.20	80

TABLE 8
SUMMARY OF RESULTS OF
CROSS-CALIBRATION SURVEYS IN 1976

Date	CO, %	Std. Deviation, %	HC, ppm	Std. Deviation, ppm
May 13, 1976	3.67	0.11	1685	31
June 16, 1976	3.67	0.14	1669	104
June 24, 1976	3.69	0.12	1693	29
August 20, 1976	2.36	0.08	1072	31
September 9, 1976	2.38	0.08	1083	40
October 21, 1976	2.35	0.06	1066	19
December 9, 1976	2.36	0.07	1080	30
Allowable Error		0.20		80

FIGURE 1
A SUMMARY OF STATION LOADING
AT THE POWELL BLVD. DEQ TESTING STATION
September 8, 1976



APPENDIX F

VEHICLE POPULATION
IDLE EMISSION CHANGES

During the Department of Environmental Quality's voluntary emission inspection program which was conducted during 1974, data was gathered to develop the final emission standards and to establish the baseline emission characteristics of vehicles operating in the Portland area. The data collected since July 1, 1976, has been used to measure program effectiveness and determine emission changes that have occurred in various vehicle classes.

The data that is being reported is in terms of idle hydrocarbon and idle carbon monoxide emission distributions. The information is being presented in this form because it provides a very graphic description of the character of the various vehicle classes. Additional methods of presentation are available and sometimes used. Among the more popular methods is the reporting of the arithmetic average. While this is a familiar statistic, it does not provide as much information as the emission distribution. One of the main parameters used in the curves in this section is the 50 percentile point. This is the midway point in the curve. It is this point where the percent reductions, comparing baseline (1974) data with current (1976) data, are calculated. Another approach to measure changes is to calculate the area under the respective curves. However, when the shapes of the curves are quite similar, the results are essentially the same with either method used. Little reference will be made to these other techniques and the discussion will concentrate on these emission distributions.

Figures 1 and 2 compare idle CO and HC distributions for the composite car in 1974 with that same composite car in 1976. The composite car is developed from the total vehicle population mix and represents all the cars on the road. As can be seen, reductions in CO are 25% and in hydrocarbons (HC) are 30% at the 50th percentile. Figure 2 shows an increase in the upper end of the tail of the hydrocarbon curve, though the net overall reduction remains at 15% when calculated using the area technique. Figures 3 and 4 show typical before and after results obtainable from maintenance. This selection of vehicles was from those failed and had maintenance performed prior to retesting.

Figures 5 and 6 compare model year distribution between 1974 data and current data. Figure 5 shows reductions in both the upper limits and the median point. The increased tail with the reduced median point on the 1975 model year curve is due to having additional data that was not readily available during calendar year 1974. Figure 6 shows that reductions in the 50 percentile point of all model year vehicles was obtained. The increases in the upper tail section on these curves is consistent with the change noted in Figure 2. Again, reductions are shown using all methods of calculation. There are several possible explanations for the higher tails. One is that we are observing the effects on some of the older cars where in an effort to insure that the vehicles pass the inspection test, the air-fuel mixture is leaned beyond the optimum point for maximum effectiveness. This can cause a slight increase in hydrocarbon levels and also promote a decrease in driveability. Another possible explanation for the differences is that now that all vehicles are required to be tested, a truer picture of all the vehicles is being observed. Oregon's car population contains a large percentage of 4 cylinder automobiles, and these vehicles have an inherently higher hydrocarbon level than 6 and 8 cylinder automobiles.

On newer cars for which baseline data was not available in 1974, comparisons have been made between our current data and data obtained from New York State. The New York pilot project is similar to the DEQ voluntary program and provides an effective comparison. As noted in Table 1, there are differences between the various vehicle classes, indicating that the inspection program is having a positive effect on maintaining newer cars to good emission characteristics.

The duration of cleanliness of emission-tuned vehicles is an often asked question. Unfortunately, this has been one area where the Department has been unable, for a variety of reasons, to provide good comprehensive information to date. The problems of readjustments, obtaining vehicles, proper test techniques, and the like compound the problem. But the Department has made an effort to determine to an extent deterioration. Two state-owned vehicles assigned to the Department were checked for their idle emissions regularly. Unfortunately, the vehicle assigned to cover the east side testing stations was unable to maintain its testing schedule during the last half of the year because of the disruption that it would cause at those testing stations. Both vehicles displayed steady carbon monoxide levels except at time of service. Readjustments were made after service and the vehicles provided good repeatability. The hydrocarbon values did show a slight increase over a period of time, but sufficient time has not passed to draw definite conclusions, as those HC levels still remained quite low. Additional deterioration work is planned for 1977 as outlined in Appendix J.

From reviewing the baseline (1974) and current (1976) data, the data from New York state, and the limited deterioration work, positive changes have occurred in the idle emission distribution of vehicles operating in the Metropolitan Service District area. These changes indicate significant improvement in the emission characteristics of local motor vehicles.

TABLE 1

Idle Emission Distribution
of
Vehicles Tested in New York State and Oregon

New York: New York State Department of Environmental Conservation, 1976 Data

Oregon: Oregon Department of Environmental Quality, 1976 Data

	NEW YORK				OREGON			
	Percentile: Vehicle Population Percent At or Below Level Shown							
	10th	50th	90th	Pop.	10th	50th	90th	Pop.
1975 Model Year: Carbon Monoxide, Percent								
Chrysler	0.0	3.55	7.75	102	0.0	0.12	3.3	278
GMC	0.0	0.25	5.10	142	0.0	0.05	2.6	539
Ford	0.0	0.20	2.00	93	0.0	0.09	1.9	391
AMC	0.0	0.20	4.10	27	0.0	0.07	1.4	83
Foreign	0.0	0.45	2.80	40	0.0	0.27	2.2	241
All	0.0	0.45	6.00	404	0.0	0.09	2.5	1532
1976 Model Year: Carbon Monoxide, Percent								
Chrysler	0.2	4.45	7.70	54	0.0	0.60	4.7	51
GMC	0.0	0.15	5.80	100	0.0	0.12	1.2	151
Ford	0.0	0.15	3.0	43	0.0	0.01	1.3	111
AMC	0.0	0.15	4.5	11	0.0	0.08	2.1	27
Foreign	0.0	0.30	1.8	18	0.0	0.43	1.8	91
All	-	-	-	-	0.0	0.08	2.1	431
1975 Model Year: Hydrocarbons, PPM								
Chrysler	60	185	360	102	0.0	50	180	278
GMC	85	115	295	142	0.0	45	300	532
Ford	40	75	150	93	0.0	25	160	392
AMC	45	90	215	27	0.0	25	95	87
Foreign	40	115	190	40	0.0	25	175	236
All	40	105	300	404	0.0	30	210	1521
1976 Model Year: Hydrocarbons, PPM								
Chrysler	NOT REPORTED				0.0	125	450	50
GMC					0.0	30	190	155
Ford					0.0	20	150	114
AMC					0.0	25	85	27
Foreign					0.0	35	120	90
All					0.0	30	235	436

FIGURE 1

DEPARTMENT OF ENVIRONMENTAL QUALITY

Carbon Monoxide Idle Emission Distribution of the Composite Vehicle Population in the Tri-County Area

Composite Vehicle Population: Representative sample of pre-68 through 1975 model year vehicles in the Portland tri-county area

Baseline Data: 1974 DEQ I/M Program -- 16,483 vehicles

Current Data: 3rd Quarter, 1976 DEQ I/M Program -- 5,541 vehicles (1976 models not included)

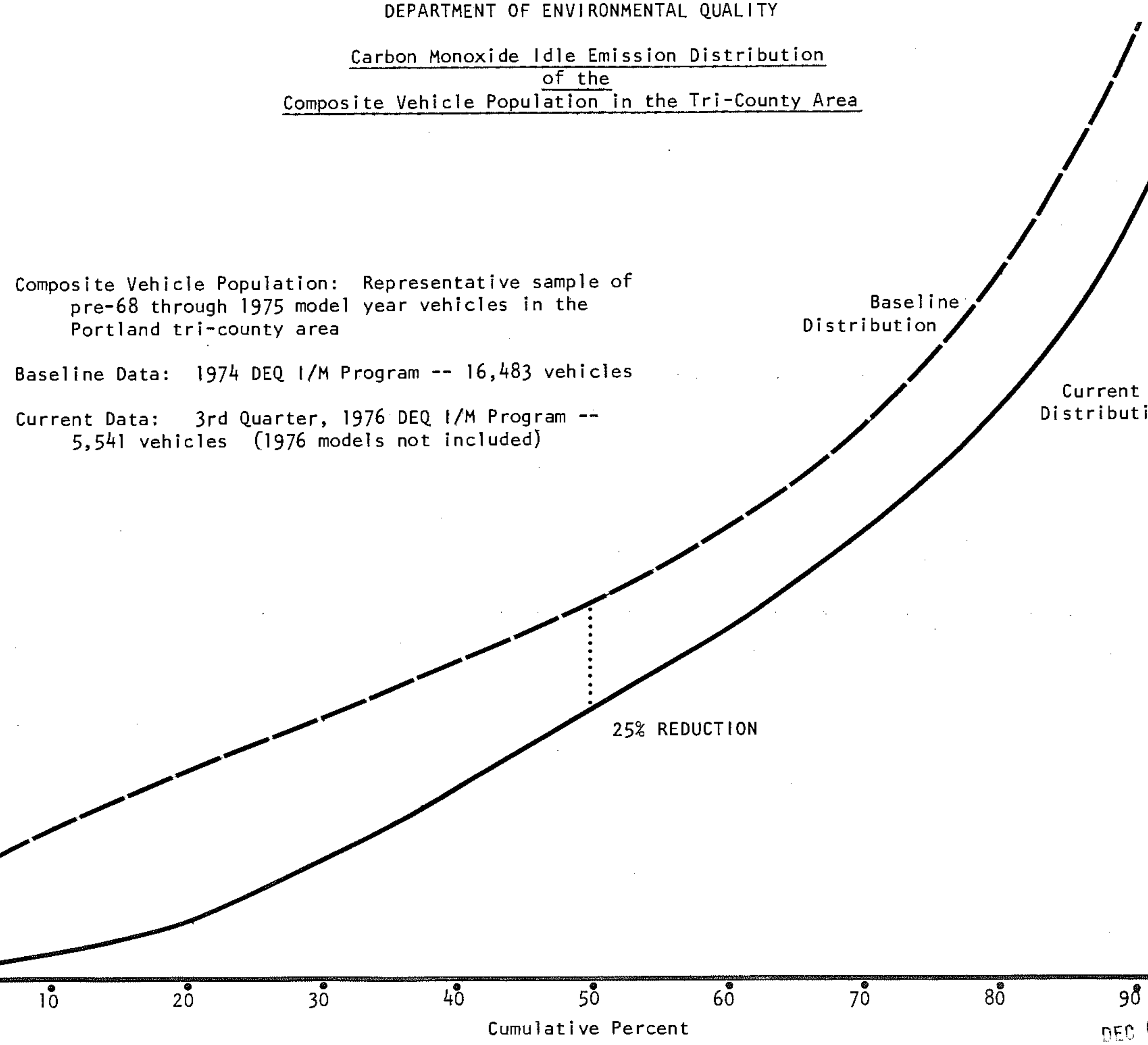


FIGURE 2

DEPARTMENT OF ENVIRONMENTAL QUALITY

Hydrocarbon Idle Emission Distribution
of the
Composite Vehicle Population in the Tri-County Area

Composite Vehicle Population: Representative sample of pre-68 through 1975 model year vehicles in the Portland tri-county area

Baseline Data: 1974 DEQ I/M Program -- 16,493 vehicles

Current Data: 3rd Quarter, 1976 DEQ I/M Program -- 5,593 vehicles (1976 models not included)

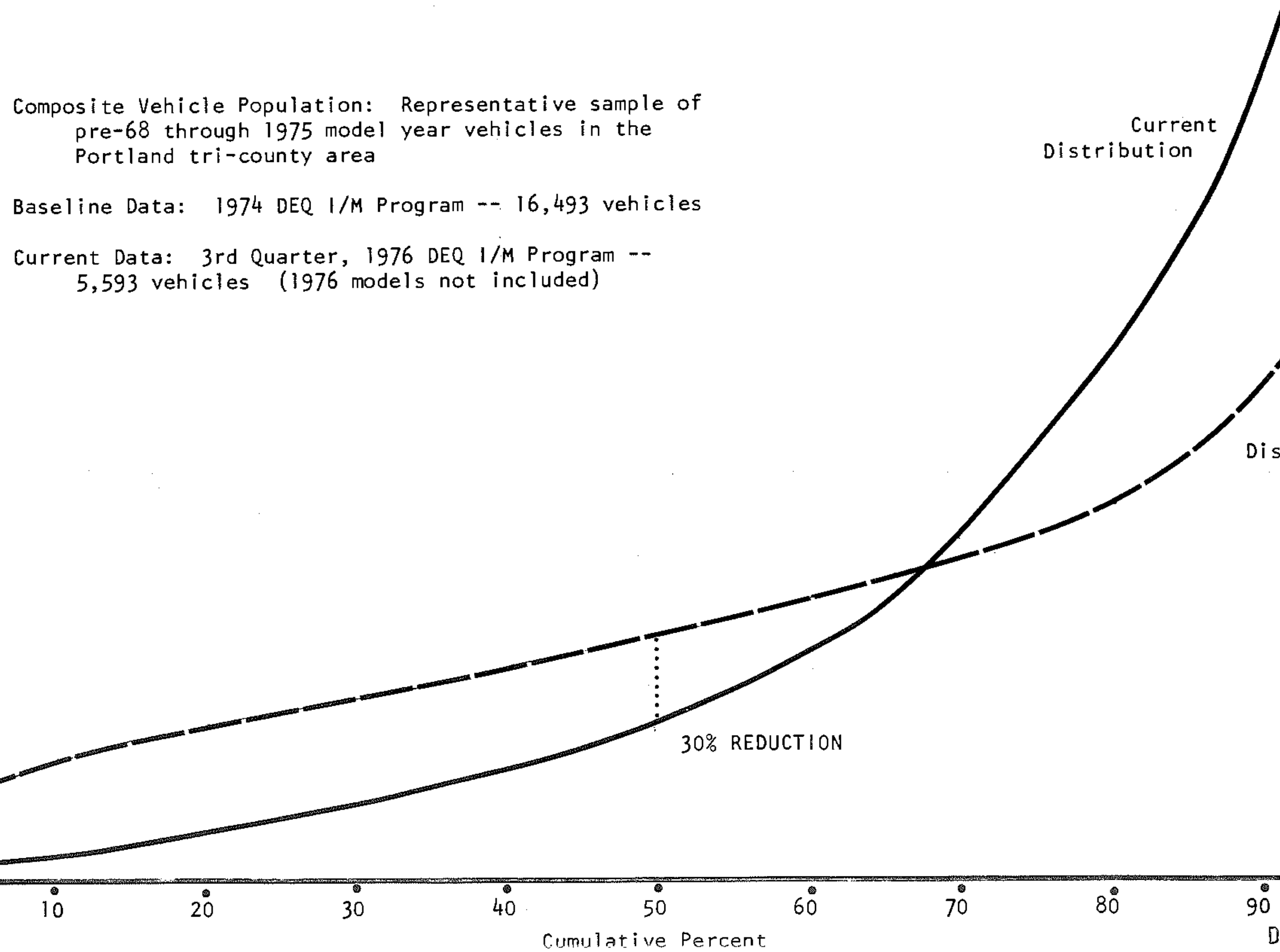
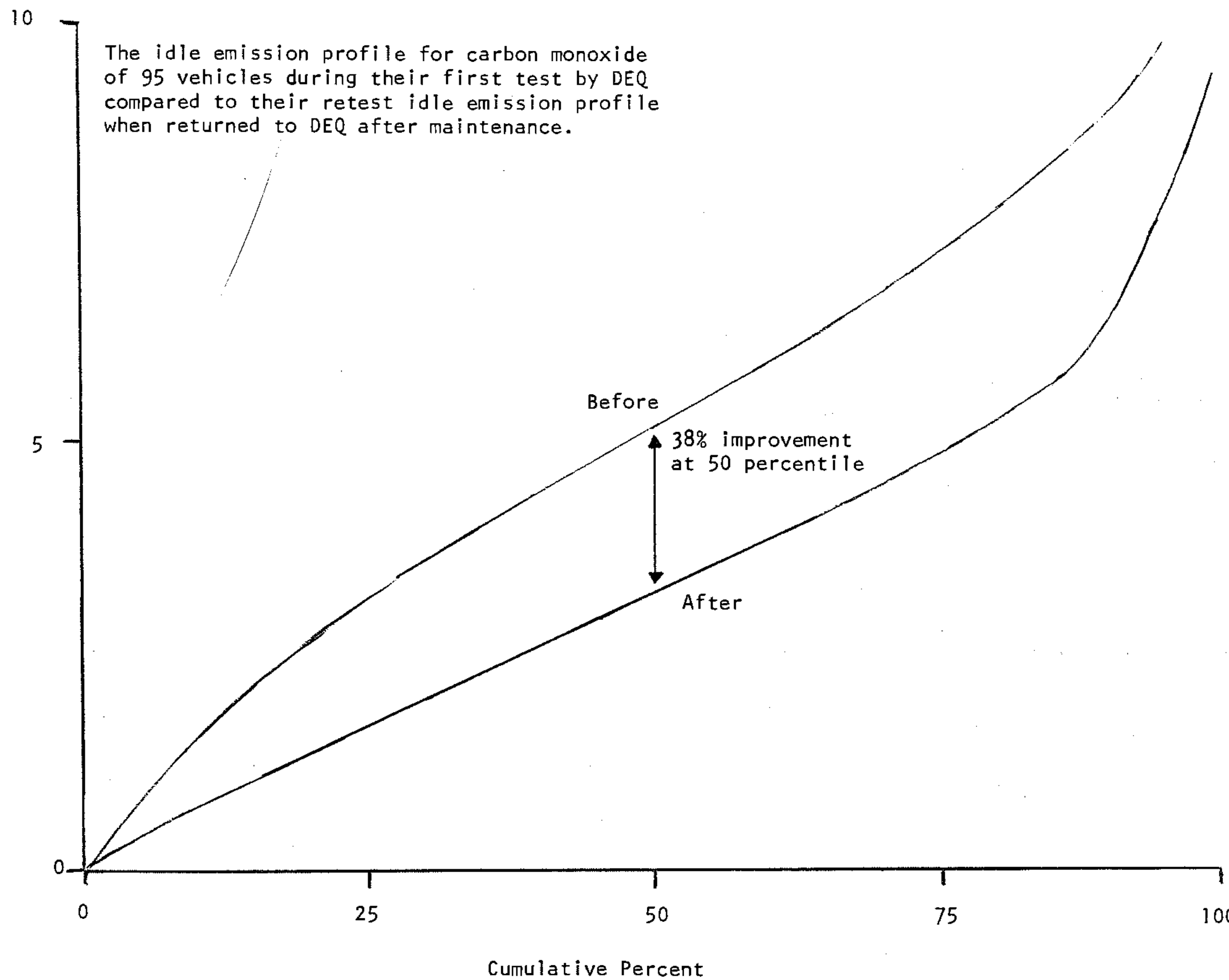


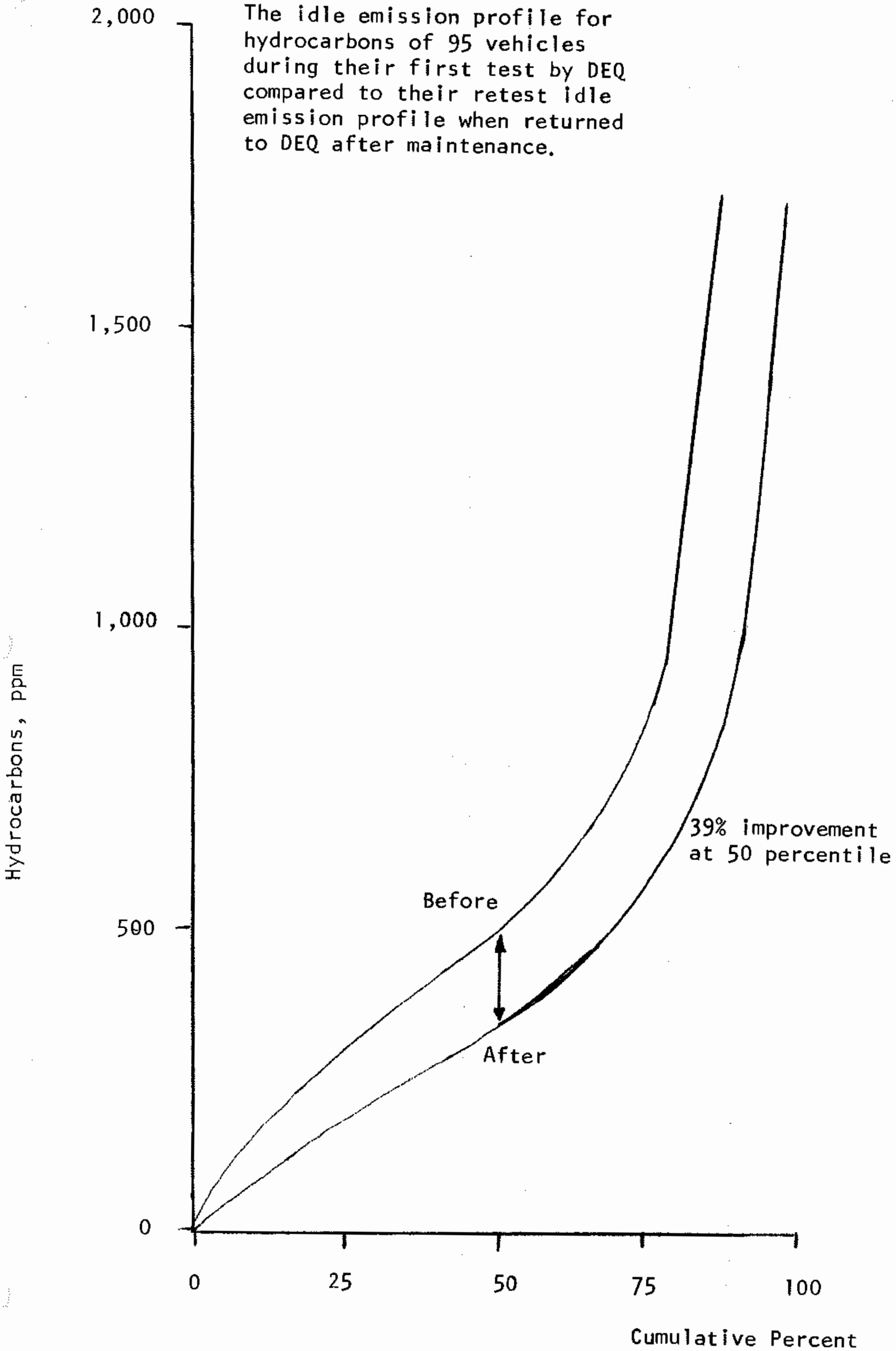
FIGURE 3



DEQ/VID 74123-A

FIGURE 4

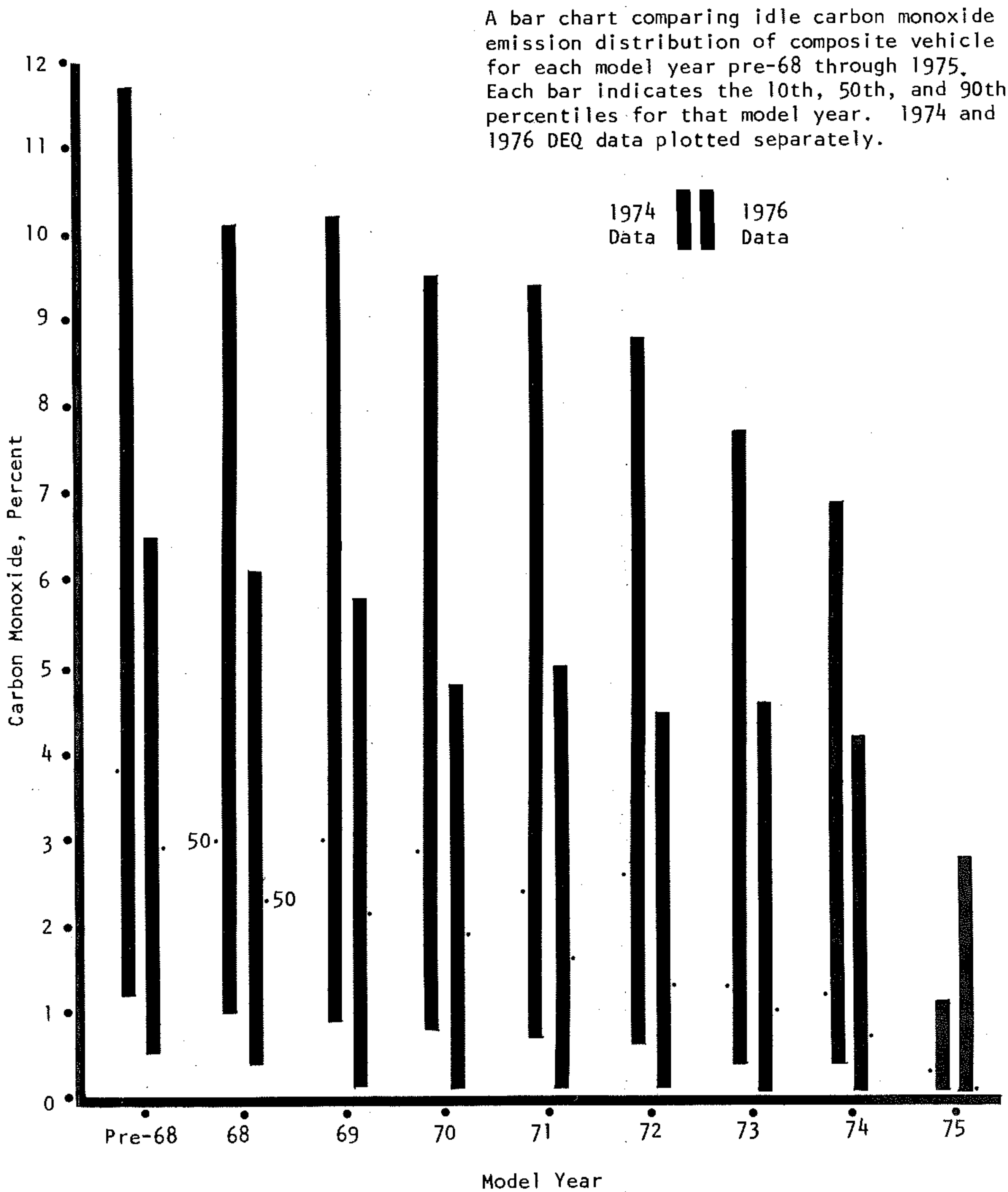
The idle emission profile for hydrocarbons of 95 vehicles during their first test by DEQ compared to their retest idle emission profile when returned to DEQ after maintenance.



DEQ/VID 74123-B

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
Vehicle Inspection Program

Figure 5

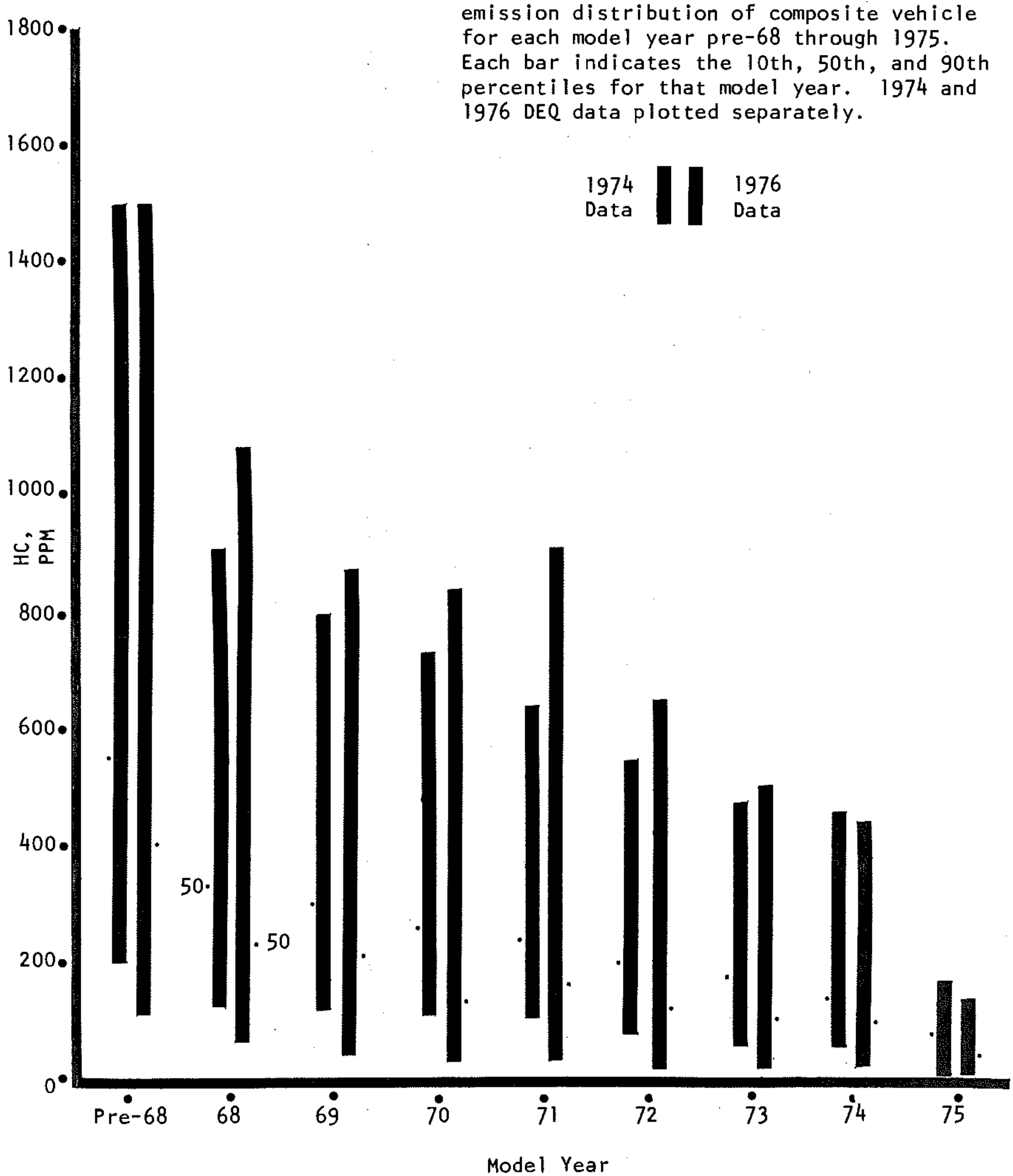


DEC 13 1976

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
Vehicle Inspection Program

Figure 6

A bar chart comparing idle hydrocarbon emission distribution of composite vehicle for each model year pre-68 through 1975. Each bar indicates the 10th, 50th, and 90th percentiles for that model year. 1974 and 1976 DEQ data plotted separately.



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APPENDIX G

SUMMARY
PORTLAND CO AND OXIDANT PROFILE

Background

Carbon monoxide has been and remains the most abundant air contaminant emitted in the Portland airshed. Motor vehicles are the predominant source of carbon monoxide emissions contributing 95 percent (414,600 tons per year) of the total carbon monoxide emissions in 1975 in the Portland AQMA area.

The Federal and State carbon monoxide health standard of 10 mg/m^3 - 8 hour average was exceeded 88 days in 1970 at the Burnside monitoring station in downtown Portland. The worst day recorded that year had a maximum 8 hour average of 20.8 mg/m^3.

The Federal Clean Air Act of 1970 required that the State of Oregon develop a transportation control strategy (TCS) to meet the carbon monoxide health standard in downtown Portland by May 1975 (later extended to May 31, 1976). The City of Portland and the Department of Environmental Quality developed such a strategy which was approved and submitted to the Environmental Protection Agency by the Governor on April 13, 1973.

The TCS was designed to achieve a minimum 64 percent reduction in carbon monoxide emissions in the worst carbon monoxide air quality area of downtown Portland. The TCS consisted of several elements. These elements and their projected carbon monoxide emission reductions from 1970 levels are listed in Table 1.

Table 1
Projected TCS Effectiveness

TCS Element	Percent CO Recuction (1970-1975)
1. Federal New Motor Vehicle Program	29
2. Mass Transit Improvements	4
3. Traffic Flow Improvements	11
4. DEQ Inspection Maintenance Program	20
	64%

CO Emission Trends

At present, all elements of transportation control strategy (TCS) have been implemented to some degree. A 12 percent reduction in carbon monoxide emissions has been calculated to have been achieved by 1975 as shown in Table 2. The effectiveness of each TCS element between 1970 and 1977 as measured and projected is shown in Figure 1.

Table 2
Actual TCS Effectiveness

TCS Element	Percent CO Reduction (1970-1975)	(1970-1976)
1. Federal New Motor Vehicle Program	- 3**	- 7**
2. Traffic Flow Improvements*	10	22
3. DEQ Inspection Maintenance Program	5	14
	12%	29%

*Includes 4% reduction in traffic volumes achieved by transit improvements.
**Based on latest but unconfirmed EPA data.

The full projected reduction was not achieved since some of the TCS elements have not been fully implemented and/or effective. Congressionally imposed delays in the Federal New Vehicle Control Program, higher than expected new car emissions at lower ambient temperatures, and greater increases in emissions from the aging of older cars have changed the projected effectiveness of this program from the expected decrease of 29 percent to an actual increase of 7 percent in 1976. The Department's inspection maintenance program has also not developed its full effectiveness since the Oregon Legislature increased the projected one year test cycle to a two year test cycle and also delayed the start of the program by one year. Traffic flow improvements have actually produced a greater than expected reduction in 1976 because traffic volumes entering portions of the downtown area have not increased as fast as previously expected. Mass transit improvements have contributed as much as expected and may increase with the full operation of the Portland transit mall. In Table 2, actual transit improvement reductions are represented by lower traffic counts to avoid double counting. They are not incorporated in the Table separately.

CO Air Quality Trends

Carbon monoxide air quality has improved substantially since implementation of the TCS. The number of carbon monoxide health standard violations has been reduced 66 percent to a total of 30 days of violation in 1976 (see Figure 2). Worst day air quality has not improved as dramatically, showing a 27 percent reduction. The highest 8-hour level recorded in downtown Portland in 1976 was 15.2 mg/m^3.

Transportation Control Strategy Effectiveness

Downtown Portland carbon monoxide air quality has improved. The most dramatic improvements have occurred in the 1975-76 years. Annual decreases in the number of violations must certainly be attributed to a great degree to TCS measures. Ventillation (pollutant dispersion caused by meteorology) can affect air quality too. However, ventillation is not a major cause of the dramatic reduction in violations of standards, since violations of health standards continued to go down in 1976, while ventillation was average and often worse than average.

The worst day carbon monoxide air quality has also improved, but not as much as annual violations. This is explained by colder temperatures on these days resulting in a much poorer performance of new motor vehicle emission controls and the fact that the TCS was not specifically designed to reduce worst day emissions.

The DEQ Vehicle Inspection Program, while not at full effectiveness, has contributed to CO air quality improvements. This is supported by the fact that CO air quality has improved at the Sandy Blvd. monitoring site, an area where carbon monoxide emissions are not affected by the TCS. Data on air quality at two other locations is inconclusive due to the short period over which these stations have been operating. The only way to fully isolate and identify the effectiveness of the Department's Inspection Maintenance Program on air quality however, would be through a comprehensive vehicle testing program. Such a program will be conducted in the Portland area through a EPA contract during 1977.

Future Air Quality

Carbon monoxide health standard violations in 1977 is projected to increase in the downtown Portland area because of the reduced effectiveness of the Department's biennial Inspection Maintenance Program. If the program were on a annual basis, Figure 2 indicates that the number of 1977 carbon monoxide standard violation would remain about at 1976 levels.

Projection of carbon monoxide levels have been estimated beyond 1977 by examining the automobile emission factor projected for the entire automobile population in each calendar year (see Figure 3). These projections are based on EPA Vehicle Emission projections taking into account up to date information on performance and deterioration of newer model motor vehicles. It appears at this time that the Federal Motor Vehicle Program will not cause a reduction in area wide CO emissions at least until 1979. In order to maintain a minimum of CO health standard violations in downtown Portland existing TCS elements must be improved in order to offset expected traffic increases. Also, it appears that an inspection maintenance program can accelerate attainment of standards by 2 to 6 years depending on whether a biennial or annual program is implemented.

Other Problem Areas

Air quality sampling in other portions of the Portland area has shown that carbon monoxide health standards continue to be exceeded. Some areas outside of the downtown area are experiencing worse carbon monoxide air quality than the downtown area. An analytical survey of roads and streets in the Portland Air Quality Maintenance Area showed that over 540 miles of streets are likely violators of standards during air stagnation periods. Of this total, downtown Portland accounts for 5 percent (25 miles) of the problem. Since the Department's TCS is oriented towards the downtown area, a region wide transportation control strategy will be needed to attain carbon monoxide air quality standards. The Federal Motor Vehicle Program (which will begin to show actual air quality benefits in the next few years) and an Inspection Maintenance Program will be key elements in such a strategy. In addition traffic and circulation plans may be necessary in special problem areas. The need for and benefits of a new area wide TCS will be identified by July 1977, as the Department completes its comprehensive analysis of attainment and maintenance of carbon monoxide air quality standards as required by the EPA.

Figur

Carbon Monoxide Emissions Resulting From Transportation Control

(West Burnside Street Station)

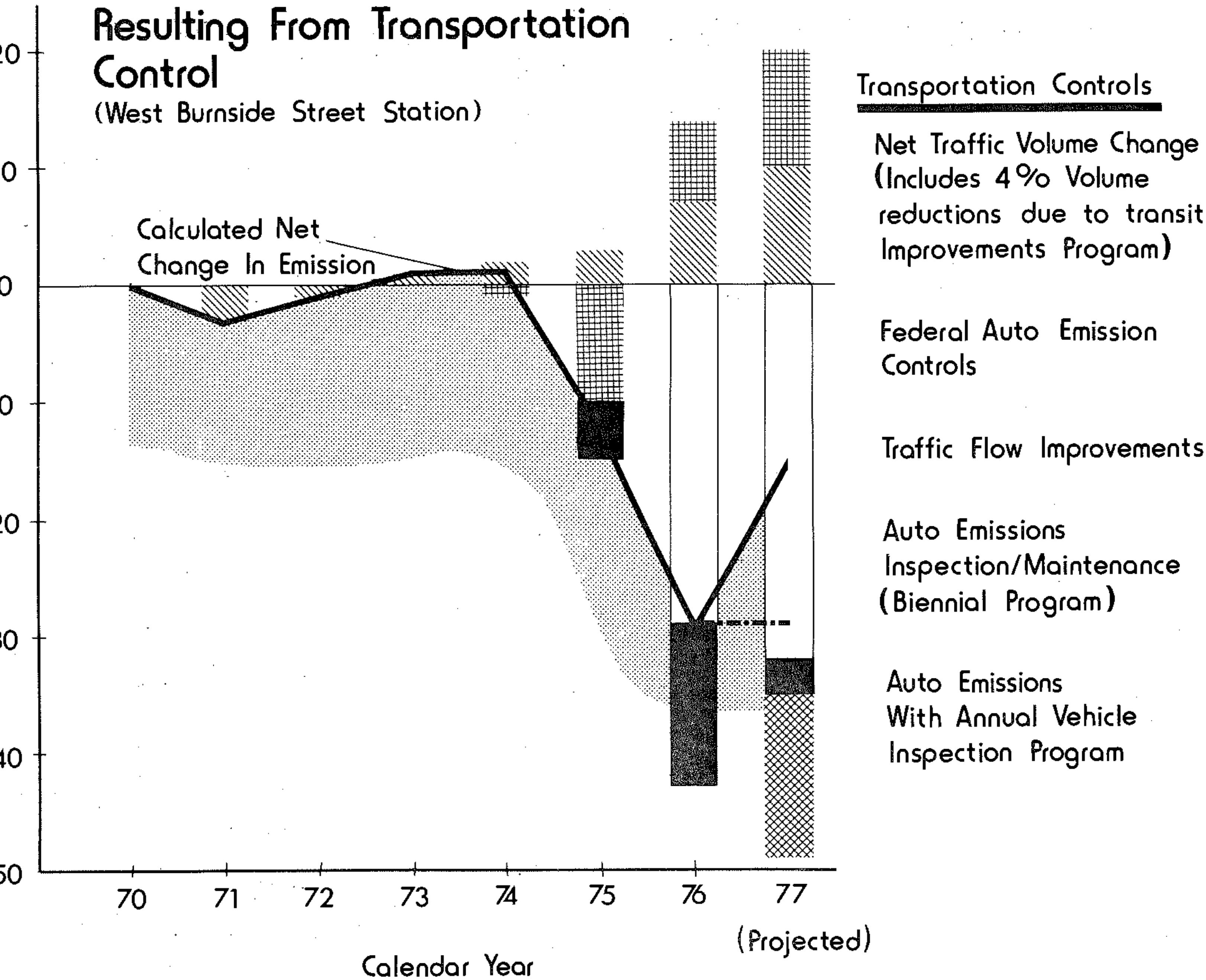


Figure 2

Carbon Monoxide Air Quality And Vehicle Emissions Trends

(West Burnside Street Station)

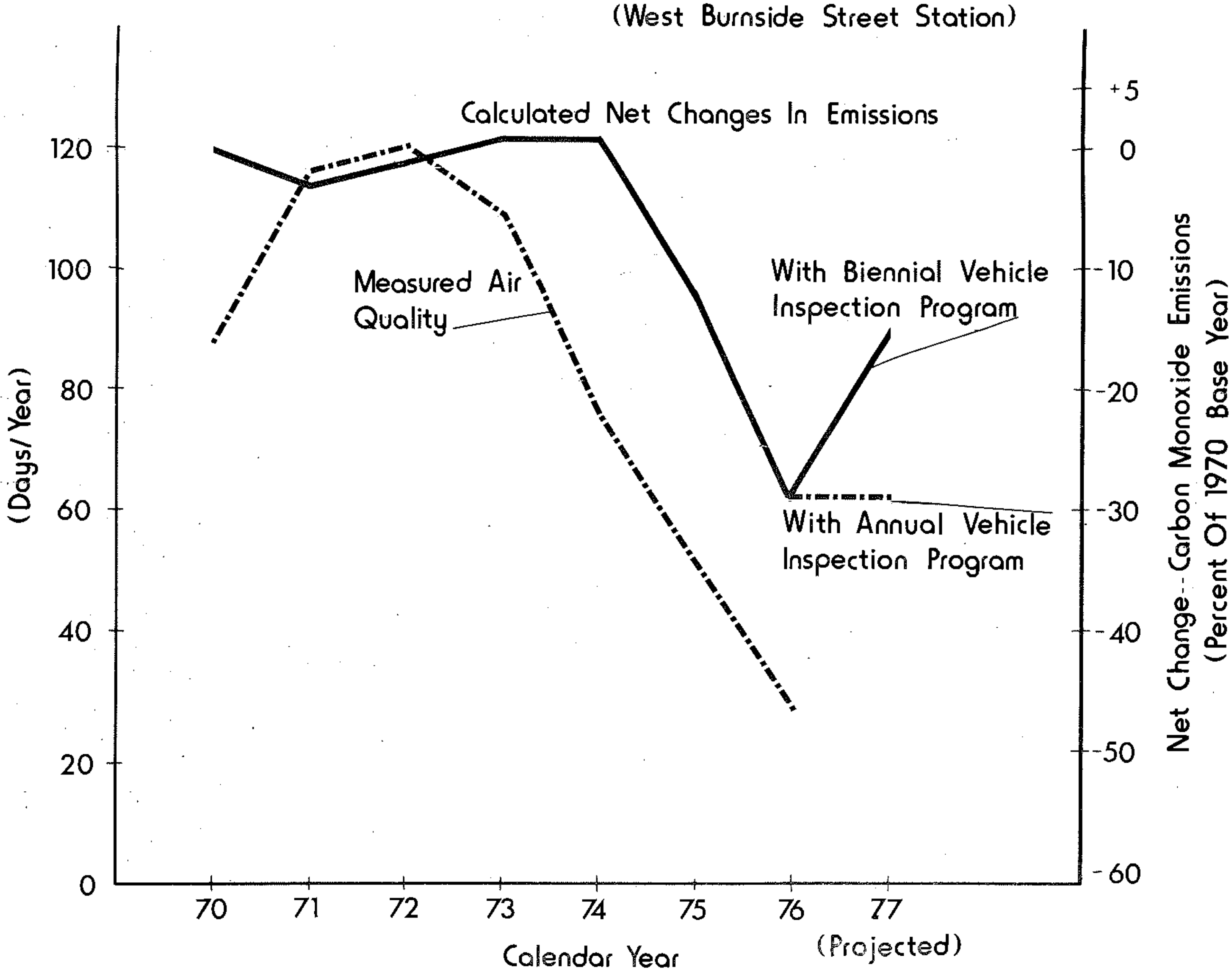
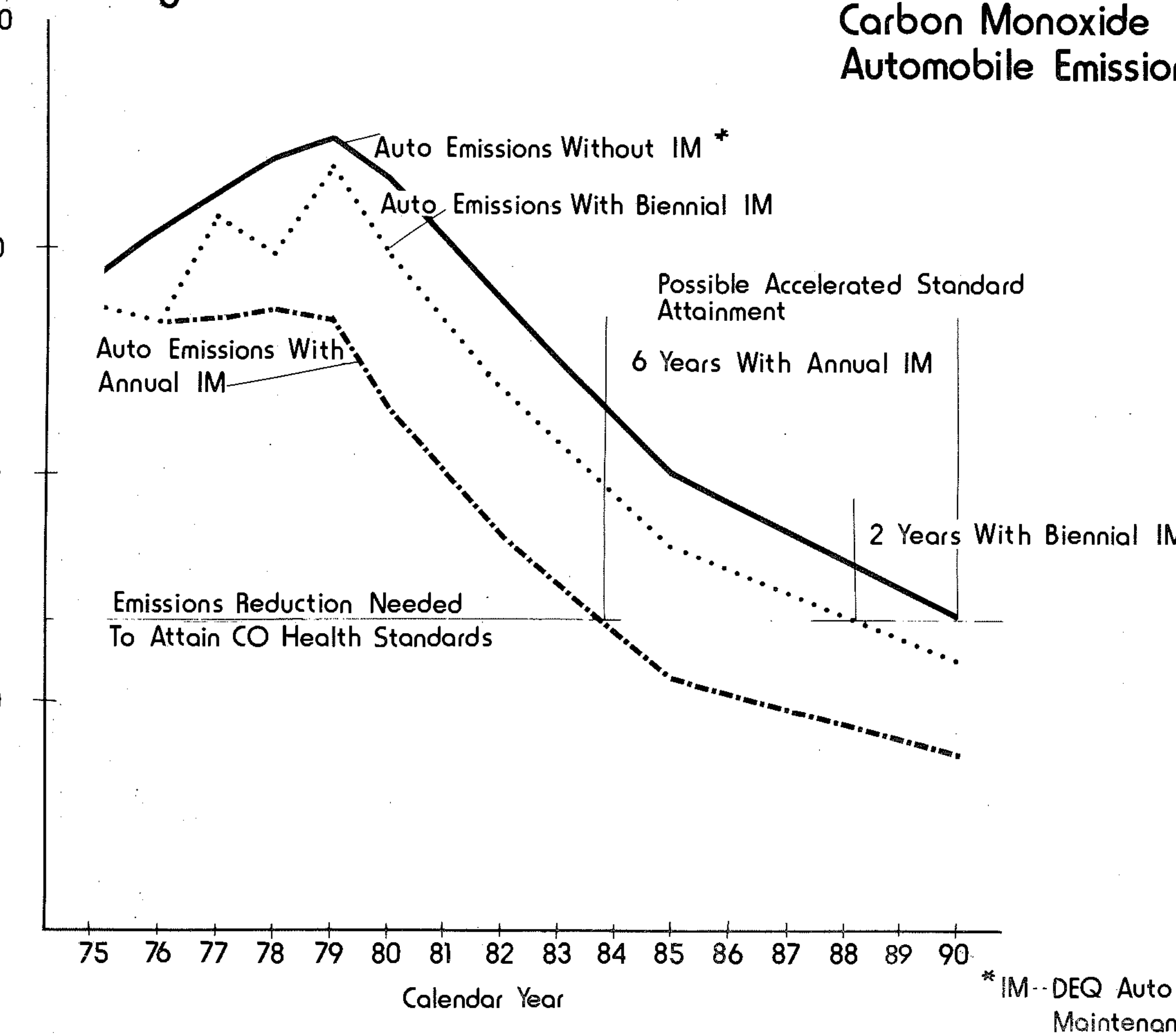


Figure 3


Carbon Monoxide
Automobile Emissio
Auto Emissions Without IM *
Auto Emissions With Biennial IM
Possible Accelerated Standard Attainment
6 Years With Annual IM
2 Years With Biennial IM
Auto Emissions With Annual IM
Emissions Reduction Needed To Attain CO Health Standards
75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
Calendar Year
* IM--DEQ Auto
Maintenan

Background

Photochemical oxidants are not emitted directly into the atmosphere but result primarily from a series of chemical reactions between oxidant precursor compounds in the presence of sunlight. The precursors are organic compounds (eg. hydrocarbons) and nitrogen oxides, primarily emitted from motor vehicles and stationary sources. Recent studies have shown that transport of oxidants and their precursor compounds have been demonstrated to be transported anywhere 5 to 50 miles downwind of urban areas. As shown in Figures 1 and 2 maximum oxidant concentrations generally occur anywhere from 13 to 30 miles from downtown Portland. It is believed the major precursor emission sources causing oxidant violations south of the City of Portland are motor vehicles and stationary sources, eg. bulk fuel storage and transfer operations, located in the greater Portland Metropolitan area including the urbanized Vancouver, Washington area.

The Federal and State oxidant health standard of 160 ug/m^3, 1 hour maximum was exceeded 7 times in 1970 within downtown Portland. The worst day that year reached a level of 294 ug/m^3. The standard was exceeded on 14 days in 1971.

The Federal Clean Air Act required the State of Oregon to develop a transportation control strategy (TCS) to attain the oxidant health standard by May of 1975 (later extended to May 31, 1976). This strategy was developed by the Department and submitted by the Governor to the Environmental Protection Agency in April of 1973. The strategy was oriented towards motor vehicles since they represent a majority (62%) of airshed hydrocarbons emissions.

The TCS was expected to provide more than the 43% reduction in hydrocarbon emissions needed by 1975 to meet the oxidant standard. This reduction was expected to have been easily achieved because the stringent plan required to meet carbon monoxide standards provided more than the necessary hydrocarbon reduction. The TCS consisted of several elements which were projected to provide the needed reduction:

Projected TCS Hydrocarbon Reduction in Downtown Portland
(1970-1975)

Element	Percent Hydrocarbon Reduction
1. Federal New Motor Vehicle Program	31
2. Mass Transit Improvements	2.5
3. Traffic Flow Improvements	14
4. DEQ Inspection/Maintenance Program	25
	75.5%

Hydrocarbon Emission Trends

All elements of the TCS have been implemented to some degree resulting a 15% reduction in hydrocarbon emissions per year within Multnomah County. The goal of a 50% increase in downtown transit ridership has been achieved and exceeded and a majority of the originally proposed traffic flow improvement measures, eg. signalization of lights, removal of parking spaces on selected streets, increased parking meter fees, etc. have been implemented. Estimated actual hydrocarbon reductions in downtown Portland and Multnomah County are summarized below:

Estimated Actual Hydrocarbon Reductions in Downtown Portland
(1970-1976)

Element	Percent Hydrocarbon Reduction
1. Federal New Motor Vehicle Program	9
2. Mass Transit Improvements	2.5
3. Traffic Flow Improvements	20
4. DEQ Inspection/Maintenance Program	7
	38.5%

Estimated Actual Hydrocarbon Reductions in Multnomah County
(1970-1976)

Element	Percent Hydrocarbon Reduction
1. Federal New Motor Vehicle Program	9
2. Traffic Flow (Vehicle Miles)	- 1
3. DEQ Inspection/Maintenance Program	7
	15%

The expected reductions were not achieved because of (a) Congressionally imposed delays in the Federal New Motor Vehicle Control program, and (b) inability of the Department's Inspection Maintenance program to reach its potential effectiveness because of the change from an annual to biennial inspection cycle.

Oxidant Air Quality Trends

Oxidant air quality in downtown Portland has improved since implementation of the TCS. While worse day air quality has not changed significantly (highest level recorded during 1976 in downtown was 204 ug/m^3-1 hour average), no oxidant ambient air standard violations were recorded in downtown Portland during 1975 and one violation recorded in 1976 as compared to 7 days in 1970 and 14 days in 1971.

Unfortunately, other areas of the airshed, primarily south of the City of Portland, continue to have poor oxidant air quality for which control strategies must be developed. Recent measurements in S. E. Portland, Milwaukie and near Canby show oxidant levels exceeding health standards. The Milwaukie and Canby monitoring sites recorded 26 violations of the oxidant standard in 1976 with a maximum 1 hour value of 278 ug/m^3. Insufficient long-term data is available from these sites to establish air quality trends.

DEQ Inspection/Maintenance Program Effectiveness

The Department's Inspection/Maintenance (I/M) program is estimated to have reduced motor vehicle hydrocarbon emissions by about 2.5% during 1975 and 7% in 1976. This compares to the 1970 EPA official reduction credit of about 10% for Oregon's program operated on a biennial test cycle. Failure to fully achieve the expected reduction rests with the 1 year delay in the mandatory inspection program. Recent information on I/M credits now suggests that reductions as high as 35% could be expected from a long term, annual inspection program.

The actual airshed benefits of I/M reductions cannot be fully identified until (a) a comprehensive vehicle testing program to measure emission deterioration and (b) oxidant dispersion modeling is conducted for Portland. Both elements will be conducted during 1977. In any event it is clear that an annual I/M program could greatly aid in reducing the area-wide oxidant health standard violations.

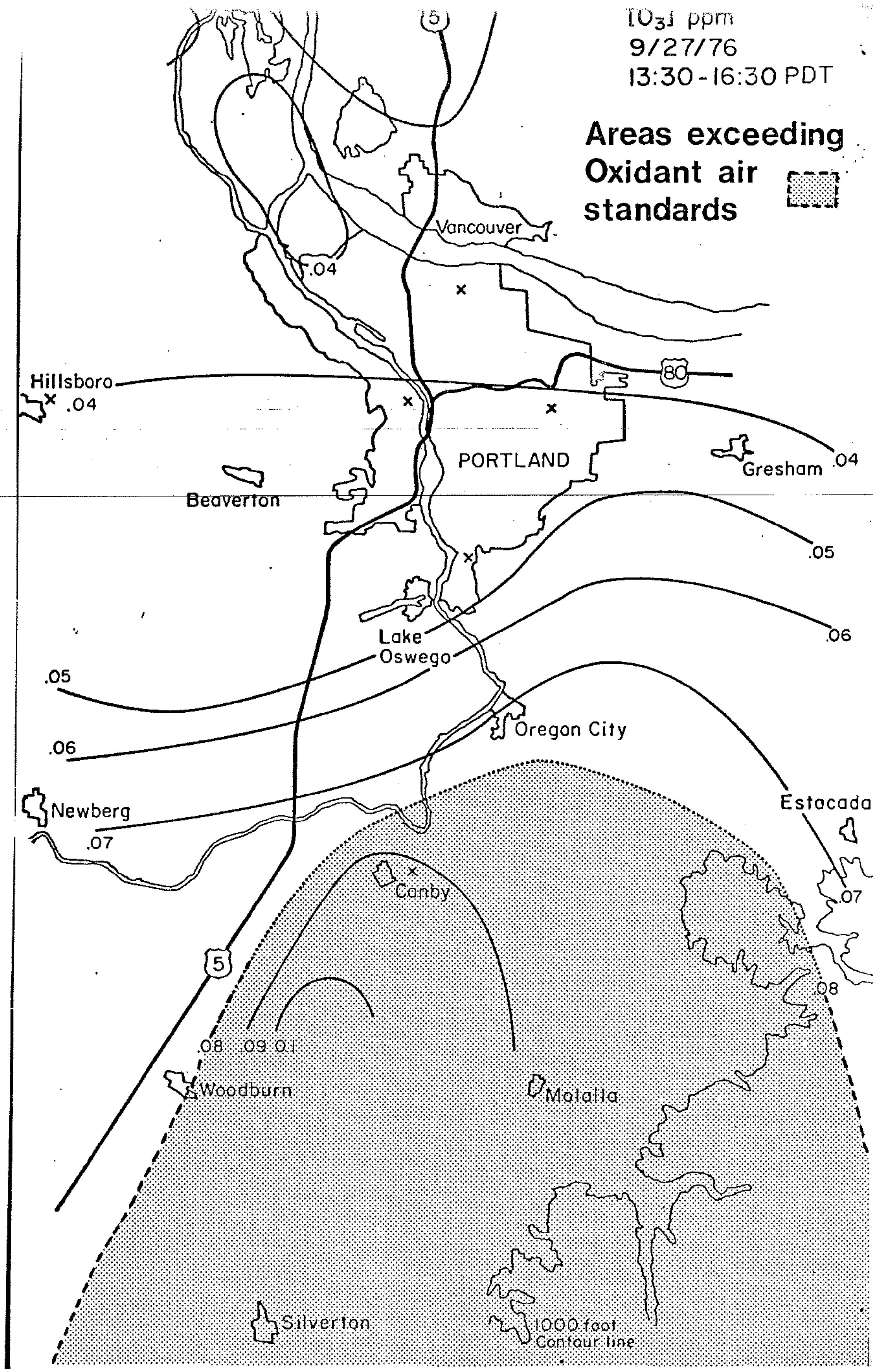
Future Air Quality

Using a modified rollback air quality projection methodology (commonly called Appendix J), it is estimated that an additional 50% decrease hydrocarbon emissions will be required to achieve the oxidant standard within the maximum concentration area south of Portland. Assuming no change in the current biennial I/M test cycle, the oxidant ambient air standard may not be met until the mid 1980's. An annual I/M program coupled with other hydrocarbon controls, such as capture of gasoline transfer loses, could reduce the mid-1980 projected compliance date by 2 to 5 years.

Detailed projections of future hydrocarbon emissions and needed control programs will be completed by July, 1977 as part of an evaluation of the means to attain and maintain compliance with oxidant health standards.

Other Problem Areas

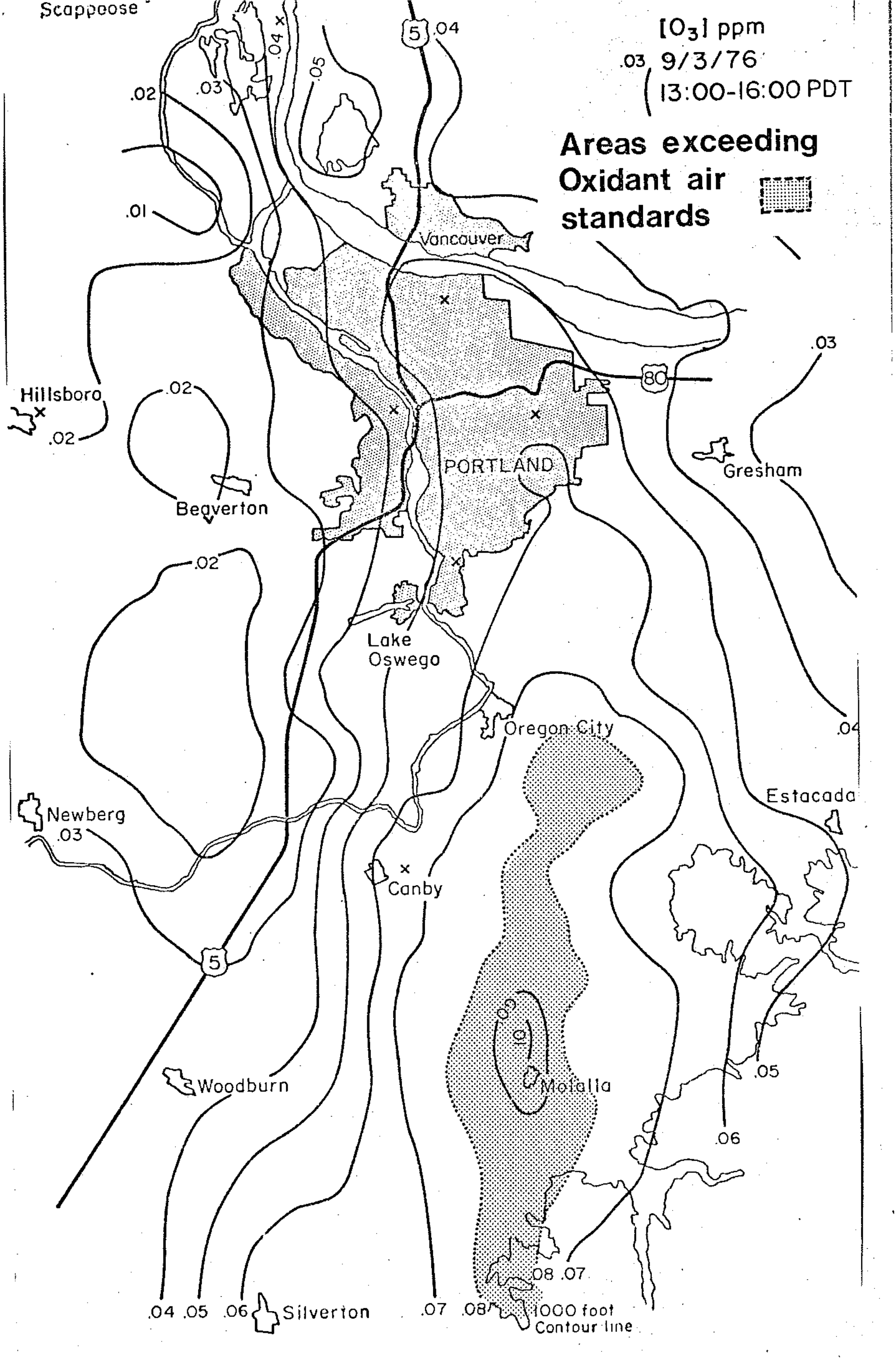
Oxidant air monitoring conducted in recent years has shown that the maximum concentration areas for which a control strategy must be designed, are primarily located south of Downtown Portland. Figures 1 and 2 shows the results of a recent air craft survey illustrating oxidant concentration patterns resulting from emissions in the greater Portland-Vancouver area. These facts strengthen the need for new control strategies to reduce regional hydrocarbon emissions.



[O3] ppm
9/27/76
13:30-16:30 PDT
Areas exceeding
Oxidant air
standards
Vancouver
.04
Hillsboro
.04
PORTLAND
Gresham
.04
Beaverton
.05
Lake
Oswego
.06
.05
.06
Oregon City
Newberg
.07
Estacada
Canby
.07
.08
.08
.09
0.1
Woodburn
Molalla
Silverton
1000 foot
Contour line

FIGURE 2

FIGURE 1



[O_3] ppm
9/3/76
13:00-16:00 PDT
Areas exceeding Oxidant air standards
Scappoose
Vancouver
Hillsboro
PORTLAND
Gresham
Beaverton
Lake Oswego
Oregon City
Estacada
Newberg
Canby
Woodburn
Molalla
Silverton
1000 foot Contour line
.01
.02
.03
.04
.05
.06
.07
.08
.09
.10
5
80

APPENDIX H

SUMMARY
EUGENE, SALEM, MEDFORD CO AND OXIDANT PROFILE

Summary

The Oregon Clean Air Implementation Plan Transportation Control Strategy (TCS) for Portland was designed to attain carbon monoxide and oxidant air quality in Portland. The I/M program is an important element of the TCS plan.

The TCS was only required for Portland since a review of the limited air quality data at that time for carbon monoxide and oxidants indicated standards were being attained in other areas of the state. During the 1970 to 1976 period, additional air monitoring information has been gathered to provide a more detailed picture of the carbon monoxide and oxidant air quality in cities other than Portland.

The marginal nature of carbon monoxide and oxidant air quality standard violations in the Eugene-Springfield and Salem areas indicate that an Inspection/Maintenance (I/M) Program is not justified at this time.

Presently, a Parking and Traffic Circulation Plan (PTCP) is being developed in the Salem area. Upon completion of the Salem PTCP, recommendations as to possible additional transportation control strategies, including I/M, will be made to minimize or eliminate future violations of ambient air standards.

Recent discovery of ambient CO standard violations in Medford will require a carbon monoxide control strategy for the Medford area. Hopefully the CO strategy can probably best be solved by a parking and traffic circulation plan for downtown Medford. The recently discovered Medford oxidant problem will require adoption of a hydrocarbon emission reduction plan likely based on industrial and motor vehicle controls. An I/M program may be needed as a part of the plan to achieve the required reduction. The Department will complete identification of the oxidant control strategy by March, 1977.

Eugene

Eugene carbon monoxide levels have only marginally exceeded the air quality standard in the last 5 years as measured at 11th and Willamette Streets. During December, 1976, under extreme conditions of prolonged stagnation, the 8 hour carbon monoxide standard (10 mg/m^3) was exceeded on 3 days. The maximum recorded was 13 mg/m^3. Only four days exceeded the standard in 1976, two in 1975, and none in 1974. Considering the marginal nature of the CO violations at the downtown monitoring site, Eugene is essentially in compliance with the carbon monoxide standard at this time. Additional carbon monoxide monitoring is presently being conducted by the Lane Regional Air Pollution Authority at several locations in the Eugene-Springfield area, but the results of this study have not been completed as of this date. However, a review of proposed parking facilities and roadways under Lane Regional Air Pollution Authority's Indirect Source Rule is still essential to ensure that localized carbon monoxide "hot spots" do not occur due to an excessive concentration of motor vehicle traffic.

Eugene's oxidant air quality status is similar to that described for carbon monoxide. The most recent information suggests that the oxidant standard violations which occurred on 26 days during 1974 were very unusual and unexplainable although it is known the field and slash burns create oxidants and could have been a major contributing factor to the 1974 oxidant violations. No violations occurred during 1975 and 1976 even though several periods of poor ventilation conducive to oxidant formation occurred. Since continuous oxidant monitoring in Eugene has failed to show a consistent oxidant problem, an I/M program for this area is not recommended at this time.

Salem

Salem's carbon monoxide and oxidant air quality is similar to Eugene's in that the standards are being occasionally exceeded. The carbon monoxide standard was exceeded on only 5 days during 1974, once during 1975 and 8 times during the fall of 1976 under extreme stagnation conditions. The maximum level recorded, 12.9 mg/m^3 (8-hour average), only marginally exceeded the standard of 10 mg/m^3 (8-hour average). The Department in conjunction with the City of Salem, Salem Council of Governments and the Oregon Department of Transportation is presently developing a Parking and Traffic Circulation Plan (PTCP) for the Salem metropolitan area to ensure that local and area-wide violations of motor vehicle related air quality standards (primarily carbon monoxide and photochemical oxidant) do not occur in the future. As a result of the Salem PTCP study, motor vehicle control strategies will be recommended within the next 6 to 12 months, which may include a suggestion to implement an Inspection/Maintenance Program.

Oxidant levels in Salem exceeded the standard 10 days in 1973, 0 days in 1974, 2 days in 1975 and only 1 day in 1976. Since recent aircraft survey information suggests that elevated oxidant levels in Salem may partially result from Portland emissions, completion of an oxidant control strategy for Portland may benefit Salem's air quality as well.

Medford

In late November, 1976, the Department began monitoring carbon monoxide air quality within Medford's Central Business District (CBD) in response to local concern about the lack of available data. During December 1976, unusually severe stagnation conditions occurred which aggrevated poor ventilation conditions common to Medford. Carbon monoxide levels reaching 25 mg/m^3 (8-hour average) have been recorded at at least two points within the CBD. The 10 mg/m^3 (8-hour average) standard was exceeded on 15 of 25 monitoring days. Current information suggests that the problem area may be limited to a few streets, rather than to wide areas of the basin. This suggests that control of Medford's carbon monoxide problem may best be solved by a transportation control strategy based on traffic circulation and parking plans as the key element.

Measurement of oxidant concentrations in 1976 have indicated a severe problem. The oxidant air quality standard (160 ug/m^3, 1-hour average) was exceeded 17 days between 7/12/76 through 9/30/76. On 13 days the alert level (200 ug/m^3, 1-hour average) for oxidants was exceeded. Medford's oxidant air quality appears to be a true airshed problem which may require a control strategy incorporating many elements including industrial control, hydrocarbon evaporative loss control, parking and traffic circulation plans, possible initiation of transit service, and an Inspection/Maintenance Program in addition to the Federal Motor Vehicle Emission Control Program. The Department is currently engaged in developing emission reduction alternatives to identify the best strategy. This work should be completed by March, 1977.

APPENDIX I

EPA POSITION ON INSPECTION/MAINTENANCE

Ron Householder

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

NOV 29 1976

STATE OF OREGON
RECEIVED
DEC 6 1976
Dept. of Environmental Quality
Vehicle Inspection Division

OFFICE OF THE ADMINISTRATOR

TO: Regional Administrators

SUBJECT: Inspection and Maintenance

You are all aware of some of the uncertainties which have surrounded the I&M program. While it has been generally believed that I&M programs are beneficial, uncertainties resulted from a lack of sufficient data, and differences, even within the Agency, in interpreting that data. The attached document represents the end of a long process during which all offices in the Agency having an interest in the subject have reviewed and interpreted the data and have jointly developed a position. The data included in the document is accordingly considered to be reliable, as are the interpretations of the data, and the resulting projections. Although some questions, noted in the paper, still exist, the document represents EPA's position on the subject.

Some of the more important conclusions are as follows: (1) deterioration from cars on the road is greater than we had previously expected; (2) inspection and maintenance programs will, in a cost effective manner, reduce pollutants from in use vehicles; (3) the short tests which we have now developed can readily identify high polluting vehicles; and (4) most of these vehicles can be repaired at a reasonable cost.

It is important that this document be circulated within your office to appropriate personnel and, of course, distributed to State and local agencies as well as to interested members of the public. I suggest that you inform appropriate personnel that if they wish to discuss any portion of the document they should contact Michael P. Walsh of the Mobile Source Enforcement Division in Washington, D.C.

John Quarles
John R. Quarles, Jr.
Deputy Administrator

Attachment

THE NEED FOR AND BENEFITS OF INSPECTION AND MAINTENANCE OF IN USE MOTOR VEHICLES

Michael P. Walsh
Mobile Source Enforcement Division
November 9, 1976

SUMMARY

This review of available data indicates that the Federal motor vehicle control program is not reducing emissions from in-use cars as rapidly as expected. Improper adjustments and a lack of proper maintenance seem to be major reasons for the shortfall. The latest technology with catalytic converters seems as sensitive as older cars to proper maintenance and adjustment, although the results in California with catalysts and air pumps are more encouraging. The ability of short tests to identify high polluters is established and the service industry seems capable of repairing failed cars at reasonable cost. Costs of repairing catalyst cars are still somewhat of a question although initial indications are that required repairs will be similar to those on non-catalyst cars. Deterioration of vehicle emission levels following I/M is still subject to some dispute but a best estimate indicates that I/M will slow down the long term rate of emission control degradation. I/M is an effective and cost effective means of bringing cars into compliance with standards and early results from New Jersey's I/M program are encouraging.

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Inspection/Maintenance (I/M) programs are intended to identify cars which need remedial maintenance or adjustment and require repair on these cars. Also by providing a general incentive for owners to maintain their vehicles it is intended to bring about an overall improvement in fleet maintenance and reduced emissions. They are an integral part of the Federal motor vehicle control strategy. As illustrated in Figure 1, other key elements of this strategy include certification, assembly line testing and recall. Initially, prototype vehicles are certified by EPA. Certification confirms that the cars are designed so as to be capable of meeting standards. Assembly line testing of production cars is conducted to assure that vehicles, as manufactured, meet standards. In-use surveillance is carried out to assure that properly maintained vehicles continue to meet standards for five years or 50,000 miles; engine families found out of compliance are subject to recall. These are the three major elements of the Federal Motor Vehicle Control Program (FMVCP), and their execution is solely a Federal responsibility. However, compliance with standards is ultimately dependent upon the vehicles being maintained and adjusted correctly. Inspection/Maintenance is intended to address this final step to "close the circle". I/M is primarily a state responsibility with Federal support in the forms of technical assistance and Federally prescribed warranties against equipment and performance defects. I/M programs will provide incentives to vehicle owners to get the maintenance done, incentives to the service industry to do the maintenance properly and incentives to the manufacturer to make vehicles more serviceable. Through the recall and warranty elements of the Federal Motor Vehicle Control Program (FMVCP), there will be ample incentive to the manufacturer to design vehicles which if properly maintained can meet the standards.

I/M has a prominent role in many of the most important components of the Federal Motor Vehicle Control Program. To the extent that I/M identifies, relatively rapidly, vehicles which may be out of compliance it can feed this information back to the recall and assembly line test programs thereby allowing EPA to focus investigations and test orders on these vehicles. It is key to the warranty program by which individuals can identify equipment defects and it is a legal requisite for the warranty against performance defects which are detected by a Federally prescribed short inspection test. It is also the major ingredient in the federal anti-tampering program, as the threat of I/M failure is considered a strong deterrent to tampering. Without inspection/maintenance, all of these programs are significantly weakened.

The need for and benefits of inspection/maintenance has been the subject of intense controversy since the motor vehicle was identified as a major air pollution source in the United States. It began when it was established that emissions were related to vehicle adjustment,[1,2*] and was intensified when manufacturers opted for modified adjustments on vehicles as the major thrust of their initial emission control techniques.[3] As early as 1964, a study had been performed which showed initial emission reductions on the order of 30% for hydrocarbons and 15% for carbon monoxide were possible by means of a smog tune-up.[4] This initial reduction has subsequently been verified many times (see Figure 2) and even greater initial benefits have been demonstrated.[5,6]

Unfortunately, much of the debate over I/M has taken place without the benefit of sufficient data to resolve other questions such as deterioration of cars without I/M, adequacy of short tests to identify high polluting cars (especially if they are equipped with catalysts), the

*numbers refer to references at end of paper.

ability of the service industry to repair high polluting cars and their deterioration subsequent to repair. In the absence of data, the debate continued. Advocates of I/M argue that the benefits of emission control depend upon proper maintenance and that I/M programs are both effective and cost-effective means of assuring proper maintenance.[7] Moreover, they continue, without programs of this type, much of the potential benefit of the Federal Motor Vehicle Control Program will be lost.[8]

On the other hand, opponents of inspection/maintenance have argued that the FMVCP can solve the emissions problem without I/M as newer technologies much less sensitive to maintenance are placed on cars.[9] In the recent past, many people were pointing to the catalytic converter as such a maintenance insensitive technology.[10] Opponents have also argued that there is no good short test which correlates with the full Federal Test Procedure (FTP), and that therefore the benefits and cost-effectiveness of I/M will be quite poor.[10,11] In addition, it has been argued that consumers, the owners of motor vehicles, will be thrown into the hands of an inadequate service industry and that I/M is just a means of passing the buck from the automobile manufacturers to individual consumers, thus shifting the burden for cleaning up the motor vehicle air pollution problem from those responsible for it.[12]

The purpose of this paper is to review the available data to see what this data reveals about the technical concerns which go to the heart of the need for and benefits of inspection/maintenance. Particular focus will be on deterioration of in-use vehicles with and without inspection/maintenance, the ability of short tests to identify cars which need remedial maintenance, the ability of the service industry to repair high polluting cars and the costs and cost-effectiveness of I/M.

THE NEED FOR I/M

To the extent that cars in use meet standards throughout their useful lives without the existence of I/M programs there is no need for I/M programs. Conversely, to the extent that vehicles fail to meet standards there is a need for additional strategies to lower emission levels. I/M,of course,is one such option.

Figure 3 compares CO and HC exhaust emission levels based on data collected during 1975 as part of the FY 74 emission factor program[13,14,15] with those most recently published by EPA.[16] For carbon monoxide, the measured results are consistently higher than the estimates while for HC the differences are insignificant except for 1975 cars. Based on these new data, as well as data collected from previous emission factor programs, new estimates of emission deterioration have been projected[17,18] and these are contrasted with the earlier estimates in Figures 4 and 5. These figures show emission estimates normalized according to their respective standards and indicate that previous estimates of 1975 model year emissions were optimistic, especially for carbon monoxide. In summary, the previous predictions that average emissions would initially meet standards and continue to do so for six or seven years for carbon monoxide, and two or three years for hydrocarbons have been found overly optimistic. Estimates based on the data now indicate that carbon monoxide emissions are initially higher than had been estimated, exceeding standards on the average in the first year, and are projected to deteriorate rapidly in subsequent years. For hydrocarbons, initial emissions are slightly higher than estimated and are projected to exceed the standard on average after about one year. The relationship of emissions for pre-1975 model year cars to their appropriate standards as a function of time is similar to the relationship for 1975 models.

The first question that comes to mind is why do vehicles in use emit at such high levels? The studies summarized in Figures 6 and 7 indicate that the major reason is a lack of proper maintenance and/or proper adjustment on in-use vehicles. More specifically, for 1973 model year vehicles with approximately 15,000 accumulated miles, two different studies were carried out. One focused on vehicles maintained according to manufacturers' instructions and which were carefully tuned-up prior to testing. The other focused on vehicles tested without special preparation, i.e., vehicles in their normal state of maintenance.[20] As the figures illustrate, carbon monoxide and hydrocarbon levels for the normally maintained cars are substantially greater than for those maintained and tuned according to manufacturers' specifications. For 1975 vehicles, parallel studies have not been done, except for normally maintained cars at an average of about 8000 miles.[21] The normally maintained cars were subdivided according to idle adjustment into "properly adjusted" and "improperly adjusted" subclasses.[22] These data indicate that the sensitivity to idle adjustment may be even greater for 1975 models than it had been in earlier model years, and again the impact is most significant for carbon monoxide.

Recent data have also been collected on 1975 cars in California[23,24] and these data, summarized in Figure 8, show that California cars are considerably cleaner than 49 state cars, relative to their respective standards, although at least some of the data indicates that they are dirtier than expected. The reason for the relative cleanliness of the California vehicles is somewhat speculative.[25] The California assembly line test program may be responsible; the mild climate may lead to less tampering than in other areas; the state's certified repair facilities may result in better vehicle maintenance; the technology which places much greater emphasis on air pumps may be more forgiving of maladjustments or less likely to receive them because of better driveability; the Title 13 Program which requires dealers to properly set cars following maintenance may keep emission levels low; the tradition which has been established over many years in California of controlling emissions from cars, though difficult to quantify, may have the greatest impact of all.

Analysis by the California Air Resources Board however, indicates that considerable tampering is going on, perhaps affecting as many as 15 - 20% of 1975 MY cars.[24] Carefully screened 49 state cars have shown as much as 20 -25% tampering on 1975 cars after only one year.[26] Since EPA studies have shown that tampering increases with vehicle age,[27,28] this raises questions about the long term effectiveness of the California and 49 state vehicle emission controls. A particular question for all of these vehicles is, what will happen to the emission controls after 50,000 miles? The Federal tools of recall and warranties are applicable only for 5 years or 50,000 miles,whichever is less. I/M is the only compliance technique which provides for the periodic evaluation of whether vehicles in use continue to control emissions throughout their life.

Although many questions remain, two firm conlusions can be drawn. First, with the possible exception of California, it is clear the Federal Motor Vehicle Control Program (FMVCP) is not fully achieving its goal of bringing cars in actual use into compliance with standards. Second, the lack of proper vehicle maintenance and, particularly for 1975 models, improper vehicle adjustment seem to be primary reasons for the shortfall. Recognizing the problem, attention must be focused on the questions of whether I/M can identify the high polluting vehicles, whether such vehicles can be repaired, the costs of such repairs and, in general, the overall emission reduction.

ABILITY OF SHORT TEST TO IDENTIFY HIGH POLLUTERS

How well can I/M do its job? The first question in this regard is how well can an I/M short test identify high polluting vehicles? The full Federal Test Procedure (FTP) of course, is the best true measure of a vehicle's pollution characteristics but this is too expensive and time consuming to be considered for a large scale I/M program. Several short tests (idle, key mode, Federal three mode among others) which are better suited to I/M have been investigated in terms of their ability to predict FTP emission levels in a consistent reliable manner but the results have not been too encouraging.[53] However the results have been very encouraging in terms of being able to predict whether a car would pass or fail the standard on the FTP. In effect, though the short tests have not demonstrated the ability to predict the absolute FTP result with any high degree of confidence, they have shown that they can discriminate with high confidence between clean and dirty cars. For example, based on data collected in the FY 74 emission factor program, a recent EPA study[29] selected cutpoints for the idle test which give approximately the same rate of errors of commission (cars failing the short test but which would pass the full federal test procedure) as the federal test procedure itself would give i.e., 5% of the total population.[30,31,32] Vehicles were then screened according to these cutpoints with results as shown in Figure 9. These data suggest that the idle test is capable of segregating low polluting cars from high polluting cars.

GETTING CARS REPAIRED

Once the polluters are identified, it is up to the service industry to repair the cars. Questions have been raised about the ability of the service industry to do these repairs as well as the cost of repairs. Figure 10 shows the types of repairs required to pass the Portland I/M program and Figure 11 shows the associated costs for vehicles tested by the Portland, Oregon, New Jersey and Arizona I/M programs through early 1976.[34] These data show that the types of repairs that are needed to pass an I/M program are mainly carburetor adjustments and tune-ups, repairs that are within the capabilities of the service industry today. Less than 10% of the failing vehicles in Oregon required repairs costing more than $50.00; in Arizona, this percentage was up to 14% while in New Jersey it was 22%. The costs of repairs is reasonable in each case. Over 70% of the repairs in Oregon cost less than $10.00 and the average is under $20.00. In New Jersey, 55% of the repairs cost less than $25.00 and the average is under $35.00. In Arizona 66% of the repairs cost less than $25, and the average is about $25. The present average I/M associated repair cost is below the average cost generally experienced for a tune up.[35] Higher repair costs are reasonably expected in New Jersey, since the less stringent standards applicable there will concentrate failures in the cars with more serious problems.

Since virtually all the repair and cost data are based on results with pre 1975 cars, major questions remain regarding the ability of the service industry to repair catalyst cars and the associated costs of such repairs. Recall testing carried out on certain catalyst equipped 1975 models indicates that repairs similar to those listed in Figure 10 were sufficient to restore these cars to a degree necessary to pass the idle test with concomitant FTP emission reductions. However, these results are preliminary and somewhat speculative with regard to other engine families.[36] Better data should be available in the relatively near future from the EPA restorative maintenance study which is currently in progress.

The New Jersey program has also demonstrated that the service industry can change in response to an I/M program. During the first year of the voluntary program in New Jersey, after failing vehicles were fixed, on retest, their failure rate was still consistently above 40%. However, within two to three months after the program became mandatory, the failure rate on retest fell to approximately 18%. This strongly indicated that a mechanics learning process was taking place.[37] Mechanics now had to fix the vehicles properly because owner's had an independent check on the quality of repair. Training programs were developed by private industry in order to address the needs of the service industry. In particular, the EXXON Corporation provided a training program for most of its own service stations to be sure that work done by those stations would not result in complaints.[38] At this time, some stations in New Jersey advertise that they will guarantee their repairs and that the work that they do will assure passing the inspection/maintenance program.

DETERIORATION WITH I/M

Far and away the most important and controversial technical issues regarding I/M effectiveness focus on deterioration, both during the year between inspections on failed cars which are repaired and the long term deterioration of an I/M fleet compared to deterioration which would have occurred on that same fleet in the absence of an I/M program. In the first case, the benefits over the course of a year are substantially less if the failing cars, once repaired, deteriorate back to their previous level in 2-3 months compared to 12-15 months. Not only is the absolute emission level to which these vehicles rise important, and the time it takes them to rise to it, but the shape of the deterioration curve can be quite significant. For example, as illustrated in Figure 13, the end of year emission level could be reached by three different shapes of deterioration rates:

(1) A very rapid initial deterioration (possibly due to tampering) with a gradual leveling off.

(2) A linear deterioration throughout the year

(3) A very slow deterioration for most of the year with a rapid climb at the end.

Traditionally, EPA has assumed a linear deterioration rate back to the level which would exist without I/M, thereby concluding that the annual benefits of I/M are about one-half the initial reductions.[39]

To date, only one study has been carried out which measured emissions from the same group of cars over a full year period.[40] These tests were conducted during 1975 by Olson Laboratories for the California

Air Resources Board on four similar groups of 1968 through 1974 model year vehicles, systematically selected to represent the proportions of these vehicles in the January 1975 California vehicle population. Only two groups, an I/M group and a control group were used in the analysis which is illustrated in Figures 13 and 14. Figures 13 and 14 show emission levels normalized to initial test levels. Results are illustrated for all vehicles which completed the program on one hand and for selected vehicles with deterioration rates less than 400% on the other. Each vehicle in the I/M group was initially subjected to an idle test with approximately 41% failing, and those which failed were given adjustments and repairs only sufficient to pass the idle test limits. Vehicles were tested according to the 1972 FTP as received, and (idle test failures only) after repair and at 1, 3, 6, 9 and 12 months. The control group was tested at the start and end of the year. Although this study is not definitive,[41] all analyses have concluded that the previous EPA deterioration estimates with I/M are too high.

When the data from all cars which have completed the years testing are used, it appears that the I/M fleet deterioration rate is greater than the control (non I/M fleet) deterioration rate. This deterioration however is not sufficient to bring thse cars back to non-I/M levels within the one year time frame. Moreover it has also been pointed out that the control fleet deterioration rate is unusually high for HC, and that if more normal deterioration were observed the I/M fleet deterioration could have reached the level of the non-I/M fleet by year's end.[42] This analysis led to the conclusion that the overall effectiveness of I/M in a program's first year is approximately 70% of the immediate reduction following repair at the start of the year.[42,52]

A second analysis has focused on apparent discrepancies in the data, the most extreme of which went from 4.88 grams per mile HC at the 9 month test point to 110.07 grams per mile at the 12 month test point. If data points are screened from both the I/M and non I/M fleets according to a criteria of eliminating all cars with deterioration rates greater than 400%, the I/M fleet is reduced from 109 to 105 cars and the non I/M fleet from 91 to 86. The I/M fleet in this case deteriorates at about the same rate as the non I/M fleet and for HC does not even return to its pre I/M level in the course of a year. For CO, the fleet does deteriorate to the pre-I/M level but not to the non I/M control fleet level.

A third approach has been even more subjective, focusing on a theoretical comparison of possible differences between the I/M and non I/M fleets that could impact on deterioration rates. On the one hand, it has been postulated that the I/M fleet would have a lower rate of deterioration because the quality of service would generally improve resulting in better maintenance for all cars across the board. In addition, to the extent that defective vehicle components exist and are identified and repaired in the I/M fleet, it is argued that the subsequent secondary deterioration to other parts due to that defect (e.g., catalyst burn up due to ignition misfire problems) will be eliminated or at least ameliorated.

On the other hand, it has been argued that more tampering may be done to the I/M fleet to compensate for possible driveability problems which exist when the vehicles are adjusted to low emission levels.

Based on a careful review of the available data and lengthy discussions between the respective offices, it is the collective best judgement of the technical staff that the deterioration rates of the I/M and non I/M fleets are the same within the limits of accuracy of current data, over one year, although there are those who still disagree. This judgement is reflected in the draft revised Appendix N which was circulated for comment on September 30, 1976.[43]

In the past, EPA has assumed that the percentages of emissions reduction obtained from successive I/M cycles was identical to that achieved in the first cycle. The assumption of a repeat performance was reasonable given a further assumption that one year after an I/M cycle emissions return to the levels that would have existed in the absence of I/M. However, with the tentative conclusion as stated above that the I/M fleet does not deteriorate to the levels which would have existed in the absence of I/M and if one further assumes that the I/M vehicles will deteriorate and be repaired in future years in the same manner as in the first year, the I/M benefits will increase with time. Over a long term in other words, if both of these assumptions are true I/M programs will actually impact on the lifetime deterioration of vehicles. This is illustrated in Figure 15.

No study exists or will exist for several years which proves or disproves the hypothesis that I/M vehicles will deteriorate over their lifetimes at a lower rate than non I/M vehicles. Concern has been expressed that because of some of the assumptions made, vehicle emissions are estimated to remain at or near standards throughout their entire life if a maximum*I/M program is properly applied. There is considerable disagreement over whether this is actually possible.

Other sources of data however, were reviewed to determine if they would shed any light on this issue. Figures 16 and 17 summarize linear regressions of all available emission factor and in-use compliance CO and HC data for 1972 and 1973 model year cars normalized according to their respective zero mile values. The emission factor data are representative of the normal non-I/M emission levels of in-use cars while the IUCP data represent what emission levels could be if all cars were properly maintained and tuned up just prior to testing (this may be a most optimistic I/M case except for the potential impact of I/M on the quality of maintenance performed). There is a lot of scatter in the data but it does indicate that properly maintained and tuned cars tend to have lower deterioration rates for CO and HC than "normal" cars. While this does not prove that I/M cars would have lower lifetime deterioration rates than non I/M cars, it does indicate that to the extent that I/M results in more and better maintenance it would tend to lower deterioration.

The only data available which address this point for catalyst cars are from the FY 74 emission factor program and are summarized in Figures 18 and 19. It should be noted that these figures represent extrapolations

*semi-annual inspection, 50% stringency factor with mechanic training of data from vehicles with very little mileage accumulation; the average accumulation is only 8700 miles and 75% of the sample have fewer than 15,500 miles. With the data available, however, regressions of emissions versus miles were developed for two groups of cars, those which would fail an idle inspection test with a cut point of 1.5% CO and those vehicles which would pass. The CO deterioration rate for failing cars is significantly greater than for passing cars while the reverse is true for HC. In terms of average emissions over a 100,000 mile lifetime, CO emissions are projected to be substantially lower for passing cars than for failing cars, HC slightly lower.

One of the critical factors upon which the impact of I/M on long term deterioration hinges is the use of constant short test cut points. It has been argued that the use of constant cut points would increase failure rates over time which would be politically unacceptable leading to a gradual loosening of these cut points.[42] Such a loosening would reduce any tendency to slower I/M vehicle deterioration rates. Of course, the critical question here is whether there will be a shift in in-use vehicle maintenance due to an I/M program or not, a shift which not only goes to the amount of maintenance performed but probably more importantly to the quality of maintenance and adjustments made.

Figure 20 summarizes the mean idle test emission levels in the New Jersey I/M program for each model year vehicle tested.[44] These data show that idle emission levels are fairly stable in New Jersey, presumably in response to the I/M program. A glance at failure rates over time as shown in Figure 21 also indicates a fairly stable failure rate for cars more than a year old. Data collected in New York State[45] and Pennsylvania[46] as illustrated in Figures 22 and 23 also show that idle emissions in New Jersey are lower than in surrounding areas although negligibly so for HC. These data tend to support the argument that the quality of adjustment will improve with I/M and that therefore there will not be a need to relax I/M cut points with time.

THE BENEFITS OF A GOOD I/M PROGRAM

Ultimately, the benefits of an I/M program depend on the quality of the program which is implemented. A poorly designed or poorly managed I/M program could result in very little or even no benefit. On the other hand a well planned, well operated system could be the cornerstone of the entire motor vehicle control effort in a given area. What distinquishes a good program from a poorer one? At a minimum, any good program would provide for the following:

(1) regular periodic inspection (at least annually) of all vehicles for which emission reductions are needed.

(2) retest of failing vehicles following maintenance to assure that necessary maintenance is performed.

(3) a careful and well designed quality control program to assure the reliability of the inspection system and equipment accuracy. This should include routine maintenance, calibration and inspection of equipment and routine auditing of results.

Some question exists whether a decentralized I/M program could ever achieve the full benefits that I/M is estimated to be capable of. If it is to do so, certain additional provisions such as the following must at a minimum be included:

(4) licensing of the inspection facilities which assures the use of proper equipment in an acceptable manner by people who have been adequately trained.

(5) maintenance of records on each vehicle inspected including vehicle descriptive data, test results and vehicle operator signatures. Records must also be maintained on the calibration of testing equipment.

(6) copies of these inspection records should be submitted on a periodic basis to the governining agency for auditing.

(7) the governing agency should inspect each facility at least every ninety days to check the facilities' records, check the calibration of the testing equipment and observe that proper test procedures are followed.

(8) the governing agency should have an effective program of unannounced/unscheduled inspections both as a routine measure and as a complaint investigative measure.

Finally, all good I/M programs should have provisions for dealing directly with the service industry to keep them informed of system changes, to handle consumer complaints and to assure that excessive tampering is not taking place.

The absence of any or all of the above would tend to reduce the amount of emission reductions achieved by an I/M program and could even make the program worthless.

Based on the data presented in previous sections on emissions deterioration without I/M, idle test/FTP correlation etc., and further based upon certain key assumptions regarding service industry repair capability and deterioration following such repair, also discussed previously, I/M emission reduction estimates have been generated using computerized models.[47,48] The results indicate that the benefits of a good inspection/maintenance program can be significantly greater than had previously been believed. This conclusion is summarized in Figures 24, 25 and 26 which reflect EPA's current estimates of emissions with and without inspection/maintenance for 1975 and 1974 model cars.

These figures show that stabilized emission reductions of 41% and 25% are possible for CO and HC, respectively, after several years of an I/M program with catalyst cars at a 30% stringency factor. Higher or lower numbers are possible if more or less stringent programs are implemented. Since there is an almost infinite variety of options available to a state in implementing a program (exemptions for vehicles requiring repairs which cost in excess of some upper limit, selecting cutpoints which focus on one or another pollutant exclusively, emphasizing fleet vehicles, to give but three examples) the actual emission reductions attainable must be estimated on a case by case basis.

As previously discussed, vehicles in use are deteriorating faster than predicted. Accordingly, cities with mobile source air pollution problems cannot expect the improvement previously estimated in their transportation control plans. However, I/M can do more than previously estimated and can therefore make up much of the shortfall. Figures 27 and 28 illustrate the significance of these new estimates for an average U.S. City* with a mobile source air pollution problem as well as certain representative cities (Phoenix, Boston, Seattle and Portland). These data show that the typical emission reduction from 1970 to 1980 expected from the FMVCP has been reduced to about 60% of the previous estimate for CO and about 70% for HC. If an I/M program were instituted in each of these cities in 1977 with a 30% stringency factor** and mechanic training, much of the short fall could be regained. Whereas I/M was formerly estimated to be responsible for about 4% and 10% of the total reduction from the FMVCP and I/M combined for CO and HC respectively, the latest estimates attribute roughly a third to I/M for each pollutant.

COSTS OF I/M

Cost data with regard to I/M are available from three main sources, the CARB/Olson study, analysis of existing programs by the Office of Transportation and Land Use Policy (OTLUP) and the Office of Planning and Evaluation (OPE) and are summarized in Figure 29.

In the CARB/Olson study, a comparison of the maintenance and fuel costs was made between the I/M fleet and the control fleet over a one year period.

*average U.S. car population and average mileage growth rate for areas with existing transportation control plans.

**Stringency factor is a measure of the rigor of a program based on the estimated fraction of the vehicle population whose emissions could exceed cut points for either or both carbon monoxide and hydrocarbons were no improvements in maintenance habits or quality to take place as a result of the program.

The results showed that while the maintenance costs were greater for the I/M fleet than for the control fleet, they were more than offset by the fuel savings (assuming $0.60 per gallon fuel prices) of the I/M fleet resulting in a net annual savings of $0.42. This study did not estimate the inspection fee which would be required to pay for system start up, administration and operating costs. A close examination of the data collected in this study indicates that the maintenance cost estimate is probably high in that subsequent to being repaired sufficiently to pass the idle inspection test, the repair costs for the remainder of the year were found to be higher for the I/M fleet than for the non-I/M fleet. This seems counterintuitive in that one would expect some of the repairs which were done for the I/M fleet to be needed during the year by the control fleet cars. One possible explanation is that since there was less control of the non-I/M fleet during the year some of the repair costs on these cars were not reported. Of course, an alternative explanation might be that the cars repaired to pass the I/M program experienced driveability problems and were subsequently "readjusted" to drive better and therefore had higher costs.

The OTLUP analyses[49,50] were based upon data collected by operating I/M programs and derived relationships between initial failure rates and repair costs and fuel consumption. It included estimates of fixed and operating costs of various program types. As in the CARB/Olson study, OTLUP's analyses lead to the conclusion that incremental maintenance costs are completely offset by fuel savings; therefore the entire program costs would be fixed and operating expenses for the inspection, which ranged from $1.76 to $1.92 per car.

The OPE analysis[42] was based upon a very comprehensive review of all existing I/M programs as well as studies of maintenance habits in the absence of I/M. Fuel savings were not analyzed by OPE but maintenance costs were found to range from somewhat lower to about the same as previous estimates. The inspection costs to cover start up and operating expenses were estimated to be higher than OTLUP's estimates.

Based upon all three studies a best estimate is that incremental maintenance costs and fuel savings approximately offset each other and that the average out of pocket costs of I/M will be about $5 per car. Some individuals, however, may be significantly impacted with high repair costs possibly coupled with increased fuel consumption.

Not included in this analysis is another cost which is not a direct out of pocket cost but is still a perceived cost; this is the cost of time spent getting one's vehicle inspected and in some cases repaired and reinspected. OPE has estimated this time to average 21 minutes with an average cost of about $1.75 per car.

There are no comprehensive cost data with regard to catalyst cars and inspection/maintenance. While the inspection costs will be the same as for non-catalyst cars there is considerable uncertainty with regard to the repair costs. Limited low mileage data collected by EPA[36] indicate that no permanent catalyst damage has occurred and normal engine repairs bring cars into compliance, therefore indicating that the repair costs would be approximately the same as for non-catalyst vehicles. However, there is concern that in the long term, extended use of vehicles out of adjustment could result in permanent catalyst damage and therefore much higher repair costs. To the extent that this is true, however, the effectiveness of I/M should also increase.

I/M COST EFFECTIVENESS

Based on the cost data cited in Figure 29 and the latest estimates of I/M effectiveness, the cost-effectiveness of I/M has been calculated. These results, and for comparative purposes the estimated cost effectiveness of reducing light duty vehicle emission standards from interim to statutory levels[51] and stage 1 Vapor Recovery[59] are summarized in Figure 30. I/M is shown to be quite cost effective.

RESULTS IN NEW JERSEY

The first fully mandatory I/M program was instituted by the State of New Jersey in February 1974. The developers of the program adopted a gradual phase-in approach, starting with relatively lenient standards to allow the public and the service industry to adapt to the program and slowly tightening down the cut points to the level which they initially deemed appropriate. They remained in Phase 1 until November of 1975, failing approximately 12% of the cars which were inspected. Investigations carried out by EPA have indicated that gross tampering has gone down in New Jersey, from 10% in 1974 to 5% in 1975 (compared to 15% recorded in 1974 in Washington, D.C., an area which while it has not been demonstrated to be an appropriate control group for New Jersey, is known to differ in at least one significant respect, that it was without a mandatory I/M program in 1974).[27,28] While many factors could influence this, including the energy crisis and the change in vehicle mix, it could also be at least partlv the result of the disincentive provided by I/M.

Finally, while air quality is influenced by many factors (meterology, transport, emission standards, etc.) it is encouraging to note that average ambient carbon monoxide levels and contraventions of the air quality standard declined during this time period. These results are summarized in Figures 31 and 32. Similar reductions in oxidant levels were not recorded although this is not surprising since oxidant levels are much more impacted by other sources, and the initial New Jersey cut points were oriented more to carbon monoxide than hydrocarbons.

VOLUNTARY I/M

In many areas of the country, private groups and fleet managers have instituted inspection programs on their own just for the fuel economy and maintenance benefits which are derived. Notable among these are the California State Auto Association, the City of Phoenix and various fleets of American Telephone and Telegraph. In the latter case, recent data from Cincinnati Bell as summarized in Figure 33 indicate that the program may have helped reverse a trend of rising running expenses (less gasoline) for their fleet. Similar reductions were noted in fuel costs as shown in Figure 34, which may also be due to their new maintenance program.

CONCLUSIONS

This review of available data indicates that the Federal motor vehicle control program is not reducing emissions from in-use cars as rapidly as expected. Improper adjustments and a lack of proper maintenance seem to be major reasons for the shortfall. The latest technology with catalytic converters seems as sensitive as older cars to proper maintenance and adjustment, although the results in California with catalysts and air pumps are more encouraging. The ability of short tests to identify high polluters is established and the service industry seems capable of repairing failed cars at reasonable cost. Costs of repairing catalyst cars are still somewhat of a question although initial indications are that required repairs will be similar to those on non-catalyst cars. Deterioration of vehicle emission levels following I/M is still subject to some dispute but a best estimate indicates that I/M will slow down the long term rate of emission control degradation. I/M is an effective and cost effective means of bringing cars into compliance with standards and early results from New Jersey's I/M program are encouraging.

NOTE

THIS EPA REPORT INCLUDES MANY REFERENCES AND FIGURES WHICH, FOR THE SAKE OF BREVITY, HAVE NOT BEEN REPRODUCED FOR THIS REPORT. THE DEPARTMENT HAS A COMPLETE COPY OF THE EPA REPORT AVAILABLE IN ITS FILES.

APPENDIX J

DEQ - EPA
COOPERATIVE EFFORTS

The Department has worked closely with the Environmental Protection Agency throughout the development of Oregon's vehicle emission inspection/ maintenance program. As the inspection program developed into full operational level, it became evident that there was considerable benefit to be gained for both the Department and EPA by analysis of the data being generated at the motor vehicle emission control test facilities. Arrangements were made to provide raw emission testing data to EPA for their analysis at their computer facilities. This data exchange was initiated on a large scale in the latter part of 1975, although voluntary data was analyzed during 1974, and the first large scale valid results were an evaluation of Oregon data for December, 1975.

A comparison of the Oregon carbon monoxide and hydrocarbon to that from New Jersey's program, such as shown in Table 1, indicates that there is now a significant difference in idle emission readings. As earlier baseline comparisons in 1973 and 1974 had shown that the emission characteristics of Oregon vehicles were typical and quite comparable with emission characteristics from cars in other parts of the country, it has been concluded that the Oregon program has resulted in improved emission control maintenance as compared to other areas.

The EPA analysis of Oregon data is continuing on a regular monthly basis. Presently, all current model year vehicles test data is forwarded to EPA for evaluation. The results, samples shown in Tables 2 and 3, are used in program effectiveness evaluation and by EPA in their consideration of emission related motor vehicle recall program.

The Environmental Protection Agency has recently announced that a major motor vehicle emission control study will be conducted in the Portland area. The following is an EPA summary of the background and purpose of this study, which is of national significance.

<u>Background:</u>

<u>Element I:</u> The Emission Control Technology Division has the responsibility of establishing an emissions short test suitable for use in the implementation of Section 207(b) of the Clean Air Act as it pertains to light duty vehicles. The results of this short test must "correlate" with the results from the Federal Test Procedure.

To date, all testing for the determination of the "correlation" between available short tests and the FTP has been performed under closely controlled conditions. At this time, it is not known if the degree of correlation which exists under closely controlled conditions will carry over to the real world of an in-use vehicle inspection station.

Element II: At present, evaluations of methods of vehicle inspection suitable for state or city usage have been limited to studies based on laboratory research or on surveillance programs using fleet, leased, or volunteered vehicles. The need, now, is for a real life study of a state or city inspection program on a mandatory basis for the evaluation of the implementation, effectiveness, and associated problems that are encountered. This project will answer a majority of questions associated with the effectiveness of the idle mode inspection technique in a typical, real-life area.

Purpose:

Element I: This element is for the purpose of determining the effects of real world constraints on the degree of correlation which exists between short tests and the Federal Test Procedure.

Element II: The proposed program is designed to answer the need for real life information on the effectiveness in an idle mode type of vehicle inspection by applying it to an actual test site. The information derived will be processed, evaluated and documented so that guidelines and recommendations can be provided to states and cities for implementation of their inspection programs.

The study is anticipated to be initiated in early 1977 and require approximately 18 months to complete. Almost 3,000 privately owned vehicles will be involved and the primary work effort will be carried out by a private contractor. The Portland metropolitan area was selected for this study, due to the quality of the ongoing emission inspection program operating here.

The Department's work involvement will be to conduct specifically prescribed emission tests on those vehicles selected to participate in the study. These tests, to be conducted at a Department operated inspection facility, include an idle emission test (such as currently used in the inspection program); a federal key mode cycle, which involves emission testing the vehicle under a dynamometer steady load at 30 and 50 miles per hour and also at idle; and a federal short cycle procedure which involves testing the vehicle under a dynamometer loading and using constant volume sampling test technique to obtain a bag sample of exhaust gas during a 60-second duration period.

Following these series of tests by motor vehicle emission testing program inspectors, the study contractor repeats these tests at contractor facilities together with a series of additional tests including sections of the federal new car certification test. The results of this study should be available in late 1978.

TABLE 1
A COMPARISON OF SELECTED VEHICLE GROUPS
FOR
OREGON BASELINE (1974) TO NEW JERSEY (1975) TO OREGON MANDATORY (1975)

Supplied by EPA

Vehicle Group		Baseline *	New Jersey	Oregon
1972 AMC	CO	1.8 (0.4, 7.0)	2.7 (0.4, 6.9)	1.2 (0.2, 3.5)
	HC	230 (80, 650)	200 (75, 400)	140 (70,330)
1974 Chrysler	CO	3.5 (0.4, 7.5)	3.5 (0.4, 8.0)	1.8 (0.2, 6.4)
	HC	150 (80, 380)	150 (80, 350)	120 (40, 320)
1973 GM	CO	0.6 (0.1, 3.8)	0.9 (0.6, 4.1)	0.5 (0.1, 3.8)
	HC	90 (30, 350)	110 (50, 350)	100 (30, 450)
1973 Ford	CO	3.5 (0.4, 7.3)	2.7 (0.6, 7.5)	1.4 (0.2, 6.0)
	HC	200 (90, 500)	145 (80, 480)	100 (30, 410)

* 50 percentile (10 percentile, 90 percentile)

TABLE 2
DATA SUMMARY FOR CARBON MONOXIDE
SUMMARIZED BY EPA FROM DEQ DATA FOR MAY 1976

VARIABLE CO1

ANALYSIS OF VARIANCE

BLE	CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
	67		4203.2500	4.0455	2.6242	7147.9062	(1039)
	68		858.9971	3.3819	2.5635	1662.5979	(254)
	69		974.1968	3.3478	2.5096	1826.5034	(291)
	70		777.1973	2.8262	2.2537	1391.6357	(275)
	71		773.5972	2.5701	2.1175	1345.0928	(301)
	72		1146.0959	2.8022	2.4018	2353.5662	(409)
	73		816.4966	2.3000	2.1944	1704.6038	(355)
	74		612.7974	2.3037	2.1636	1240.5403	(266)
	75		590.3965	1.1976	1.8430	1671.1348	(493)
	76		211.1996	1.1116	1.6826	535.0732	(190)
		TOTAL	10964.2109	2.8309	2.3221	20878.6328	(3873)

ANOVA TABLE

	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
BETWEEN GROUPS	3760.7734	(9)	417.8635
WITHIN GROUPS	20878.6328	(3863)	5.4048
TOTAL	24639.4062	(3872)	

F = 77.3138 ETA SQRD = 0.1526

TABLE 3

DATA SUMMARY FOR HYDROCARBONS

SUMMARIZED BY EPA FROM DEQ DATA FOR MAY 1976

76 DATA : SUBGROUP MEANS AND ST-DEVS 08/18/76 PAGE 27

VARIABLE HC1

ANALYSIS OF VARIANCE

BLE	CODE	VALUE LABEL	SUM	MEAN	STD DEV	SUM OF SQ	N
	67		7503.2617	7.2216	6.0717	38265.8125	(1039)
	68		1326.1538	5.2211	5.6942	8203.3867	(254)
	69		1284.9065	4.4155	4.9303	7049.3906	(291)
	70		1154.2271	4.1972	5.0519	6992.9727	(275)
	71		973.2571	3.2334	3.6421	3979.5281	(301)
	72		1068.4470	2.6123	3.1179	3966.2371	(409)
	73		946.9971	2.6676	3.1687	3554.2859	(355)
	74		678.2971	2.5500	3.4925	3232.2837	(266)
	75		775.5068	1.5730	2.6771	3526.1318	(493)
	76		260.9995	1.3737	2.0607	802.5664	(190)
		TOTAL	15972.0391	4.1239	4.5333	79572.5000	(3873)

ANOVA TABLE

	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE
BETWEEN GROUPS	17529.9375	(9)	1947.7708
WITHIN GROUPS	79572.5000	(3863)	20.5986
TOTAL	97102.4375	(3872)	

F = 94.5583 ETA SQRD = 0.1805

APPENDIX K

REPAIR COSTS ASSOCIATED WITH EMISSION INSPECTION AND GENERAL MAINTENANCE

There are a number of costs associated with the ownership and operation of an automobile. Aside from the initial cost, there are operational costs which include gas, oil, insurance, license fees, tires, and maintenance. The emission inspection/maintenance program is aimed at reducing the automobiles' air pollution contribution by emphasizing one phase of operational cost -- maintenance. During both the voluntary period of the inspection program and the mandatory period, the Department collected cost-of-repair information in order to estimate the average costs associated with passing the inspection. The costs may be broken into two categories: one which applies to all vehicle owners, and costs which apply only to owners of vehicles which fail.

The costs that are shared by all motorists are the inspection fee and the time necessary to have the inspection performed. The inspection fee is $5.00 and currently is paid only once, when the vehicle passes. The time spent by an individual will vary on the particular location and time of the month that is chosen. Travel time can vary between individuals depending upon their locations and their choice of test stations. Department goals are to have sufficient locations so that all stations are within 5 miles of most locations. Waiting time averaged throughout the system at just over 15 minutes. However, should the individual desire to wait until the last day of the month or choose to wait in a very long line, waiting times in excess of one hour have been experienced at some stations.

The fee charged is a concern of some citizens, for when it is compared to Oregon's license fee structure, $20.00/biennium, it appears large. Yet the inspection fee is in keeping with similar fees charged in other programs. The driving times are usually not considered significant cost items by most persons. Waiting times can be a different matter, since any irritation usually increases with waiting time, though most individuals do not equate it as a cost.

Maintenance costs for automobiles can be a sizable portion of a family budget, yet some people often do not consider the maintenance of their second largest purchase essential. But most people generally consider that their car or truck needs a tune-up at least once in a while. The problem comes in determining what constitutes a tune-up. To some, a tune-up is just "points, plugs, and a condenser," while to others, it is a more complex operation. Reviewing various service manuals, the section on tune-ups covers many pages and details a variety of operations and checks to maintain engine performance, exhaust emissions, and fuel economy. Poor performance, high emissions, and poor fuel economy are symptoms of misadjustments and malfunctioning equipment. The EPA has recently proposed increased implementation of the warranty provisions of the Clean Air Act, and has included in the proposals a list of various mechanical and emission malfunctions and symptoms. This listing is shown in Table 1.

Repair costs associated with preparing a non-complying vehicle to meet the inspection program emission standards have been the subject of two Department studies, two independent studies, and studies by other inspection programs. The first DEQ survey was conducted during the voluntary phase of the inspection program, and the second DEQ survey during the mandatory phase.

Cost-of-Repair Survey: September - December, 1974

A survey was conducted during the voluntary phases with each customer that failed the inspection criteria receiving a questionnaire to be returned by mail after repairs were effected. The rate of return on the questionnaire was 8.5 percent. Over half of the repairs were under $10.00. Carburetor adjustments, electrical tune-ups, and spark plug replacements accounted for most of the repairs. Nearly 90 percent of the repairs were performed to the customer's satisfaction. Average repair cost was $23.11. The survey is summarized on Table 2.

Cost-of-Repair Survey: September, 1975 - April, 1976

With the implementation of the mandatory program, vehicles were required to comply with emission criteria before they could obtain their registration renewal. During the period between September, 1975 and April, 1976, over 90,000 repair questionnaires were given to motorists who owned non-complying vehicles. They were requested to return the questionnaire at time of retest. The rate of return was 7 percent. Nearly three-quarters of the repairs were under $10.00 with a third made at no charge whatsoever. Eighty-two (82) percent of the vehicles retested were in compliance. Carburetor adjustments and "tune-ups" were the most common repair. Thirty (30) percent of the repairs were accomplished by the vehicle owner. The average cost of repair was $18.65. The survey is summarized on Tables 3 and 4.

Radio station KXL conducted a survey among 141 service departments in the metropolitan area. One of the questions asked was, "what is the average price of repairs to vehicles . . . in order to meet DEQ standards?" The responses averaged $23.22. The Oregon Auto Dealers Association also conducted a similar survey among their members. The average reported cost was $22.92.

Similar costs have been reported by both New Jersey and Arizona. These repair costs, summarized by EPA, are shown in Table 5 and are compared with the later Oregon figures. Care should be taken in reviewing later Oregon cost figures because of the very high number of repairs reported as no charge. The cost figures of approximately $22.00 are probably more in keeping with actual costs. It should be noted that costs in the $20.00 range are not especially steep for a portion of the normal maintenance that is required.

There are definite benefits from the I/M program for the customer. First, there is the improvement in air quality. Other benefits to the consumer would be correct vehicle performance, potentially longer vehicle life, and fuel economy benefit. A recent Federal survey indicated a 5 to 10% improvement with an annual fuel savings of up to $50.00 for properly repaired vehicles. This fuel savings is accrued over a year's period, and to most is almost imperceptible.

Thus, consumer costs for the emission inspection program encompass the direct cost of the test, and the indirect cost of the time to consumer, the already existing cost of normal maintenance, and the cost of those vehicles which fail the inspection test. Automobile operation is expensive, for as Hertz Rent A Car recently reported: operating costs of a 1976 intermediate two-door sedan driven 10,000 miles annually and kept for three years were 28.1 cents per mile. This compared to a low of 13.1 cents per mile for a sub-compact car kept 10 years.

Conclusion

Costs of owning and operating a motor vehicle are substantial. All vehicle owners incur additional operating costs because of the inspection program. To most, these costs are a very minor addition, and many have a potential payback and savings in fuel economy over a yearly period. The average repair costs reported do not appear excessive and the available surveys indicate that there is little price gouging in the service industry.

TABLE I

APPENDIX II—Defects list, defects which may be presumed to cause Federal standards to be exceeded include those listed below

Part	Defect or failure modes	Symptoms
Carburetor		
1. Choke mechanism	Stuck closed	Hard starting, driveability.
2. Deceleration valve	Stuck closed, disconnected	Backfire.
3. Anti-dieseling assembly	Calibration, solenoid	Low idle RPM.
4. Dashpot	Malfunction	Low idle RPM, excessively slow throttle deceleration.
5. Metering jets and rods	Wrong size, rapid deterioration	Driveability, fuel economy.
6. Power valve	Sticking, rupture	Do.
7. Needle and seat	Improper seating	High fuel consumption, driveability.
Mechanical Fuel Injection		
8. Fuel distribution lines	Rupture, improper fit	Driveability, fuel economy, leaks.
9. Injectors	Rapid deterioration, improper casting.	Driveability, fuel economy.
10. Pressure regulator	Rapid deterioration	Driveability, fuel economy, smoke (diesel).
11. Fuel injection pump	do	Driveability, fuel economy.
12. Starting valve (air and fuel)	do	Fuel consumption, black smoke when starting, hard starting.
13. Injection pump and throttle valve synchronization mechanism.	Improper synchronization	Driveability, fuel economy.
Electronic Fuel Injection		
14. Fuel distributor	Rupture, improper fit	Do.
15. Injectors	Rapid deterioration, faulty manufacturing.	Do.
16. Pressure regulator	Rapid deterioration	Do.
17. Throttle valve switch	do	Do.
18. Electronic control unit	do	Do
19. Temperature sensor	do	Do.
20. Starting valve (fuel and air)	do	Fuel consumption, black smoke when starting, hard starting.
Continuous Fuel Injection		
21. Fuel distributor	Rupture, rapid deterioration	Driveability, fuel economy.
22. Injectors	Rapid deterioration, faulty manufacturing.	Do.
23. Pressure accumulator	Rapid deterioration	Do.
24. Starting valve	do	Fuel consumption, black smoke when starting, hard starting.
25. Air flow sensor	Stuck, improper fit	Driveability, fuel economy.
26. Throttle-position compensator	Rapid deterioration	Do.
Valve Train		
27. Intake valve	do	Driveability, backfire noise.
28. Exhaust valve	Broken, rapid deterioration, leaking	Driveability, noise, fuel economy.
29. Valve guide	Leaking, rapid deterioration	Oil consumption.
30. Valve springs	Weak, broken	Fuel, economy, driveability.
31. Valve seats	Improperly formed, rapid deterioration.	Noise, driveability, fuel economy.
32. Crankshaft to camshaft synchronization mechanism.	Rapid deterioration	Driveability.
33. Valve stem seals	Rapid deterioration, improper fit	Oil consumption.
Combustion Region		
34. Piston ring	Cracked, rapid deterioration	Driveability, excessive smoke, fuel economy, oil consumption.
35. Cylinder head	Cracked, faulty manufacturing	Loss of coolant, oil in coolant, driveability.
36. Cylinder head gasket	Improperly seated, split	Driveability.
37. Cylinder block	Faulty manufacturing, cracked, warped.	Loss of coolant, oil in coolant.
38. Rotor housing [1]	Faulty manufacturing, cracked, warped.	Loss of coolant, oil in coolant, driveability.
39. Rotor side housing [1]	do	Do.
40. Rotor apex seals [1]	Rapid deterioration, improper seating.	Fuel economy, driveability and hard starting.
41. Rotor side housing seals [1]	do	Do.
42. Exhaust manifold and pipe catalytic converter.	do	Noise.
43. Thermal reactor	Rapid deterioration, leaks	Do.
44. Catalyst	Melted, physical loss of catalytic material.	No change in temperature of exhaust gases entering and exiting from catalyst.
45. Evaporative emission	Improper fit, missing, rapid deterioration.	Visual inspection, fumes.
46. PCV system	PCV valve stuck closed, lines improperly fitted or missing, rapid deterioration.	Visual inspection, driveability, fuel economy, oil leaks.
47. EGR system	Valve stuck closed, lines improperly fitted or missing, rapid deterioration.	Visual inspection, driveability, fuel economy.
Ignition System		
48. High voltage leads	Rapid deterioration, broken	Misfire.

[1] Rotary (wankel) engines only.

TABLE I (Cont.)

Part	Defect or failure modes	Symptoms
49. Coil	Premature winding separation	Misfire.
50. Distributor, including spark advance/retard mechanism.	Electrical deterioration, mechanical and/or vacuum advance/retard mechanism deterioration.	Driveability, fuel economy.
51. Spark plugs	Rapid deterioration defective construction.	Driveability, misfire.
52. Points, condensor	do	Do.
53. Pulse generator and amplifier (electronic ignition).	do	Do.
54. Rotor and rotor cap	do	Do.
55. Distributor point cam	do	Do.
56. Fuel tank	Rapid deterioration, leaks due to defective construction.	Fuel, economy fumes.
57. Fuel system vapor-liquid separator	Lines improperly fit, leaks	Fumes.
58. Fuel tank lines	do	Fumes, fuel economy.
59. Air injection system	Valves defective, lines improperly fitted, air pump inoperative, rapid deterioration.	Noise, visual inspection.
60. Intake air preheating system	Servo-motor failure, vacuum line deterioration, temperature sensor failure, heat ducting deterioration.	Driveability at low temperatures.
Deisel Engines		
61. Turbocharger	Restricted or seized	Smoke, performance.
62. Blower (2 cycle)	Leaks	Smoke, performance oil consumption.
63. Cylinder liner ports	Cracked, clogged	Smoke, oil consnmption.
64. Injector rack control	Improper setting	Smoke, performance.
65. Governor	Improper setting, broken springs	Do.
66. Turbocharger air by-pass	Leaks	Do.
67. Injectors	Rapid deterioration	Smoke, performance, fuel economy.

[FR Doc.76-33505 Filed 11-15-76;8:45 am]

TABLE 2

SUMMARY OF RETURNS FROM DEQ VEHICLE INSPECTION MAIL BACK CARDS

Through December, 1974

954 Cards Received Represents 10.4 Response For Cars Failed During That Time Period

INFORMATION RECEIVED

* * * *

Cost of Repair For Model Year Groupings, Percent

	Pre-68	68-69	70-71	72-74	Total
Under $10	57	54	46	55	54
$10 - 30	12	11	18	18	15
$30 - 50	10	12	9	11	11
$50 - 70	4	2	4	3	3
$70 - 90	1	8	2	2	3
Over $90	3	5	5	1	3
Did not respond to question	12	7	15	9	11

* * * *

Estimated Average Dollar Cost of Repairs Reported on Mail Back Cards For November and December, 1974: $23.11

* * * *

Repair Work Reported For Model Years Groupings, Percent Responding

	Pre-68	68-69	70-71	72-74	Total
Carburetor adjustment	90	89	86	90	89
Electrical tune-up	27	30	28	25	27
Spark plugs replaced	23	18	18	21	20
Valve grind	2	3	3	1	2
Engine overhaul	1	2	1	-	1
Other	6	9	8	8	8

* * * *

Completed Repair Work, Percent

	Pre-68	68-69	70-71	72-74	Total
Dealership Service Department	13	20	24	46	28
Independent Garage	21	16	13	8	14
Service Station	19	14	15	10	15
Self	32	25	17	21	25
Other	6	2	2	3	4
Did not respond to question	8	23	26	12	13

Customer Satisfaction With Repairs

44% Responded YES

8% Responded NO

48% Did Not Answer This Question

TABLE 3
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM

CUMULATIVE COST-OF-REPAIR SUMMARY
SEPTEMBER 19, 1975 - April 30, 1976

QUESTIONNAIRE FORMS RETURNED - 6,527

Retest Results: 82 Percent Pass

EMISSION INSPECTION TEST PASS/FAIL CRITERIA

Of Vehicles Failing DEQ Clean Air Test, causes were:	
Failed on Carbon Monoxide (CO)	72 percent
Failed on Hydrocarbons (HC)	13 percent
Failed on Both CO and HC	7 percent
Failed Other (Smoke, dilution, high idle speed)	6 percent
Failed More Than One of the Above	2 percent

VEHICLE REPAIR CENTERS

Repairs to failing vehicles performed at:	
Self-repair	30 percent
Service Station	29 percent
Independent Garage	20 percent
Dealership	16 percent
Other	5 percent

NECESSARY REPAIRS

Repairs affected to the failing vehicle:	
Carburetor Adjustment	78 percent
Tune-up	14 percent
Engine Overhaul	1 percent
Valve work	1 percent
Other work	6 percent

COST OF REQUIRED REPAIRS

No Charge	32 percent
Less than $10	40 percent
$10-30	15 percent
$31-50	6 percent
$51-75	3 percent
$76-100	2 percent
Over $100	2 percent

DEQ/VIP 76135

TABLE 4
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM

COST-OF-REPAIR QUESTIONNAIRES - CUMULATIVE SUMMARY
September 17, 1975 - April 30, 1976

Questionnaire Forms Returned	6,540
Retest Results:	82 percent pass
Rate-of-Return:	7 percent

Vehicles Failing for Carbon Monoxide - 72 percent

Repairs Performed By:
16% Dealerships; 20% Independent Garages; 32% Service Stations; 28% Self; 4% Other

Work Performed:
85% Carburetor Adjustment; 10% Tune-Up; 0.5% Engine Overhaul; 0.5% Valve Grind; 4% Other Repair

Repair Costs:
38% No Charge; 40% Less than \$10; 13% \$10-30; 4% \$31-50; 2% \$51-75; 1% \$76-100; 2% Over \$100

Retest Result:
86 percent pass

Vehicles Failing for Hydrocarbons - 13 percent

Repairs Performed By:
16% Dealerships; 19% Independent Garages; 18% Service Stations; 40% Self; 7% Other

Work Performed:
53% Carburetor Adjustment; 33% Tune-Up; 1% Engine Overhaul; 4% Valve Grind; 9% Other Repair

Repair Costs:
32% No Charge; 30% Less than \$10; 17% \$10-30; 9% \$31-50; 4% \$51-75; 3% \$76-100; 5% Over \$100

Retest Result:
68 percent pass

Vehicles Failing for Both Carbon Monoxide and Hydrocarbons - 8 percent

Repairs Performed By:
24% Dealerships; 23% Independent Garages; 24% Service Stations; 25% Self; 4% Other

Work Performed:
59% Carburetor Adjustment; 28% Tune-Up; 2% Engine Overhaul; 3% Valve Grind; 8% Other Repair

Repair Costs:
22% No Charge; 30% Less than \$10; 21% \$10-30; 10% \$31-50; 7% \$51-75; 4% \$76-100; 6% Over \$100

Retest Result:
62 percent pass

TABLE 4 (Cont.)

COST-OF-REPAIR QUESTIONNAIRES - CUMULATIVE SUMMARY

September 17, 1975 - April 30, 1976

Vehicles Failing for Smoke - 1 percent

Repairs Performed By:

4% Dealerships; 12% Independent Garages; 15% Service Stations; 58% Self; 11% Other

Work Performed:

25% Carburetor Adjustment; 5% Tune-Up; 5% Engine Overhaul; 9% Valve Grind; 56% Other Repair

Repair Costs:

30% No Charge; 37% Less Than $10; 11% $10-30; 10% $31-50; 7% $51-75; 5% Over $100

Retest Result:

79 percent pass

Vehicles Failing for Other Causes - 5 percent

Repairs Performed By:

10% Dealerships; 21% Independent Garages; 18% Service Stations; 40% Self; 11% Other

Work Performed:

58% Carburetor Adjustment; 6% Tune-Up; 1% Valve Grind; 35% Other Repair

Repair Costs:

49% No Charge; 17% Less than $10; 16% $10-30; 9% $31-50; 3% $51-75; 2% $76-100; 4% Over $100

Retest Result:

79 percent pass

Vehicles Failing for More Than One Cause - 1 percent

Repairs Performed By:

16% Dealerships; 22% Independent Garages; 21% Service Stations; 33% Self; 8% Other

Work Performed:

59% Carburetor Adjustment; 19% Tune-Up; 1% Engine Overhaul; 3% Valve Grind; 18% Other Repair

Repair Costs:

29% No Charge; 25% Less Than $10; 21% $10-30; 10% $31-50; 4% $51-75; 5% $76-100; 6% Over $100

Retest Result:

76 percent pass

TABLE 5

Repair Cost Summary

New Jersey

less than $10	29.7%
$10 to $25	26.4%
$25 to $50	22.1%
$50 to $100	16.1%
more than $100	5.7%

N = 8,825
Avg. Repair Cost = $32.97
Median: 50% of repairs cost less than $21
65% of repairs cost less than average

Oregon

No cost	32%
less than $10	40%
$10 to $30	15%
$30 to $50	6%
$76 to $100	2%
more than $100	2%

N = 6,527
Avg. Repair Cost = $18.86
Median: 50% of repairs cost less than $6
79% of repairs cost less than average

Arizona

less than $5	24%
$5 to $10	17%
$10 to $25	25%
$25 to $50	20%
$50 to $100	11%
more than $100	3%

N = 4,000
Avg. Repair Cost = $25.42
Median: 50% of repairs cost less than $15
67% of repairs cost less than average

October 13, 1976

APPENDIX L

TRENDS IN VEHICLE REGISTRATION AND TRAFFIC PATTERNS

Vehicle registration distribution by county and traffic patterns in the Portland region were important in 1972 as part of the Department's recommendation to the Commission on establishment of vehicle inspection boundaries. In 1974, the Oregon legislature established as inspection boundaries the Metropolitan Service District (MSD). The MSD incorporates much of the land area within Clackamas, Multnomah, and Washington Counties. Evaluation of current registration data and traffic volumes document the growth that has occurred in the Portland metropolitan area. These three counties are at the top when comparing counties in the state according to population, vehicle registrations, and vehicle density. Tables 1, 2, and 3 summarize the top 10 counties statewide in these categories respectively.

Population

Population is increasing in Washington and Clackamas Counties, and remains near 1970 levels in Multnomah County, as shown in Table 1. Data from the 1975-76 Oregon Blue Book lists population increases of nearly 20 percent in Washington and Clackamas Counties since 1970. This trend is confirmed by increases in income tax filings recorded over a similar period. Using the tax data below, it is seen that tax returns are increasing at nearly the same rate in Washington and Clackamas Counties. Clark County, Washington is also following a similar growth pattern. Multnomah County shows an increasing number of tax returns, but at a lower rate. Based upon population census figures and income tax records, the Portland area is continuing to grow in the urban counties surrounding Multnomah County.

Oregon State Income Tax Filings

County	1969 Returns	1974 Returns	Av. Growth/Yr.
Multnomah	223,257	232,400	0.7%
Washington	52,511	74,600	7.0%
Clackamas	55,871	75,800	6.0%
Clark County, Washington	12,804	17,900	6.7%

Vehicle Registration

Passenger car registrations are increasing proportionately to the population growth, with registered motor vehicles in excess of 650,000 in 1976 for Clackamas, Multnomah, and Washington Counties (Table 2). Registrations subject to the I/M program number approximately 585,000, based on Department projections of 1975. The greatest percentage increase in registrations is within Washington County. All told, the tri-counties account for 39 percent of the statewide passenger vehicle registrations.

Vehicle Density

The number of vehicles registered per square mile within a county (i.e., vehicle density) is shown in Table 3. Multnomah has the highest vehicle density at 857.7 vehicles per square mile. Each of the tri-counties has shown an upward trend in vehicle density since 1971. The rate of growth is roughly proportional to the increase in income tax filings in each of the three counties.

Traffic Counts

Traffic counts are used to estimate the non-Multnomah county traffic in the Portland area. Traffic counts are normally referred to as ADT, or the average daily traffic. The ADT data presented in Tables 4, 5, and 6 was generated from permanently located traffic counters in and around the Portland area.

Traffic crossing the Multnomah County boundary into and from adjoining counties is listed for 1970 and 1975 in Table 4 and shown in Figure 1. Overall traffic has increased 19% since 1970. The highest increases are from areas of greatest development in Clark and Washington Counties, though the relative contributions of trans-county line crossings have not changed significantly.

Reviewing Highway Division traffic count data, Table 6, a large share of out-of-state vehicles crossing into Oregon from Washington appear to disperse near the border. The industrial area along the Columbia, and shopping malls appear to be major attractions, so that many of these vehicles stay relatively near the border. Other checkpoints in the area list the out-of-state vehicles as about 5% of the traffic. Growth in Clark County has contributed to an increase in Interstate Bridge crossings, but when reviewing Table 6, the I-5 traffic at N. Ainsworth has increased even more, attesting to the increasing activity along the Oregon-Washington border. Also of note is the increase percentage of Oregon vehicles, compared to 1970 crossing the Interstate Bridge.

Trucks and bus traffic are a significant component at the various checkpoints on Portland's interstate system. Increases in ridership for Tri-Met account for a portion of this growth. The overall heavy duty vehicle traffic has shown increases at all points except the Morrison Bridge crossing, indicating that heavy truck traffic in the core area is on a decline or remaining relatively constant.

Trans-Multnomah County ADT is approximately 90 percent Oregon licensed vehicles, and about 5 percent each from out-of-state vehicles, and heavy trucks and buses. From Table 4, the trans-Multnomah County ADT totals 353,000 with a vehicle mix of 318,000 Oregon, and 17,500 each out-of-state, and trucks and buses. Out-of-state commuter traffic from Clark County is estimated as 13,700 ADT and in-transit through trips as 3,800 ADT. These estimates are derived by defining the through ADT as the difference between the Multnomah County out-of-state ADT (17,500), and out-of-state ADT measured at the edge of the metropolitan area (i.e., I-5 Wilsonville, and I-80N Troutdale) from Table 6. The difference of 13,700, or 3.9 percent of trans-Multnomah County ADT corresponds to the DeLeuw, Cather and Company estimate of 2.8 percent.[1]

Figures 2 and 3 are derived from Highway Division ADT tables for 1975. Figure 2 indicates the ADT crossing the tri-county boundaries from neighboring counties as 158,500 ADT. Assuming a worse case condition that all of this traffic is represented by vehicles registered outside of the tri-county area, then 13.5% of the Oregon passenger vehicles operating in the MSD are from the outside of the tri-county area. Figure 3 indicates that 181,450 ADT cross the MSD boundaries. This represents 15.5% of Oregon passenger vehicles operating in the MSD are from outside MSD areas. The difference of 2% or 12,000 vehicles represents vehicles registered in the tri-county but not in the MSD.

In another study by the Department, 11.7% of the Oregon licensed vehicles observed in parking lots in the MSD area were from outside the MSD. Of that 11.7%, 25% were from Clackamas County. Clackamas County has a higher population than Washington County, and a higher vehicle population than Washington County. Major growth is occurring along the Clackamas County-Multnomah and Washington County borders. There are certain problems in the total analysis presented here which may mask Clackamas County's contribution to traffic in the MSD boundaries. The problem is that some of Clackamas County's contribution may be falsely attributed to Washington County's traffic total because of the geography in the western portion of Clackamas County. Also, the potential exists that as the population increases from those areas bordering the MSD, that presence will also have a greater impact than previously projected.

The Data shown in Table 2 is derived from information supplied by the Motor Vehicles Division. There are certain problems associated with the use of that data, since MVD uses two different registration statistics somewhat interchangeably: the number of registration transactions and the number of registrations on file in the computer. Recent MVD data is from the computer projections from license registration files. These files contain more records for vehicles than the actual number of vehicles which are registered. Among the reasons are that it is necessary to maintain on file records of wrecked vehicles, vehicles taken out of service or moved out of state, that the Division has not been notified of, and the like. This may amount to having more than 10% more vehicles on file than actually exist.

Problems can develop using these figures. By April, 1976, it was realized that revenue and workloads were about 10% below original MVD projections, based upon anticipated vehicle registrations. Part of the

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1 DeLeuw, Cather and Company, June 12, 1974 correspondence

reason is that with the biennial registration, there has been added an extra level of uncertainty about the total number of vehicles registered, and compounding this, it appears that MVD used a computer projections in developing these figures so that they are artificially high. It is of note that the California ARB had similar problems in using their Department of Motor Vehicles data.

Conclusion

Traffic has increased throughout the metropolitan area. The area is developing in both Washington and Clackamas Counties. Because of certain geographic difficulties in determining the total contribution attributable to Clackamas County, there may be a greater than stated contribution. Out-of-area Oregon licensed passenger vehicles operating in the MSD area amount to about 14 to 15%. MVD registration data can be misleading. The continued use of the MSD boundaries as inspection boundaries should be evaluated because of the growth outside the MSD. The next recognizable existing political area boundaries are the boundaries of Clackamas, Multnomah, and Washington Counties.

Table 1
10 Most Populous Counties, Population
(Compiled from 1975-1976 Oregon Blue Book)

	County	1970 Rank	1974 Population	Percent of 1970 Population
1	Multnomah	1	544,900	98.2%
2	Lane	2	237,000	110.0
3	Clackamas	3	196,900	118.6
4	Washington	4	189,400	119.9
5	Marion	5	164,900	109.0
6	Jackson	6	108,100	114.4
7	Linn	7	79,900	111.1
8	Douglas	8	78,500	109.4
9	Benton	10	63,500	118.1
10	Coos	9	59,070	104.5

Table 2
10 Counties With Highest Passenger Vehicle Registration

	County	Estimated 1976 Passenger Car Registrations	Percent of 1971 Registrations	Percent of Statewide Registrations
1	Multnomah	391,987	118.3%	22.1%
2	Lane	181,774	135.3	10.2
3	Clackamas	154,594	140.9	8.7
4	Washington	141,855	162.3	8.0
5	Marion	127,475	138.3	7.2
6	Jackson	93,042	143.8	5.2
7	Douglas	66,517	139.3	3.7
8	Linn	61,518	139.5	3.5
9	Coos	45,773	129.0	2.6
10	Klamath	45,371	131.2	2.6

Table 3
Top 10 Counties in Vehicle Density

	County	Vehicle Density (Vehicles/Mile^2)	Percent of 1971 Vehicle Density
1	Multnomah	857.7	118.2%
2	Washington	194.3	138.2
3	Marion	108.5	138.2
4	Clackamas	81.7	162.4
5	Benton	57.2	135.2
6	Yamhill	50.2	140.6
7	Columbia	41.1	96.7
8	Lane	39.4	135.4
9	Polk	37.5	135.9
10	Jackson	33.0	Coos County #10 in 1971

Table 4

The Average Daily Traffic (ADT)
Across the Multnomah County Boundary [2, 3]

Abutting County	1970 Data	1975 Data	Change, %
Multnomah-Columbia			
ADT US 30	8,000	9,000	11.1
Multnomah-Hood River			
ADT I-80N	10,000	10,300	3.0
Multnomah-Washington			
ADT I-5	32,800	35,800	9.1
ADT Barbur Blvd.	24,000	28,600	19.2
ADT US 26 & ORE 8	50,200	68,600	36.7
ADT Barnes Road	6,100	6,400	4.9
ADT Thompson Road	4,750	4,650	-2.1
Subtotal	117,850	144,050	22.2
Multnomah-Clackamas			
ADT I-205	---	6,600	---
ADT US 26	14,000	12,600	-10.0
ADT US 99E	35,200	38,300	8.8
ADT ORE 43	16,500	17,000	3.0
ADT ORE 213	25,500	27,600	8.2
Subtotal	91,200	102,100	12.0
Multnomah-Clark County, Wn.			
ADT I-5	69,200	87,300	26.2
TOTAL	296,250	352,750	19.1

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2 Oregon State Highway Division, Traffic Volume Tables for 1970. Official Publication No. 71-1.

3 Oregon State Highway Division, Traffic Volume Tables for 1975. Official Publication No. 76-1.

Table 5
Percentage of ADT
Across the Multnomah County Boundary [4]

Abutting County	1970	1975
Multnomah-Columbia	2.7%	2.6%
Multnomah-Hood River	3.4%	3.0%
Multnomah-Washington	39.7%	41.6%
Multnomah-Clackamas	30.8%	27.6%
Multnomah-Clark County, Wn.	23.4%	25.2%
	100 %	100 %

4 ibid.

FIGURE 1

ADT ACROSS THE MULTNOMAH COUNTY BOUNDARY

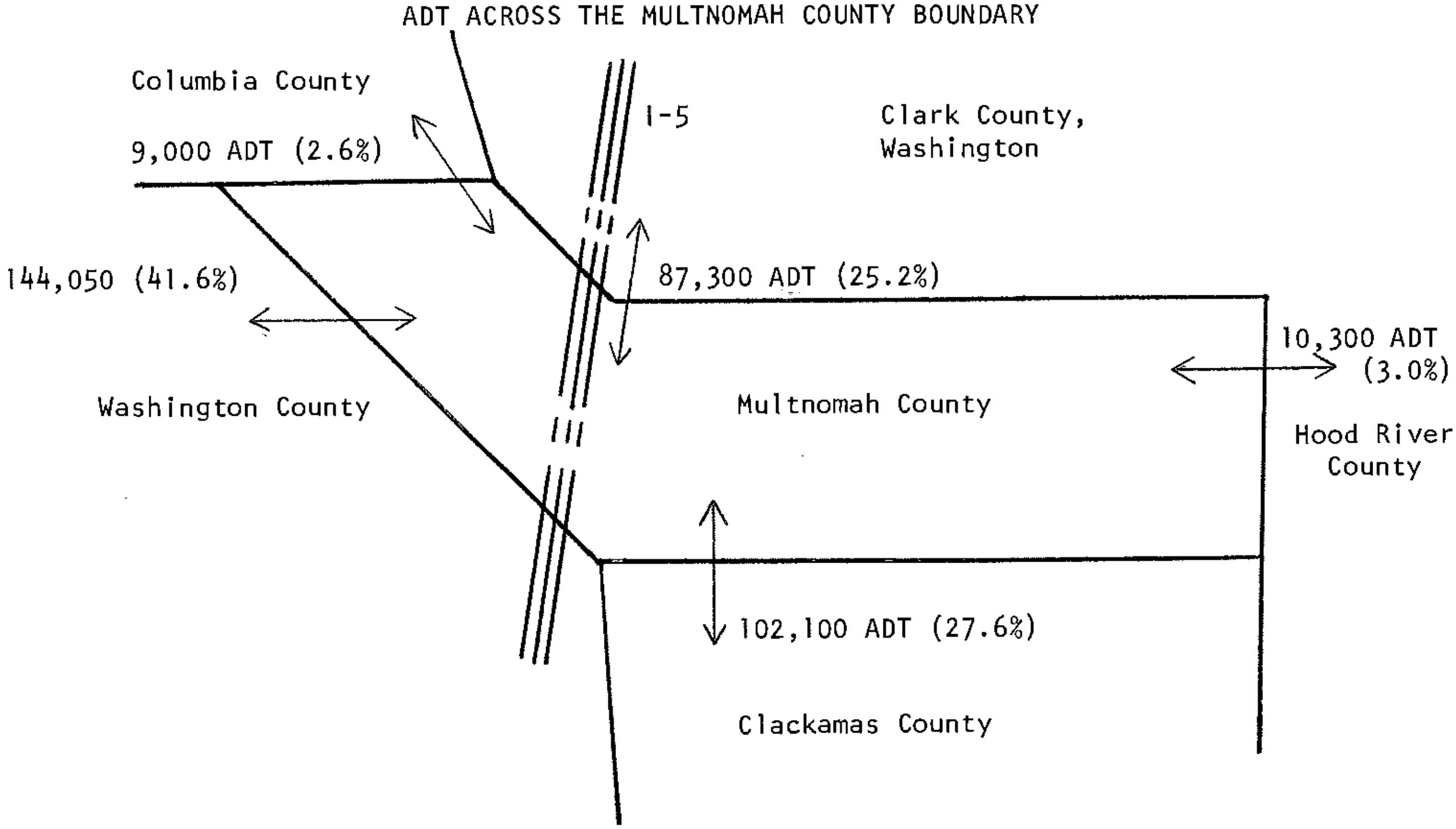


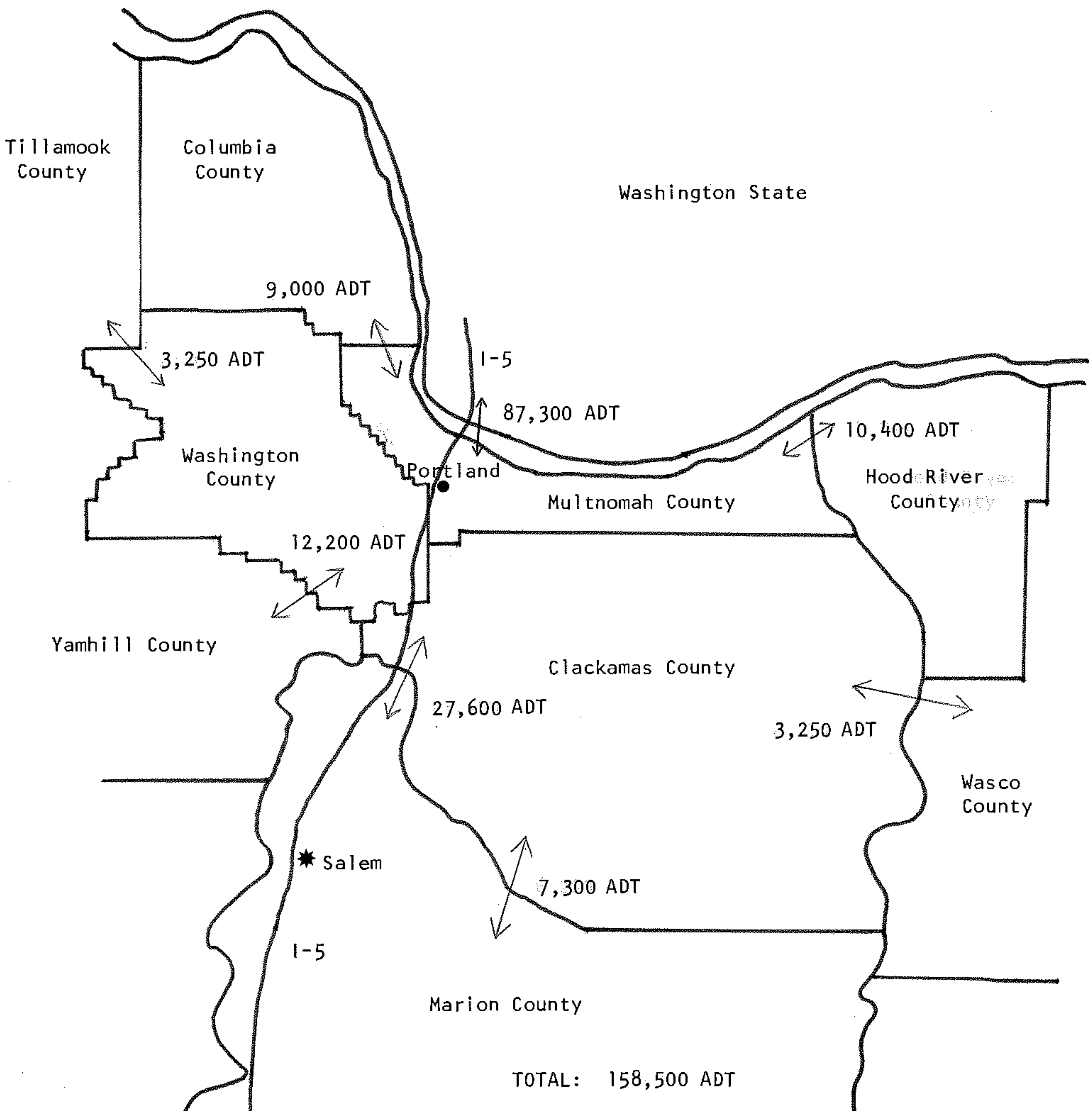
Table 6
ADT as an Indicator of Vehicle Impact on the Portland Commercial Area[5]

Recording Location	1975 Traffic Count	Percentage of 1970 Traffic Count	Oregon Licensed Vehicles	Out-of-State Vehicles	Buses, Trucks, Etc.
Interstate Bridge	87,255 ADT	126%	39,614 (45.4%)	40,748 (46.7%)	6,893 (7.9%)
Minnesota Traffic Counter (N. Ainsworth)	87,280 ADT	129%	62,754 (71.9%)	16,147 (18.5%)	8,379 (9.6%)
Banfield Traffic Counter (N. E. 21st)	94,779 ADT	103%	85,112 (89.8%)	4,265 (4.5%)	5,402 (5.7%)
Baldock Traffic Counter	77,810 ADT	113%	67,461 (86.7%)	4,046 (5.2%)	6,303 (8.1%)
Vista Ridge Tunnel	65,652 ADT	155%	62,895 (95.8%)	--- ---	2,757 (4.2%)
Morrison Bridge	33,049 ADT	92%	29,248 (88.5%)	2,115 (6.4%)	1,686 (5.1%)
Wilsonville I-5	28,652 ADT	109% (1974 traffic count)	20,830 (72.7%)	2,435 (8.5%)	5,387 (18.8%)
Troutdale I-80N	12,285	116%	8,526 (69.4%)	1,339 (10.9%)	2,420 (19.7%)

5 ibid.

FIGURE 2

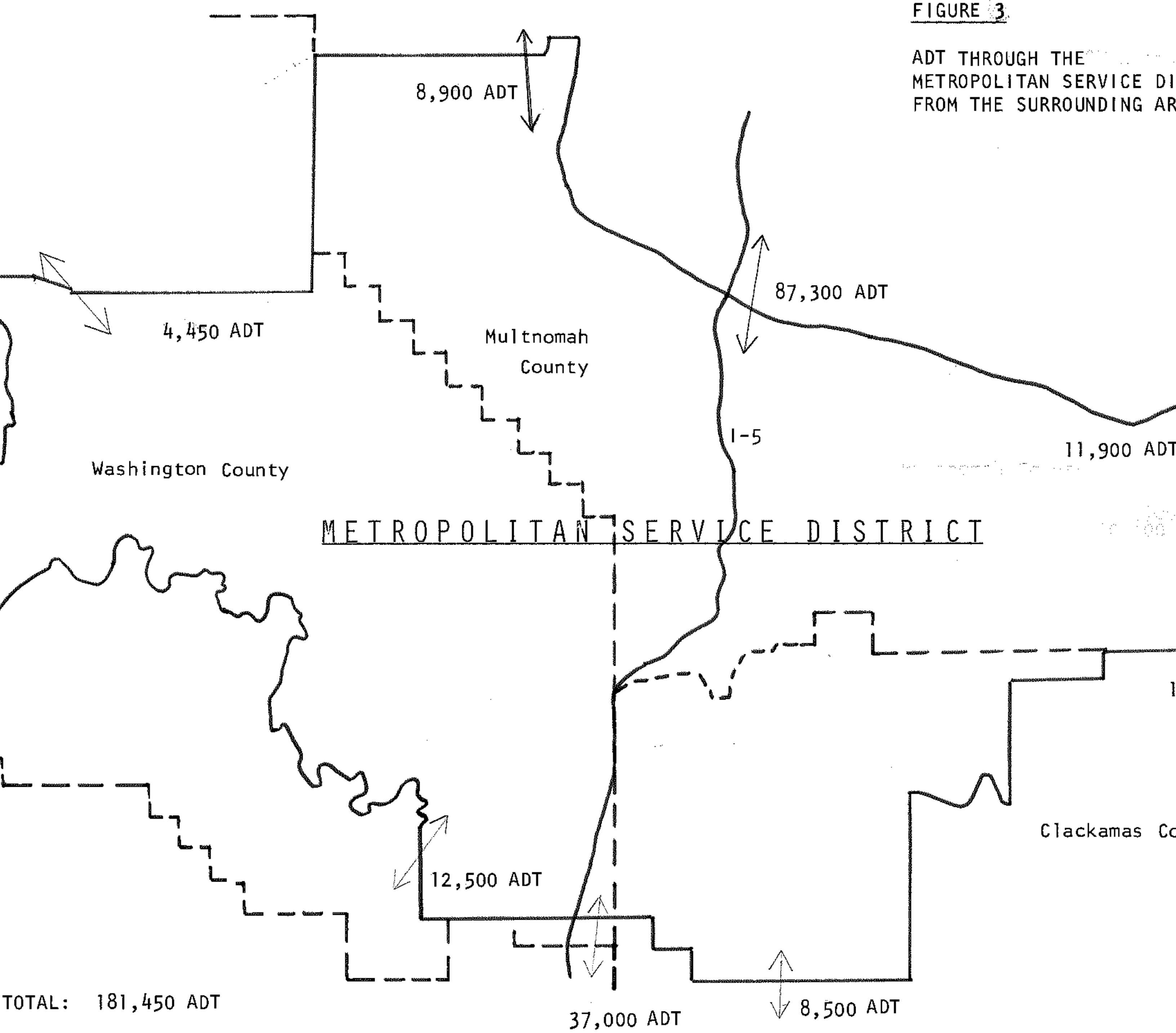
NORTHWEST OREGON ADT INTO TRI-COUNTY REGION



DEQ/VIP 76351

FIGURE 3

ADT THROUGH THE
METROPOLITAN SERVICE DI
FROM THE SURROUNDING AR



DEQ/VIF

APPENDIX M

HEAVY DUTY GASOLINE VEHICLE INSPECTION

Currently, the Motor Vehicle Emission Testing Program operated by the Department, is restricted to testing light duty motor vehicles with a manufacturer's gross weight rating of 8,400 lbs. or less. Thus, large buses, motor homes, and trucks are not now required to comply with emission control requirements prior to license renewal.

Department reports have noted that the major contributor to motor vehicle carbon monoxide and hydrocarbon gas pollution has been light duty vehicles. This has resulted from both the large numbers and the mileage accumulated by such vehicles compared to heavy duty vehicles. As the light duty vehicle pollution became more and more controlled, it was recognized that the impact of heavy duty vehicles would become more significant. As such, following implementation of effective emission control measure for light duty vehicles, it was intended that emission control measures would be implemented for heavy duty vehicles.

During 1976, the Department solicited the cooperation of several of the fleets licensed for self inspection to participate in a heavy duty vehicle emission study. A short test study was proposed in which the heavy duty vehicles would be tested in the same manner as our current idle test, and the results be forwarded to the Department for analysis. Initially, five fleets stated that they would cooperate and provide information on their heavy duty vehicles. However, a number of problems arose which severely limited the participation of these fleets. These problems centered upon the inability of the fleets to schedule the larger trucks for the inspection outside of normal maintenance. In the six week period, however, tests on 47 heavy duty gasoline powered trucks were obtained.

The results of this survey indicated that the average emissions for these fleet vehicles was high. The following table lists the results of that survey.

Fleet A	5.6% CO	225 ppm HC
Fleet B	4.3% CO	335 ppm HC
Fleet C	4.7% CO	415 ppm HC
Fleet D	4.75% CO	320 ppm HC
Department-Tested Heavy Duty Vehicles	2.4% CO	150 ppm HC

To better understand the differences in the above table, a short description of the Federal new heavy duty motor vehicle engine program is in order. While new light duty motor vehicle emission control began in 1968, heavy duty vehicles (above 6000 lbs. GVW) did not have to meet Federal emission levels until 1970; and then the standards were related to a work cycle (gm/bhp-hr) rather than to a driving cycle (gm/mi). When the Department established its in-use emission standards, it was aware of the differences that existed between light and heavy duty vehicles, but also recognized that in general, one-half and three-quarter ton pickups and vans were widely used for general tranportation. In fact, most pickups and vans in Oregon are licensed as passenger cars. These heavy duty vehicles had the same engine packages as the larger gasoline powered trucks until model year 1975, when a light truck category was created by the EPA. Thus, a general comparison is legitimate and can be made between the large heavy duty trucks tested by the fleets, and pickup trucks and vans with a gross vehicle weight over 6,000 lbs. tested by the Department. While the general application of the engine packages may have different degrees of severity, these are the same engines. Comparing the results of the fleets with those vehicles that went through the inspection, there appears to be a potential for emission reduction.

If the standards currently used by the Department for vehicles over 6,000 lbs. GVW were applied, the fleet surveyed vehicles would have shown a 65% pass rate. One of the fleets participating in the survey performed emission tests both before and after maintenance. The pass rate for that fleet after maintenance was 87%. New York City has studied heavy truck testing as part of its transportation control strategy. The idle test which was used by New York City is similar to the Department's, but has one additional pass level, the 2500 rpm point. If that type of test regime were applied to the surveyed fleet, the pass rate would drop to 50%.

A problem, however, develops in applying the inspection laws to many heavy duty vehicles. The State of Oregon has entered into interstate compacts dealing with registration reciprocity and pro-rated or apportioned licenses. The wording of some of the statutes, such as ORS 481.730(1), raises the question of the authority to require an inspection on those vehicles which may be registered, in part, to operate outside of Oregon. The Attorney General's office concurs that current legislation requiring certification prior to registration renewal is unclear in its applicability to commercial vehicles operating under reciprocity agreements. Efforts to implement an inspection/maintenance program for heavy duty vehicles will be hindered until this situation is legislatively clarified. Similar inequities and difficulties exist with regard to fixed load licensed vehicles in that the categories established for that license include many vehicles which, in fact, are not motor vehicles as normally understood.

APPENDIX N

INSPECTION/MAINTENANCE PROGRAM CIRCUMVENTION

In measuring the effectiveness of the Department of Environmental Quality's I/M program, attention has been given to the various ways to circumvent the inspection requirement. These methods have been studied by the Department and other interested groups in an effort to determine the impact on the program.

Adjust - Readjust

One of the more common reported methods used to circumvent the inspection is to readjust the vehicle after it has passed the emission test. Most failures of the inspection test are for excess carbon monoxide, which is usually associated with carburetor misadjustment, choke malfunctions, or other areas involving the air intake system. Hydrocarbon failures are usually caused by malfunctions involving the ignition system operation or other items directly affecting the combustion reaction. When correct adjustments are made (e.g., to the carburetor) so that the vehicle is operating within the standards, there sometimes are other engine operating problems made evident by poor engine operations. The service person may be unfamiliar with some of the more recent technology and control systems and may have difficulty in diagnosing or servicing those systems, though throughout the year there may have been many educational programs aimed at increasing their technical competence. The service person might inform his customer to leave the vehicle operating poorly, but below the emission standards until the vehicle has passed the test. He will then readjust the vehicle back to near its original condition. The same applies when the work is done by the vehicle owner.

While the above describes an adjust-readjust procedure based upon lack of experience or unfamiliarity with some of the newer systems, there is another primary reason for this activity: economics. Some people are not willing, or may be temporarily unable to do what is required to correctly repair or maintain the vehicle. The automobile is a highly complex mechanism and certain maintenance is necessary to maintain its performance at an optimum level. So some of the adjust-readjustments that are occurring are due to economic reasons.

During the House Task Force on Auto Emissions, radio station KXL did a survey of 141 service departments in the metropolitan area. One of the questions asked was, "what percentage of those vehicles tuned to pass DEQ return to your shop to be reset or retuned?" The response from the shops responding to that question was 21%. Informal contacts by Department staff with segments of the service industry indicate that this activity has been in the neighborhood of 15 to 25% and appears to be declining with increased service experience.

Falsification of Registration

Registration of the vehicle to an address outside of the Metropolitan Service District is a method used by some persons to avoid the inspection requirement. Many individuals have a second home or have friends or family who live outside the MSD area. The Motor Vehicles Division has limited resources to verify the address given on the registration applications. If a person applies for registration, either by mail or by person, by submitting an application with a signed Declaration of Exemption, or with an address outside of the MSD area, the Motor Vehicles Division will process it. The Department, in an attempt to determine the extent of this practice, did a study in which it recorded the license numbers of recently renewed vehicles located in major parking lots throughout the metropolitan area. With the assistance of the Motor Vehicles Division, the addresses of those vehicle plates which indicated out of Metropolitan Service District addresses were cross-referenced with the addresses on the registered owner's driver's licenses. There were 300 vehicles in the survey and 11.7% of the vehicles were found to be registered outside of the MSD area. Of that amount, 24% were from Clackamas County. Only one license in that 300 appear to have a true conflict between the registered address and the owner's driver's license address. The Department would estimate that this occurs in less than 1% of the vehicles in the Metropolitan Service District.

Expired Plates

Failure to renew the license plates is a way of avoiding, or at least postponing, the vehicle inspection requirement. The Department conducted a survey on some of the major highways in the Portland area in the spring of 1976 and observed from 3-7% of the vehicles with expired plates. Motor Vehicles Division lists 14,518 convictions written in the state for expired vehicle licenses in 1975. Police enforcement of expired plates is a matter of local priorities, and there seems to be little economic incentive to actively seek out this offense.

Other studies conducted by the Department on vehicles with expired plates that were coming through the test system for the purpose of renewing those plates indicates that on any one month from 7 to 15% would have plates that were expired. It should be emphasized that people whose vehicles have expired plates are going through the system and having the car brought into compliance. Overall Department estimates for the total number of expired plates range from 5 to 15%. The Department estimates that the number of people attempting to totally circumvent the inspection process using expired plates is very small.

Falsification of Statement of Fact

The test criteria adopted by the EQC allows for the standards to be applied based upon the year and make of the engine in cases where engine changes have been made. When a vehicle comes to a test center and the driver informs the inspector that there has been an engine exchange, the driver is given a Statement of Fact to complete. This occurs in only about 0.3% of the total inspections. There may be some falsification of these Statements of Facts, but currently, no follow-up nor challenge is made on these statements.

Over 8,400 lbs. Gross

Current Department inspection requirements apply only to motor vehicles with a manufacturer's gross vehicle weight rating of less than 8,401 lbs. There may be some falsification of vehicle ratings. It is necessary to have the weight rating verified at any of the DEQ centers to obtain passenger vehicle plates for vehicles rated over 8,400 pounds.

The above summarizes most of the various methods that have been employed to avoid or change the inspection requirements. The total impact attributable to these activities is not certain. The most widespread would appear to be the tune-retune, followed distantly by falsification of registration information, and driving with expired plates.

APPENDIX O

CONTRACTOR APPROACH

The House Task Force on Auto Emission Control directed the Environmental Quality Commission to study and consider contracting with the private sector for operation of Motor Vehicle Emission Testing and Certification. There is one inspection/maintenance program which is currently operated by a private contractor. This program is in Arizona state and the private contractor is Hamilton Test Systems. The State of California is in the process of issuing a Request for Proposal (RFP) for purposes of determining whether it is cost feasible for a private contractor to operate an emission inspection program in the south coast basin. The State of Rhode Island has enacted legislation which calls for the inspection of motor vehicles by an independent contractor. The House Task Force, during its meetings early in 1976, received comments and proposals from Hamilton Test Systems relative to the merits of the private contractor approach. During the year, at the request of that legislative task force, the Department discussed with various prospective vendors, options relating to the private contractor approach. The specific vendors that this was discussed with were Hamilton Test Systems, Rockwell International, and Sun Electric. In November of 1976, Hamilton Test Systems submitted to the Department a preliminary presentation on their merits as a contractor to operate the Vehicle Inspection Program. In reviewing that proposal, it is determined that this is purely a preliminary proposal as much detail would have to be discussed.

Probably the best example of the complexities involved in the private contractor approach and the time frames required would be found by reviewing California's RFP. The Bureau of Automotive Repair and the Air Resources Board, at the direction of the California Legislature and Assembly were required to review the alternatives for a private contractor operation of their mandatory vehicle inspection program in the south coast basin. California has various legislatively-set dates as milestones in terms of the selection and awarding and operation of the California inspection program. The final date is January 1, 1979 in that at that time, the entire emission inspection program must be operating in their Phase 1 level of operations for the entire south coast basin. The south coast basin is the six counties around the Greater Los Angeles area.

The State of California draft began working on the preliminaries of the RFP in mid-summer 1976. On October 27, 1976, they issued a draft Request for Proposal to various prospective contractors for their comments. The comments were due in to the State of California by December 1, 1976. Between January 1 and 15, 1977, California is to issue a final RFP. The review and proposals are due from the contractor by March 1977. The short time for contractor preparation of the RFP is hopefully to be alleviated or softened by the fact that all prospective contractors have had several months to review and comment on the initial RFP. After the RFP is due in in mid-March, the state is to provide notice of award by April 1, 1977. At this point, the state has determined, in terms of the technical and cost basis which is the best submitted proposal. At this point, however, the California legislature has reserved review rights and it will be the function of the California legislature and assembly to review the selected contractor and program and enter into the contract. A contract should be signed by June 20, 1977. Between June 20, 1977 and January 1, 1979, it would be the contractor's responsibility to build, equip, man, and the like, the various inspection stations in the south coast basin area.

Based upon the reivew of the proposal submitted to the State of Oregon by Hamilton Test Systems and reviewing the draft RFP written by the State of California, the recommendations are as follows:

1. It would require specific legislative direction for the Commission to direct the Department to initiate a review and issuance of an RFP for the purpose of obtaining a contractor to operate the inspection program in a manner similar to what is being done in the State of Arizona and what is being proposed for the State of California.

2. It would require a specific legislation and turn-around and approval to provide for funding and provide for the economic structure of such an operation.

3. The Commission would recommend that should this approach be taken and that the legislature directs the Commission to franchise the operation to the private sector that after a contractor is selected, that the state legislature or the emergency board review the contract proposal and make the final decision.

The following lists some of the benefits to a private contractor approach. One of the most visible benefits is that it takes the state out of that activity. It removes employees from the public payroll and places the day-to-day operations of a specific program in the hands of private industry. It requires no initial appropriation in terms of funds for start-up.

Some of the disadvantages are as follows. A contract is entered into for an extended length of time, normally beyond a particular legislative session. This, in essence, would require one legislature to bind the following legislature in terms of a program. Another disadvantage or operational handicap is that once the contract is signed, the program is, in essence, finalized and allows little latitude for deviation.

APPENDIX P

OVERVIEW
MOTOR VEHICLE INSPECTION/MAINTENANCE PROGRAM OPERATIONS OUTSIDE OF OREGON

Motor vehicle inspection/maintenance programs are operating in several areas throughout the United States and world. The following is a brief synopsis of the current status of some of these programs.

Arizona. The Arizona program began operation in January, 1976. This program is legislatively restricted to operation in Maricopa County, which contains the metropolitan area of Phoenix and Pima County, which contains the metropolitan area of Tucson. During this first year of operation, all vehicles registered within these two county areas must be emission tested. However, no repair is required for those vehicles failing the test requirements during this first year of operation.

The Arizona program is operated by a private contractor, Hamilton Test Systems. The contractor constructed, owns, and operates the inspection network under the supervision of the state Department of Health Services. This test system network currently consists of 12 stations, 36 automated inspection lanes, capable of conducting loaded mode tests. The pass/fail criteria has recently been changed so that it is based only upon the idle readings. The loaded mode readings are used to provide additional diagnostic information to the vehicle owner. During the last general election, a referendum was included on the state ballot to repeal the inspection program. This referendum was defeated.

California. The State of California has been very active in automobile air pollution control since the early sixties, and its control can be considered as consisting of two basic divisions: new motor vehicle emission control and in-use vehicle emission control. The new car program efforts include having more stringent emission control standards for new vehicles sold in California than in the rest of the nation, and also include assembly line audit tests. The in-use programs have included random roadside inspection programs, private garage inspection of vehicles upon change of ownership, and certain retrofit requirements. During 1976, California concluded a very extensive private project, the Riverside project, which was aimed at evaluating loaded mode emission testing.

The state also operated an intensive mechanic training program and maintained surveillance on the project vehicles to determine program effectiveness. In reports written by the California Air Resources Board and the Bureau of Automotive Repair, it was determined that both idle testing, such as is done in Oregon, and loaded mode testing provides significant and cost-effective reduction in hydrocarbons and carbon monoxide with a slight improvement in overall fuel economy. With the idle test, it was considered that the repair industry can better assure the customer the vehicle will comply, though additional industry education is necessary to improve service to the public.

The best cost effectiveness was achieved with standards giving at least a 35% failure rate. The results from this pilot program are now under study by the California legislature to evaluate the best means of implementing a program in the south coast basin. Project costs have been solicited from both the state and the private sector.

City of Chicago. The City of Chicago has been operating a voluntary test program funded through an increase in the city vehicle license fee. Chicago uses an idle test and currently tests about 10% of the city's population of vehicles. A recent Chicago report on their program noted high failure ratings of late model cars in their test, and concluded that an I/M program, operated under full implementation criteria, is capable of making substantial reductions in carbon monoxide and hydrocarbon emissions.

City of Cincinnati. The City of Cincinnati conducts an idle emission inspection in conjunction with their ongoing vehicle safety inspection. The city uses the same standards that are used in the City of Chicago and while initial failure rates were higher than had been anticipated, the failure rates have been reducing apparently due to vehicle owners having cars maintained before going to the test lanes.

Nevada. An idle emission inspection is required on change of vehicle ownership in the Las Vegas area. The program is supervised by the state with the inspection conducted by licensed, private garages.

New Jersey. The State of New Jersey operates the largest and oldest inspection/maintenance program in the country. A mandatory idle emission test was incorporated into the state's ongoing annual safety inspection program in 1974. Results from New Jersey program have been encouraging with significant reductions in emissions being reported even though the pass/fail criteria are set to detect only gross emitting vehicles. Recently, due to overloading of the state-operated inspection lanes, vehicles which initially fail the emission test, may have repairs made and a certificate issued by a licensed, private garage.

New York. The State of New York has been conducting a pilot emission study program. The City of New York, through a private contractor, had established a pilot program for safety and emission inspection of taxi cabs. The city has also been very active in evaluation of emission control programs for heavy duty vehicles.

Rhode Island. Legislation was adopted in the State of Rhode Island in 1976 directing the establishment of a motor vehicle safety and emissions inspection program. This program is to begin in 1977 and is to be conducted by a private contractor. The state has prepared and issued Requests for Proposals and is presently evaluating private contractor responses.

Other States. Emission inspection programs are being studied in a number of other states. Included in these are Alabama, Alaska, Connecticut, Georgia, Kentucky, Massachusetts, Missouri, Ohio, Texas, Puerto Rico, and Washington, D. C. Officials from the States of Kentucky recently visited the Oregon program operations to obtain working information to assist them in implementing a voluntary inspection program.

International. Motor vehicle emission control is of concern in many industrialized European and Asian countries. Japan has a stringent new-vehicle emission control program and in-use vehicle emission control program which includes a random roadside emission inspection. The Economic Commission of Europe has developed a new motor vehicle emission control test procedure which several European countries have implemented. Recently, Swedish officials visited the Oregon program operations as part of a study of American programs for controlling motor vehicle emissions. Sweden, which has a nationwide periodic vehicle safety inspection program had expanded its vehicle inspection program to include emission testing in 1970. This test is restricted to an idle carbon monoxide test, with an emission standard having been set at 4.5% carbon monoxide with a 1% tolerance added. Vehicles which exceed the 5.5% pass/no-pass standard but do not exceed a 7% idle carbon monoxide level may have adjustments performed at the inspection station. If the carbon monoxide level is over 7% at idle, however, then the vehicle must be adjusted and then returned for reinspection. Sweden operates 165 inspection stations with 312 inspection lanes. The overall inspection requires about 17 minutes and appointments are required for the inspection.

APPENDIX A

SUMMARY
FEDERAL LEGISLATION

CLEAN AIR ACT OF 1965	Title II ("Motor Vehicle Air Pollution Control Act") empowers HEW to establish emission standards for pollutants from new motor vehicles manufactured for sale in California beginning with model year 1966.
CLEAN AIR ACT OF 1967	Establish emission standards for pollutants from new motor vehicles manufactured for sales in remaining 49 states beginning with model year 1968. Emissions regulated by HEW were crankcase emissions (HC), fuel evaporative emission (HC), and exhaust emissions (CO and HC).
CLEAN AIR ACT OF 1970	Directs EPA to manage the national control of air pollution by developing Interstate Air Quality Agencies or Commissions, Air Quality Control Regions, establishing national primary and secondary air quality standards and requiring each state to submit implementation plans. Specifies 90% reduction in exhaust emissions of CO and HC from allowable 1970 levels by the 1975 model year and 90% reduction in NOx emissions from average measured 1971 levels by the 1976 model year. Required manufacturers to warrant emission control equipment for 5 years or 50,000 miles; subjects certain persons to a civil penalty of not more than $10,000 for tampering.
CLEAN AIR ACT OF 1970, AS AMENDED, JUNE 1974	Requires EPA to comply with provisions of the Energy Supply and Environmental Coordination Act of 1974.

SUMMARY
FEDERAL GOVERNMENT AGENCIES' ACTIVITIES

March 30, 1966

The initial Federal motor vehicle emission standards became applicable with the 1968 models. The standards and procedures were similar to those which had been employed by California and required specified control of exhaust hydrocarbons and carbon monoxide from light-duty vehicles and one hundred percent control of crankcase emissions from gasoline-fueled cars, buses, and trucks. The term light-duty vehicle refers to self-propelled vehicles designed for street or highway use, which weigh less than 6,000 pounds and carry no more than twelve passengers.

June 4, 1968

Revised Federal standards were published which required more stringent control of hydrocarbons and carbon monoxide from light-duty vehicles, of evaporative emissions from fuel tanks and carburetors of light-duty vehicles, of exhaust hydrocarbons, and carbon monoxide emissions from gasoline-fueled engines for heavy-duty vehicles, and of smoke emissions from diesel engines for heavy-duty vehicles. The fuel evaporative emission standards became fully effective with model year 1971. The other standards applied to 1970 model year vehicles and engines.

July, 1970

The Federal Government adopted a Constant Volume Sample or CVS procedure, during which the vehicle is run through a test cycle designed to simulate urban driving. The characteristics of the standard test drive were based on an elaborate study of Los Angeles traffic patterns in 1965. All emissions from ignition key-on after a 12-hour storage period to the end of the test cycle are collected and analyzed. EPA further refined the test procedure by later including both a cold start (after a 12-hour storage) and a hot start (after a 10-minute wait) and the computation of a weight average as a basis for 1975 and 1976 numerical standards. These changes, as well as certain minor modifications in analytical techniques, were intended to make test results more representative of emissions from in-use vehicles.

November 10, 1970	Standards were published applicable to 1972 model light and heavy-duty vehicles and heavy-duty engines.
April 30, 1971	National primary and secondary ambient air quality standards were published in final rulemaking, including standards for hydrocarbons, carbon monoxide, and oxides of nitrogen. Also, the State of California was granted the first of several waivers of Federal preemption for motor vehicle emission standards more stringent than those currently in effect by Federal regulations.
May, 1971	Three contracts were awarded to provide prototype cars for government testing and evaluation under the Federal Clean Car Incentive Program.
June 18, 1971	The Low-Emission Vehicle Certification Board held its initial meeting and approved procedural regulations concerning preferential purchasing of low-emission vehicles for use in government fleets.
June 29, 1971	The first Federal standards were issued requiring control of oxides of nitrogen emissions and prescribing measurement techniques for this pollutant applicable to 1973 model light-duty motor vehicles. Also, standards were promulgated to prescribe the 1975 exhaust hydrocarbon and carbon monoxide emission requirements and 1976 oxides of nitrogen emission requirement applicable to light duty vehicles. In addition, modifications in test and analytical procedures were included.
December 15, 1972	EPA ordered six motor vehicle manufacturers to eliminate certain emission control system disabling devices from their 1973 automobiles produced after specified dates.
January 10, 1973	Fuel regulations were promulgated to insure that lead-free gasoline would be available by July 1, 1974 to owners of automobiles equipped with catalytic converters. Also, regulations were promulgated requiring the amount of lead in gasoline to be reduced to an average of 1.25 grams per gallon by January 1, 1978.

April 11, 1973	EPA suspended for 1 year the statutory 1975 model year light-duty vehicle emission standards for hydrocarbons (HC) and carbon monoxide (CO) and established interim standards.
July 20, 1973	EPA suspended for 1 year the statutory 1976 model year emission standards for nitrogen oxides (NOx) and established interim standards. The 1976 standards are applicable to light-duty vehicles and engines manufactured during or after model year 1976.
August 7, 1973	Regulations for the control of exhaust pollutants from diesel-powered light-duty pasenger vehicles to be effective with the 1975 model year were promulgated. These vehicles were now required to meet the same emission standards that were applicable to gasoline-fueled light-duty vehicles. Also, regulations for the control of emissions from light-duty gasoline-fueled trucks, effective with the 1975 model model year were promulgated. (A light-duty truck is defined as any motor vehicle weighing 6,000 pounds or less, which is designed primarily for tranporting property, or is a derivative of such a vehicle, or has special features enabling off-street operation). This action was in response to the U. S. Court of Appeals' decision regarding emission standards for 1975 model year light-duty vehicles (International Harvester Company vs. Ruckelshaus, D. C. Cir. No. 72-1517, February 10, 1973) in which the court ordered EPA to remove light-duty trucks from the light-duty vehicle category. The new emission standards for light-duty trucks were significantly more stringent than the 1974 standards, but were slightly less stringent than the interim 1975 standards for light-duty vehicles.
February, 1974	EPA published the first of yearly fuel consumption results in a booklet for consumer use.
February 27, 1974	EPA promulgated regulations designed to accomplish three main purposes: (1) to clarify certain requirements pertaining to vehicle emissions certification, and provide that certification may be denied (or revoked) on account of a failure to comply with such

	requirements; (2) to clarify that the Administrator would not certify any vehicle employing Auxiliary Emission Control Devices which have been determined by the Administrator to be "defeat devices;" and (3) to provide that once the regulations are in effect, production vehicles which do not conform in all material respects to the same design specifications that applied to a certification vehicle would not be covered by the Certificate of Conformity.
June 25, 1974	Under the Recall Program, EPA tested in-use vehicles and announced that four manufacturers of certain 1972 model year vehicles appeared to be in violation of Federal air pollution emission standards.
September 4, 1974	Regulations were promulgated which provided for the exclusion and exemption from emission standards for certain motor vehicles and motor vehicle engines.
October 15, 1974	EPA and the Federal Energy Administration (FEA) published a notice of Voluntary Fuel Economy Labeling for 1975 model year vehicles.
October 22, 1974	The Environmental Protection Agency published the final rulemaking concerning the control of emissions from light duty diesel powered trucks.
November 18, 1974	EPA promulgated regulations which required manufacturers to certify new motor vehicles designed for initial sale at high altitude to comply with emission standards at those altitudes. These amendments are applicable to light-duty gasoline-fueled vehicles, light duty diesel vehicles and light-duty trucks beginning with the 1977 model year.
November 21, 1974	EPA promulgated regulations for the emissions control of 1976 and later model year light-duty diesel powered trucks.
December 23, 1974	EPA promulgated regulations governing the recall of motor vehicles and motor vehicle engines which failed to conform to emission standards for their useful life.

May 30, 1975	EPA promulgated regulations to establish the certification procedures for 1977 model year light-duty diesel powered trucks offered for sale in high altitude regions.
June 5, 1975	EPA established standards for 1976 model year light-duty vehicles and light-duty trucks and emission standards for 1977 and later model year light-duty vehicles, light-duty trucks and diesel-powered light-duty trucks.
June 23, 1975	EPA promulgated regulations to deny importation, except as a bonded entry, to all vehicles certified with a catalyst which were driven outside the United Stated, Canada, and Mexico unless the vehicles were included in an internal control program.
February 6, 1976	EPA announced it was considering amendments to increase in the upper weight limit for 1978 and later model year light-duty trucks from 6,000 to 8,500 pounds gross vehicle weight (GVWR). Also proposed was a reduction of the current light-duty truck emission standards which would represent more than a 10% reduction from the present limits for current light-duty trucks, and more than a 67% reduction for vehicles to be added to the class.
May 11, 1976	EPA published proposed revised regulations for 1979 and later model year heavy-duty gasoline-fueled and diesel engines.
July 20, 1976	EPA promulgated regulations establishing a testing program for new automobiles coming off the assembly line in order to insure that these vehicles conform to the pollution control requirements of the Clean Air Act.
November 3, 1976	EPA published an advance notice that it was considering the development and promulgation of regulations to provide general clarification concerning the coverage of Section 207(a) of the Clean Air Act (the emission control production warranty) for light-duty vehicles and light-duty trucks. In EPA's view, this was necessary because the Section 207(a) warranty has not developed into an effective remedy for the consumer, despite its presence since the 1972 model year.

November 10, 1976	EPA promulgated regulations which require manufacturers of 1977 and later model year automobiles and light-duty trucks to label each vehicle with fuel economy information.

SUMMARY
OREGON LEGISLATIVE ACTION

1969	Adopted legislation which prohibited the removal or rendering inoperative of factory-installed pollution control equipment.
1971	Legislation was adopted which directed the Department of Environmental Quality to develop a periodic Motor Vehicle Emission Inspection Program.
1973	Assembly reviewed Motor Vehicle Emission Control Inspection proposals, but adjourned without providing budget for a mandatory program.
	Emergency Board authorized the Department to implement a voluntary pilot program using $1,000,000 in funds appropriated during the regular session.
1974	During the Special Session, action was taken to provide for an increase of inspection fees to $5.00; restricted the program to within the Metropolitan Service District; required annual emission control inspection; and set the start up date as July 1, 1975.
1975	Legislative Assembly again reviewed the implementation of the program and at the end of the session changed the laws so that an inspection would be required only every other year with vehicle license renewal as of July 1, 1975.
	Emergency Board approved a revised budget reflecting the reduced fee income resulting from bi-annual inspection of vehicles.
1976	Speaker of House of Representatives assigned a five member Task Force on Auto Emission Control to review the program and forward recommendations.

SUMMARY
ENVIRONMENTAL QUALITY COMMISSION ACTION

March 30, 1970	Adopted motor vehicle visible emission regulation.
October 25, 1972	Approved the projected inspection/maintenance program after reviewing a comprehensive staff report.
March 2, 1973	Held public hearings to designate those Oregon counties in which the vehicle inspection program would be instituted.
March 21, 1973	Designated Clackamas, Columbia, Multnomah, and Washington counties and set an effective starting date for the program of January 1, 1974.
May 29, 1973	Adopted the Portland Transportation Control Strategy as an Amendment to Oregon's Implementation Plan (Clean Air Act).
November 26, 1973	Commission authorized the deletion of Columbia County from the inspection program requirements and to extend the effective date of the program to May 31, 1974.
January 25, 1974	Adopted criteria for Certification of Motor Vehicle Control Systems which precluded the use of retrofit devices.
December 20, 1974	Gave authorization for Public Hearings to adopt Motor Vehicle Inspection Program Criteria.
March 28, 1975	Adopted Proposed Motor Vehicle Emission Control Inspection Test Criteria, Methods and Standards.
June 25, 1976	Adopted Emergency Rules Extending Enforcement Tolerance for the Motor Vehicle Emission Inspection Program through June 30, 1977.
August 27, 1976	Repealed the Emergency Rules adopted June 25, 1976 and adopted Revisions to OAR Chapter 340, Sections 24-320 through 24-330 pertaining to Motor Vehicle Inspection Standards.

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

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

MEMORANDUM

TO: Environmental Quality commission

FROM: Director

Subject: Agenda Item F, January 14, 1977, EQC Meeting

Revised Proposed Permit Regarding Martin Marietta
Requested Change in Air pollution Control System

Public Informational Hearings were held before the Environmental Quality Commission (EQC) on October 15 and November 19, 1976, to gather information and narrow issues regarding Martin Marietta's (MM) request to replace its wet primary air pollution control system with a dry scrubber. Through these hearings and testimony received subsequent to them, the Department identified that a possible fourfold increase in plant-site SO_2 emissions could occur (from present levels of approximately 500 tons/year). The Department ultimately narrowed the issue regarding the proposal to a determination of what, if any, SO_2 control should be imposed after the dry scrubber in light of the requirements of the Department's Highest and Best Practicable Treatment and Control Rule (H&BPT&C) (OAR 20-001).

Based on information received as a result of these hearings the Department concluded that:

1. An SO_2 scrubber with a collection efficiency of up to 95% could be designed for MM's proposed primary control system.

2. The minimum expected performance of an SO_2 scrubber was 70% efficiency (performance of present wet system at MM).

3. Projected costs of a 95% efficient SO_2 scrubber would not cause major damage to MM's competitive condition.

As a result of these conclusions the Department prepared and proposed a permit for MM on November 26, 1976 which would require SO_2 control to be applied after the dry scrubber which would meet the following requirements:

1. 95% SO_2 removal or equivalent treatment as a design condition.

2. 70% SO_2 removal or equivalent treatment as a minimum operating condition.

3. Not exceed a maximum plant site SO_2 emission rate of 22.8 #/ton of aluminum as an annual average and 24.4 #/ton of aluminum as a monthly average.

Attachment 1 presents the proposed permit and further details of the basis for it.

Summary of December 9, 1976 Public Hearing Testimony

A public hearing was held on December 9, 1976 before the Department's hearings officer to receive testimony on the proposed permit. Details of the testimony are presented in the Hearings Officer's report. MM's testimony in essence claimed there would be no environmental benefit from application of SO_2 control after the dry scrubber and that by requiring such control the Department was discriminating in comparison to treatment recently given to a similar project by the Reynolds Metals Co. MM's testimony at this hearing was very extensive but MM's attorney in summing up at the end of the testimony stated he didn't think that anything was put into the record that was news to the staff. After review of this record the Department generally agrees with this statement with the exception of the economic analysis presented by CH2M/Hill. Generally the rest of MM's testimony had been presented to the EQC at previous hearings and responded to by the Department in previous hearings reports. There were some clarification statements made by several MM representatives that are worthy of summarizing which are in support of previous Department conclusions.

Dr. Leonard H. Weinstein of the Boyce Thompson Institute for Plant Research, a leading plant physiologist, stated he knew of no information on the effects to sweet cherries of any combination of air pollutants (synergistic effects from the presence of SO_2 and fluorides or SO_2 and ozone, etc.).

Mr. I. S. Shah, a leading consultant in SO_2 emission control, indicated that taking into account the emission parameters of the MM facility, 85% SO_2 control is practical technology to apply (he inferred that this has been demonstrated at Nevada Power and Light). He also did not offer anything technically wrong with Research Cottrell's proposal to MM for a 95% efficient SO_2 control system.

Mr. Werner Furth of MM's Environmental Technology Center and author of the air impact modeling study for the MM's The Dalles plant indicated despite the many uncertainties, qualifications and different approaches in modeling that his calculations show that a 70% efficient SO_2 scrubber would start being superior to the dry scrubber (in air quality impact) somewhere on the order of 4 Kilometers or more from the plant (in the heart of the orchards).

New economic information or at least a new perspective on the economic impact of requiring a 95% efficient SO_2 scrubber was presented by Mr. F. R. Lanou of CH2M/Hill. This analysis indicated requirement of a 95% efficient SO_2 scrubber after the dry scrubber would result in a less profitable condition for the company than with their present system. This was in direct contrast to the Department's analysis of previous economic information submitted by MM and has caused the Department to reevaluate the economic implication and practicality of requiring installation of a 95% efficient SO_2 scrubber.

Re-evaluation of Department's Position on H&BPT&C

The Department had concluded by the November 19, 1976 hearing that in relation to meeting requirements of the Department's HBPT&C Rule, SO_2 control technology existed to reach 70% to 95% efficiency when applied after MM's proposed primary dry scrubber. The issue of whether this control was economically practical remained as the final point to resolve before making a recommendation on this matter.

In investigating the financial condition of MM, EPA Region X's economist, Mr. Robert L. Coughlin, in his November 11, 1976, report (attached to Nov. 19, 1976 Department report to the EQC) concluded that MM's financial condition is good with respect to other aluminum producers. In fact, he indicated MM out-performed the big four (Alcan, Alcoa, Kaiser, Reynolds) in all three indicators of profitability in 1974, a record profit year, and 1975, a recessionary year. He further concluded that MM could afford to install a 95% efficient SO_2 scrubber without major damage to its competitive condition.

Despite Mr. Coughlin's analysis the Department recognized that MM wished to install the dry scrubber to a large extent to further increase its profitability (by recovery of valuable fluoride). In evaluating the economic practicality of requiring installation of the scrubber the Department believed it should not impose a requirement which would overwhelmingly hinder the potential profitability of the proposed investment. The Department, therefore, analyzed the profitability of the nearly $10 million investment for the pollution control systems ($6 million dry scrubber and up to $4 million for an SO_2 scrubber). MM's "bottom line" cash flow analyses (attached to November 19, 1976 Department report to the EQC) was interpreted by the Department to mean that of the potential $1.5 million annual economic benefit of replacing the present wet primary scrubber with a dry scrubber, MM would lose roughly $500,000 or 1/3 of it if the 95% efficient SO_2 scrubber was installed. Considering the environmental benefits and present economic stature of MM the Department concluded this was not an overwhelming economic burden or threat to potential profitability of the large capital investment. This interpretation formed the basis for the Department's conclusions and ultimate recommended permit of November 27, 1976.

CH2M/Hill's economic analysis presented at the December 9 hearing (attachment 2) indicated that, instead of the dry scrubber plus SO_2 scrubber being nearly $1 million more profitable annually than the present system, it would, in fact, be less profitable, based on percentage reduction of net income.

Further analysis of the economics of this issue by the Department and by Mr. Coughlin concluded that MM's original analysis based on cash flow had not taken into account recovery of the large capital investment. In fact, depreciation was included when calculating annualized costs and then subtracted out as a tax credit when calculating cash flow.

Another perspective of the economic impact was developed by Mr. Coughlin by looking at rate of return on capital investment. Mr. Coughlin's calculations show that for the $6.2 million capital investment of the dry scrubber, the rate of return would be 27.8%. By addition of a $4 million 95% SO_2 scrubber and its associated operating costs, the rate of return (on a $10 million investment) would drop to 3.3%.

Based on this information, it now appears the requirement of the 95% efficiency scrubber would essentially destroy the potential profitability of the large capital investment. For the Department to require such an expenditure with such a low rate of return on a project not required to comply with air quality emission limits or air quality standards would have to be considered not meeting the "practicable" requirement of the Department's H&BPT&C Rule.

While the Department now concludes that a $4 million 95% SO_2 scrubber would not represent H&BPT&C for MM because it would force an impracticable use of a large capital investment, the Department's prior position on this issue which tentatively concluded that the present scrubbing system efficiency for SO_2 (70% efficient) represents H&BPT&C (October 15, 1976 Department report to the EQC) must be evaluated.

MM's present wet primary system meets Department particulate and fluoride emission limits and controls SO_2 with a 70% efficiency. From an overall air emission standpoint it can be considered best demonstrated treatment. From an economic standpoint it does have a high operating cost, does not recover valuable fluorides and has a non-complying waste water discharge. However, even with this system MM has maintained a very profitable operation while in competition with other Northwest companies, most of which had already installed dry scrubbers (in many cases as a necessity to meet air emission limits. In fact, many of the Northwest aluminum plants were operating dry scrubbers during the years 1974-1975 that Mr. Coughlin's economic analysis shows MM out-performed them in profitability.

While MM's proposed dry scrubber does offer the benefit over the present wet scrubber of eliminating the waste water stream, there are means of treating the present waste water through recycling at relatively minimal costs (Approximately $500,000).

The Department therefore concludes that for the type of process MM employs (vertical Stud Soderberg) a 70% SO_2 collection efficiency for the primary control system represents H&BPT&C. Given this conclusion, if MM chose to keep its present system, it would not suffer major damage to its competitive conditions (see Coughlin's analysis) and it would not be forced to invest $10 million capital and receive a 3% rate of return which would be the case with the Department's original proposed permit.

With the above determination of H&BPT&C, MM would still likely have more attractive options than keeping the present control system. They could install the dry scrubber and use less costly means of achieving an equivalent 70% SO_2 collection efficiency. For instance at the lower SO_2 efficiency (lower than the 95% originally proposed), simpler, less costly SO_2 scrubber options become available such as the once-through caustic unit analyzed by EPA. Alternatives of treating part of the exhaust gas through the existing 50% efficient secondary roof scrubbing system and applying higher treatment to the remaining gases to maintain the current 70% efficiency are also possible. These alternatives as far as can be seen would not cause any significantly greater water or solid waste problem than just allowing installation of the dry scrubber.

If equivalent 70% efficient SO_2 control costs could be kept to about \$1.5 million (which has been calculated as possible by EPA Region X), then a dry scrubber and SO_2 scrubber installation could still result in about a 12% rate of return on investment. A rate of return of even up to 16% may be possible by partial treatment of the air flow by the existing secondary scrubber and application of an 85% SO_2 scrubber on just 50% of the total system air flow. See Table 1 for a comparison of potential alternatives and their estimated impacts on investments.

With a 70% SO_2 efficiency requirement for the primary system and with coke sulfur content expected to rise to 3% the plant site SO_2 emission limits originally contained in the proposed permit would still apply. A revised proposed permit has been prepared on this basis (See attachment 3).

Response to Other Issues of Significant Air Quality Benefit of SO_2 Scrubber

With well over 100 written citizens comments on this issue and other lengthy testimony at hearings, and numerous public complaints, it is clear the general public of The Dalles feels the airshed is already overloaded with air pollutants.

Because of previous crop damages and lack of synergistic damage effects information and with further imminent industrial growth in the area (1000+ citizens wrote the State of Washington about Western Zirconium) local people generally pleaded for the Department to minimize impact from the MM project as much as possible.

The Department firmly believes there would be some measurable air quality benefits from maintaining a 70% SO_2 control efficiency on MM's primary air pollution control system in comparison to allowing installation of just the dry scrubber. These benefits are:

1. Plant site SO_2 air emissions essentially would not increase over present levels if coke sulfur content remains the same and would not increase by more than a factor of two in comparison to possibly quadrupling with installation of a dry scrubber alone if sulfur content rose to the expected 3% level.

2. SO_2 air quality degradation would be measurably minimized to the greatest extent possible in the critical orchard areas.

3. Area visibility reduction on poor air quality days (stagnation) would be measurably minimized to the greatest extent possible.

In regard to minimizing air quality deterioration, it is true that a 70% efficiency SO_2 scrubber would cause a greater calculated impact than just the dry scrubber in the near vicinity of the plant site. However, MM's modeling expert agrees that the scrubber would produce less of an impact in the orchards. Since no adverse effects to health and welfare would be expected in the vicinity of the plant site at even the highest SO_2 levels projected and since there is great concern about adverse effects in the local orchards and in fact an admitted lack of research data to positively assure of no synergistic effects (of increased SO_2 levels in combination with other air pollutants) the Department concludes that given a choice, SO_2 air quality deterioration should be minimized to the maximum extent possible in the orchard area and not in the vicinity of the plant site. This minimization should be measurable as portrayed in the Department's October 15, 1976 Report to the EQC.

In regard to visibility degradation, MM has indicated water vapor from an SO_2 scrubber would be detrimental. Actually most people recognize and do not complain about naturally foggy conditions. Therefore, water vapor has not been considered an adverse air pollution source, particularly with high natural water background. Most people do recognize and complain about brownish haze from air pollution which is predominantly reflected by suspended particles (which are not water droplets). It is true, for instance, an SO_2 scrubber after a dry scrubber would result in a greater water vapor emission from the plant site. This increase is negligible though. MM's existing secondary scrubbers emit 25,000 #water/ton of aluminum and a primary wet scrubber would add approximately 4% more. This additional water would have even less impact on an airshed visibility reduction by water vapor considering water vapor emissions from other sources including The Dalles Dam spillways. There would be times when a short steam plume would be observed from such a scrubber but this would be no greater than the plumes from the present wet scrubbing system and no visibility loss complaints have been registered about them.

On the other hand MM represents the majority of the airshed SO_2 emissions. From an airshed standpoint SO_2 emissions could nearly double from the level proposed by the Department if MM did not maintain 70% SO_2 efficiency of its primary system. The Department has previously pointed out (November 19, 1976 Department Report to EQC) that estimated conservatively, SO_2 conversion to sulfate particulate from this additional SO_2 in The Dalles airshed could measurably increase area particulate levels and reduce local visibility in the order of 10% on bad air pollution days (high particulate levels).

<u>Question of Discriminatory Treatment in Comparison to Reynolds Metals</u>

Martin Marietta has charged that it would be discriminatory against them if SO_2 control is required after a dry scrubber when no such control was required of Reynolds Metals.

The Department maintains that a dry scrubber in conjunction with a 150' tall stack correctly reflects application of H&BPT&C for primary cell emissions from a pre-bake type aluminum reduction plant such as Reynolds; and, in fact, such equipment minimizes air quality impact to the greatest extent practicable.

A table comparing relevant data on the two plants is shown below.

<u>Comparison of Reynolds and Martin Marietta</u>
<u>Primary Cell Emission Control Systems</u>

	Reynolds	Martin Marietta
Production Capacity	130,000 T/y	90,000 T/y
Process	Pre-Bake	Vertical Stud Soderburg
Primary Cell Air Volume	2,000,000 cfm	100,000 cfm
Cost of Primary Dry Scrubber	$25,000,000	6,000,000
Cost of Medium efficiency (50%) SO_2 Scrubber after dry scrubber	$6,000,000	Unknown (possibly negligible if ducted to existing secondary)
Cost of High Efficiency (95%) SO_2	$80,000,000	$1-4,000,000

From this table it is obvious that the plants are of similar production rate yet because of the difference in process Reynolds has vastly greater air flows and faces vastly greater costs for air pollution control of its primary system.

In determining H&BPT&C for Reynolds the \$6,000,000 medium efficiency SO_2 scrubber was rejected in favor of a \$1,000,000 tall stack when it was clearly shown the stack would produce less ground level impact.

The high efficiency SO_2 scrubber which might have further reduced SO_2 air quality impact was not very seriously considered for Reynolds because it was obviously impractical because of its astronomical costs.

Once it was determined that control equipment representing H&BPT&C for Reynolds consisted of a dry scrubber and tall stack based on economics and minimization of air quality impact, an SO_2 emission limit was established based on the maximum anticipated coke sulfur content from Reynolds suppliers. This is exactly the same procedure being followed for Martin Marietta.

Although the Reynolds SO_2 emission limit is relatively higher than any proposed for MM, the Reynolds plant configuration (tall stack), and location (on and near relatively flat terrain and in line with the Columbia River gorge which provides excellent ventilation) create a condition of minimizing air quality impact to the greatest extent practicable. In contrast MM is located in a tightly confined bowl of surrounding mountains and off line (probably in a back eddy) of the Columbia River gorge ventilation path. These facts imply that a lower emission rate for MM as compared to Reynolds can actually cause greater impact. This fact is borne out by particulate air sampling data which indicates that particulate air quality is at least twice as clean around the Reynolds plant as compared to around the MM plant despite a nearly threefold greater particulate emission rate from Reynolds in comparison to MM. Thus a lower SO_2 emission rate for MM can be supported from this aspect.

Greater Stringency of Control

Comments have been made about the economic inequity MM would face in the aluminum industry if it were to have to install SO_2 control while other companies would not.

In fact, this type of economic inequity is widely accepted in the field of environmental control nationally and in the State of Oregon for new or modified sources as a means of improving environmental quality and making room for continued growth.

As an example, the Federal New Source Performance Standards require tighter standards for many new or modified major industrial plants such as power plants, oil refineries and steel mills. These facilities must accept and are accepting greater environmental control costs as part of business in comparison to their existing competitors.

In Oregon, the Department has many more stringent standards for new or modified sources. A case in point is the aluminum plant regulation which required a new facility such as Alumax to install primary and secondary pollution control equipment in order to meet a more stringent standard. No other existing pre-bake aluminum plant in the country would have to meet such requirements or substantial costs. Also Department general emission standards for visible and particulate emission concentrations are twice as stringent for all new or modified sources.

Tall Stack Options

There has been some question of whether a tall stack in lieu of an SO_2 scrubber would be a feasible alternative. The Department does not believe a tall enough stack could be practicably engineered to penetrate The Dalles normal inversion levels and allow the dry scrubber to perform better than the addition of an SO_2 scrubber under stagnant conditions (in terms of minimizing visibility degradation and impact in the orchards). A taller stack on an SO_2 scrubber, however, could lessen the portion of the Federal Prevention of Significant Deterioration (PSD) increment that would be used and should be kept in mind as a trade off in the future if PSD appears to adversely hinder future growth in the area.

Further Area Studies

There are significant concerns and some unknowns about the impact of MM air emissions on local orchards and on The Dalles air shed in general. With MM potentially increasing its SO_2 emissions and with other new industries looking at The Dalles area as a desirable location, further studies of the airshed should be conducted and MM should be an active participant. No specific studies are planned in the near future because of lack of resources, however.

Conclusions

1. A 95% efficient SO_2 scrubber after MM's proposed dry scrubber would be economically impractical because it would reduce the rate of return on a multi-million dollar investment from approximately 28% to 3%.

2. Maintaining the present 70% SO_2 collection efficiency of the MM's primary system and solving associated wastewater problems is technically feasible and economically practicable.

3. An emission limit of 24 #SO_2/ton of aluminum would reflect maintaining a 70% SO_2 collection efficiency of MM's primary system but allow MM to use coke which is projected to rise to 3% sulfur.

4. The Department's revised proposed permit would essentially keep plant site SO_2 emissions the same at present coke sulfur content but would allow MM to only double SO_2 emissions instead of possibly quadrupling if sulfur content of coke increases as projected to 3%. This is considered a fair environmental-economic tradeoff considering that all air quality standards would be met and the risk to crop damage is considered minimal versus the lack of specific research on synergistic effects of SO_2 on cherries and the general public feeling that air pollution in the airshed is presently unacceptable.

5. Requiring MM to maintain a 70% SO_2 control efficiency <u>or equivalent</u> on the primary system provides some alternatives to MM such as installing the dry system with a low cost means of providing 70% SO_2 control efficiency and possibly achieving a 12% or higher rate of return on investment while solving the wastewater problem associated with this system.

6. While the means to finding an economically attractive and technically achievable equivalent SO_2 control system will present a challenge to MM's ingenuity, the Department firmly believes that the likelihood of success is great.

7. By requiring MM to maintain a 70% SO_2 control efficiency on the primary system, SO_2 air quality impact in The Dalles orchard areas, and degradation to airshed visibility loss would be measurably minimized to the greatest extent practicable.

8. MM should participate in further studies of the effects of air pollution on local orchards.

Recommendation

It is the Director's recommendation that the attached revised-proposed permit (Attachment 3) be issued.

Attachments:

William H. Young

William H. Young
Director

1/5/77

TABLE 1

SO_2 Control Alternatives on Primary System and Approximate Effect on Capital Investment
(All systems meet Water Quality Requirements)

MM's Proposal (Base)

Dry Scrubber	
Capital Cost	$6,100,000
Annual Operating Cost	410,000(1)
Rate of Return	27%

Department's Proposed Permit of 11/26/76

Dry Scrubber and 95% efficient SO_2	
Additional Capital over Base	$4,000,000
Additional Annual Operating Cost	500,000
Rate of Return	3%

Some Potential Alternatives Under Department's revised proposed permit of 1/3/77

Dry Scrubber and 70% efficient SO_2 Scrubber (simple once through caustic scrubber)	
Additional Capital over Base	$1,500,000
Additional Annual Operating Cost	300,000
Rate of Return	12%

Dry Scrubber and 70% efficient SO_2 equivalent system (50% of air to existing 50% efficient secondary and 50% through new 85% operating efficient SO_2 system)	
Additional Capital over Base	$1,500,000
Additional Annual Operating Cost	150,000
Rate of Return	16%

Existing Wet ESP + Recycle Water	
New Capital Construction over existing	$500,000
Estimated Additional Annual Operating Cost over present	100,000
Rate of Return	Inapplicable (2)

(1) Does not include $1,100,000/yr recovery of product.
(2) $6,000,000 capital available from dry scrubber would then be available for other investment.

Dec. 9, 1976 Hearing
ATTACHMENT 1

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE MEMO

To: Recipients of Proposed Air Permit for Martin Marietta dated 11/26/76

Date: November 29, 1976

From: Director

Subject: Basis for Proposed Permit

The Department's proposed permit is based on conclusions derived from evaluation of EPA and Martin Marietta (MM) reports on the economic and technical feasibility of installing SO_2 control and the requirements of OAR 20-001 dealing with application of Highest and Best Practicable Treatment and Control.

In summary the Department has concluded that:

1. An SO_2 scrubber with a collection efficiency of up to 95% can be designed for MM's proposed primary control system.

2. The minimum actual expected performance of an SO_2 scrubber is 70%.

3. Projected costs of an SO_2 scrubber will not cause a major damage to MM's competitive condition.

4. The Dalles area ~~is a special~~ has unique air quality problems ~~area~~ in terms of gfk

   a) Past history and present claims of adverse effects from air pollution to agricultural interests.

   b) Lack of complete and conclusive evidence about air pollution effects on agricultural interest.

   c) Restricted ventilation.

   d) Present unacceptable visibility reduction.

   e) Potential for significant industrial growth and the need to allocate the airshed wisely.

The Department's proposed SO_2 emission limits are considered the lowest reasonably enforceable limit that can be set considering

1. The possibility of increases in sulfur content of coke to 3%.

2. SO_2 emission evolution from the process according to MM's assumption

3. Minimum expected performance (70%) of state of the art SO_2 scrubbers applied to an aluminum plant.

If all the worst case conditions should occur, then the Department's proposed SO_2 emission limits would allow up to a doubling of present plant site SO_2 emissions.

On the other hand, plant site SO_2 emission would not change from present levels IF:

1. The installed scrubber performs up to design conditions (95% efficiency).
gfk

2. SO_2 emissions evolve from the new process according to DEQ assumptions.

3. Coke sulfur increases to 3.0%.

Without an SO_2 scrubber plant site SO_2 could triple to quandruple over present levels depending upon whether MM's or the Department's assumptions on SO_2 evolution from the process becomes reality.

11/26/76

AIR CONTAMINANT DISCHARGE PERMIT

Department of Environmental Quality
1234 S.W. Morrison Street
Portland, Oregon 97205
Telephone: (503) 229-5696
Issued in accordance with the provisions of
ORS 468.310

ISSUED TO:	REFERENCE INFORMATION		
Martin Marietta Aluminum, Inc. P. O. Box 711 The Dalles, Oregon 97058	Application No. 0817		
PLANT SITE: Martin Marietta Aluminum, Inc. 3303 W. Second Street The Dalles, Oregon 97058	Date Received 5/17/76		
	Other Air Contaminant Sources at this Site:		
	Source	SIC	Permit No.
	(1)		
ISSUED BY DEPARTMENT OF ENVIRONMENTAL QUALITY	(2)		
Director Date			

ADDENDUM NO. 1

In accordance with OAR, Chapter 340, Section 14-040, Air Contaminant Discharge Permit Number 33-0001 is modified.

Condition 1 is modified by addition of the following paragraph:

a. Subject to review and approval of detailed plans and specifications the permittee may replace its wet ESP primary air pollution control system with a dry filter system provided sulfur dioxide control is applied after the dry filter which meets the following requirements:

1) 95% SO_2 removal or equivalent treatment as a design condition

2) 70% SO_2 removal or equivalent treatment as minimum operating condition

Continued page 2

Condition 2 is modified by addition of a new subsection d.

d. Upon operation of the dry filter system the total sulfur dioxide emissions from all sources shall not exceed 10.3 kg/ton (22.8 pounds/ton of aluminum produced) as an annual average and 11.0 kg/ton (24.4 pounds/ton of aluminum produced) as a monthly average.

Condition 4 is modified to read as follows:

4. The permittee shall conduct an approved monitoring program which shall include:

   a. Prescheduled plant wide emission testing for gaseous fluoride, particulate fluoride, total particulate and <u>sulfur dioxide</u>.

   b. Measuring of forage fluoride <u>and sulfur</u>.

   c. Measuring ambient air gaseous fluoride, particulate fluoride, suspended particulate, particle fallout, <u>sulfur dioxide, submicron sulfate particulate</u> and wind speed and direction.

Condition 5 is modified to include the following paragraph:

Details of the additions to the monitoring program required by this Addendum shall be submitted no later than March 1, 1977 for review and approval by the Department.

Condition 6 regarding monitoring and reporting is modified by addition of 6.c.4), and 6.d.4) as follows:

Parameter	Minimum Monitoring Frequency
c. Primary potroom control system emissions	
4) Sulfur dioxide	Three times per month or once per line per month whichever is greater with prior notice to the Department.
d. Secondary potroom control system emissions	
4) Sulfur dioxide	Three times per month or once per line per month whichever is greater with prior notice to the Department.

ATTACHMENT 2

CH2M HILL
engineers
planners
economists
scientists

December 8, 1976

Martin Marietta Aluminum Inc.
P. O. Box 711
The Dalles, Oregon 97058

Attention: Mr. Jack P. Doan

Subject: Economic Evaluation of Alternative Emission Control Systems for Martin Marietta Aluminum Inc.'s Plant in The Dalles, Oregon

Gentlemen:

Pursuant to your request, we have studied the economics associated with three alternative emission control systems that would meet 1977 EPA water quality requirements at Martin Marietta Aluminum's plant in The Dalles. This includes a review of financial analysis of the three alternatives by Dr. Peterson of Martin Marietta Aluminum, a review of the related study by Mr. Robert L. Coughlin of the Environmental Protection Agency for the Oregon Department of Environmental Quality, and our own analysis of the three alternatives and the impact each might have on the economics of The Dalles plant.

Summary

Most aluminum producers in the United States have already installed a dry scrubber system similar to the one that Martin Marietta Aluminum (MMA) proposes for its aluminum reduction plant in The Dalles, Oregon. Of the three alternatives analyzed herein, the dry scrubber without auxiliary SO_2 removal (Alternative 2) is the least costly.

The DEQ could order the company to purchase and operate a more costly alternative system that uses an auxiliary SO_2 scrubber and clarifier. These are not required under existing state or Federal emission standards and not required of any other aluminum producer. This would put The Dalles plant in a significantly disadvantageous competitive position and would be unduly burdensome to its operation. Because there apparently would be no detectable benefits resulting from the additional investment over those offered by the dry scrubber alone for primary air control, the added investment and its operation would be contraproductive because it would misallocate limited resources.

We estimate that the added cost of investing in and operating an auxiliary SO_2 scrubber and clarifier would reduce net income at The Dalles plant by over 20 percent.

Our conclusions are listed on pages 8 and 10 of this letter.

Alternatives Studied

The three alternatives we were asked to study are:

- Alternative 1 - Primary air quality control system: wet electrostatic precipitator (ESP) with recycle of scrubber water. Secondary air quality control system: water spray with recycle of scrubber water.

- Alternative 2 - Primary air quality control system: dry scrubber. Secondary air quality control system: water spray with recycle of scrubber water.

- Alternative 3 - Primary air quality control system: dry scrubber system with an auxiliary wet scrubber for SO_2 removal and a clarifier. Secondary air quality control system: water spray with recycle of scrubber water.

We understand these are the three alternatives for which the DEQ in its October 27, 1976, letter requested the company to prepare a detailed comparable economic analysis. Time did not allow study of three other alternatives presented in Dr. Warren S. Peterson's November 17, 1976, memorandum to Joseph L. Byrne, copy attached. Those three alternatives are:

- Alternative 4 - Primary air quality control system: Dry scrubber system. Secondary air quality control system: water spray with once-through use of scrubber water.

- Alternative 5 - Primary air quality control system: dry scrubbers system with an auxiliary wet scrubber for SO_2 removal and a clarifier. Secondary air quality control system: water spray with once-through use of scrubber water.

- Alternative 6 - Primary air quality control system: wet electrostatic precipitator (ESP) with recycle of scrubber water. Secondary air quality control system: water spray with once-through use of scrubber water.

We understand that Martin Marietta Aluminum proposes Alternative 4 as the most economically and environmentally sound system available and the only alternative for which there is demonstrated technology and reliable capital cost data.

Cost Comparison of the Three Alternative Systems

As Mr. Coughlin of the EPA states in his 11 November 1976 report to Mr. E. J. Weathersbee of the DEQ, it is not uncommon to have varying cost estimates for installing and operating emission control equipment. The cost estimates included in Mr. Peterson's 17 November 1976 memo to Mr. Joe Byrne of MMA differ somewhat from those presented by Mr. Coughlin. However, the differences appear to be inconsequential in evaluating the overall economics of the three alternatives. The two sets of cost estimates are compared in appendix A. We have used Mr. Peterson's cost estimates in our analysis because they include secondary treatment costs not considered by Mr. Coughlin and are therefore more complete. We have not attempted to evaluate the accuracy of cost estimates by either Mr. Peterson or Mr. Coughlin.

We are told that it has not been established that the present wet secondary system at The Dalles plant can be used with the treated and recycled scrubber water as provided in Alternatives 1, 2, and 3, and that the capital costs for these cases increase about 23 million dollars if a new wet secondary system is required. This possibility has not been included in our analysis.

Cost analysis of the three alternatives is shown in table 1. Alternative 1, which includes a wet scrubber for primary air control, requires relatively low capital costs of about $1 million, but requires about $1.5 million per year to operate. Alternative 2, which includes a dry scrubber for primary air control, requires about $7 million in capital cost, but

Table 1. PRESENT VALUE AND ANNUAL COST OF THREE ALTERNATIVE CONTROL SYSTEMS WHICH WOULD MEET EPA 1977 WATER QUALITY REQUIREMENTS AT THE DALLES PLANT

	Alternatives[1]		
	1. Wet ESP	2. Dry Scrubber	3. Dry Scrubber With SO_2 Scrubber
	(thousand dollars)		
Raw costs:			
Capital cost	$ 991	$6,976	$10,563
Operating cost			
Cost of operations[2]	1,543	768	1,382
Chemicals recovery	--	(1,091)	(1,091)
Total operating cost	$ 1,543	($ 323)	$ 291
Present value of capital and operating costs:[3]			
Initial year	$ 991	$6,976	$10,563
10-Year operation	9,480	(1,985)	1,788
Total	$10,471	$4,491	$12,351
Average annual cost:			
Debt service[4]	$ 161	$1,135	$ 1,719
Operating cost	1,543	(323)	291
Total	$ 1,704	$ 812	$ 2,010

1 Listed by primary air quality systems. For full descriptions of the three alternatives, see page 2 of this letter.

2 Includes labor, maintenance, water, power, lime, and other supplies.

3 Calculated assuming a 10-percent opportunity cost rate of money.

4 Interest and amortization calculated assuming a 10-year loan and a 10-percent interest rate.

actually reduces operating costs by about $323,000 per year as a result of recovery of fluoride and other chemicals. Alternative 3, which includes a dry scrubber with an auxiliary scrubber and clarifier for primary air control, is the most expensive investment at $10.6 million and would add $291,000 to the plant's annual operating costs.

The proper way to evaluate these costs is to determine the present value of each alternative. Present value analysis makes adjustments for the time value of money and, in effect, accounts for timing variation in the cost flow. Because money spent in future years has less value than money spent at present, it is appropriate to discount future amounts to obtain a single measurement which is comparable to other discounted time-streams of monetary values. Alternative 2 is by far the least cost alternative at $4.5 million, followed by alternative 1 at $10.5 million, and alternative 3 at $12.4 million.

A second way of analyzing the alternative cost flows is to determine the average annual cost of each investment. Average annual cost is the sum of debt service on the investment (level interest and amortization payment) plus annual operating costs. Under average annual cost analysis, alternative 2 is again the least cost alternative at $812,000 per year followed by alternative 1 at $1.7 million per year and alternative 3 at $2 million per year.

Misuse of Limited Resources

Even though such investments are considered to be "nonproductive" in their direct impacts on the investing firm, the cost of many emission control investments by industry and others is outweighed by the benefits of a resulting cleaner environment. However, in cases where emission control investment and operation result in undetectable environmental benefits, the cost of the facility and its operation represents a misallocation of limited resources. In fact, since such an action diverts resources from productive to nonproductive avenues, it is contraproductive. In MMA's case, if the company were forced to invest in alternative 1 or 3 rather than alternative 2, it appears that, on a present value basis, $6 million to $8 million would be misallocated from the opportunity to invest in production of goods and services. As Mr. Coughlin states on page 2 of his report, "No environmental benefits are ascribed to SO_2 reduction in this case, so the efficiency of the investment is most questionable." On page 17 of his report, he emphasizes that "The central fact is that in the event that wet scrubbing (of SO_2) is required, resources will be consumed and aluminum production costs increased to purchase a reduction in SO_2 concentrations that has no beneficial consequences." This consideration alone should dissuade a regulatory agency from forcing MMA to invest in either of the more costly alternatives.

Inequitable Treatment = Competitive Disadvantage

External Disadvantage

We agree with Mr. Coughlin that, if MMA were not allowed to select alternative 2, The Dalles plant would face an inequitable "distinct competitive disadvantage" since none of the plant's competitors are likely to have to absorb the additional costs inherent in either alternative 1 or alternative 3. In addition, it would be inequitable to, in effect, penalize MMA for its early investment in emission control. As Mr. Coughlin states on page 17 of his report, "The plant at The Dalles faces (auxiliary) SO_2 reduction costs only because of its early efforts to control air pollution through the use of suboptimal technology." It is my understanding that this technology was the best available at the time of the investment.

Internal Disadvantage

MMA owns and operates two aluminum reduction plants: one at The Dalles and one at Goldendale, Washington. If MMA were permitted to proceed at its Goldendale plant with the installation of a dry scrubber system without the added cost of an auxiliary SO_2 scrubber and clarifier, but were forced to invest in alternative 1 or alternative 3 at The Dalles plant, then under normal circumstances the latter would be more costly to operate and would become the company's marginal aluminum reduction plant. Under these conditions, if demand for MMA's aluminum slackened, corporate management would have incentive to cut production at the marginal cost plant in The Dalles while the Goldendale plant remained at nearly full production. Such an occurrence would have resulted in much greater production drops at The Dalles plant in 1973 and 1975. If MMA had not cut production at both plants, as shown in table 2, and instead had reduced output at The Dalles plant only, cutbacks at The Dalles would have been over 75 percent greater in 1973 and over 55 percent greater in 1975. We have not studied the prospect in any detail, but future extraordinary reductions at The Dalles plant would have an important impact on employment in The Dalles and on the regional economy in general.

The Aluminum Industry - Volatile Profit Rates

The profit rate in the aluminum industry is quite volatile as it is in most primary metals industries. As shown in table 3, profit rates of three large aluminum producers in the United States have ranged from 3.0 to 13.2 percent since 1967. The profit rate of MMA is even more volatile, ranging from 1.1 to 16.9 percent since 1969. There is thus no discernible trend of steady profits in the aluminum business. The added cost of an auxiliary SO_2 scrubber may well in some years eliminate profits attributable to The Dalles plant.

Table 2. MARTIN MARIETTA ALUMINUM INC. ALUMINUM PRODUCTION BY PLANT 1972 THROUGH 1975

Year	Actual Production			Estimated Decrease From Normal, Planned Production		
	The Dalles	Goldendale	Total	The Dalles	Goldendale	Total
	(thousand short tons)					
1972	89,130	101,947	191,077	--	--	--
1973	73,220	89,713	162,933	15,800	12,300	28,100
1974	88,642	102,282	190,924	--	--	--
1975	75,700	94,330	170,030	13,300	7,700	21,000

Table 3. PROFIT RATES OF ALUMINUM COMPANIES IN THE UNITED STATES

Year	Rate of Return to Shareowners' Equity	
	Three Large U.S. Producers (percent)	Martin Marietta Aluminum Inc. (percent)
1967	10.3	N/A
1968	8.4	N/A
1969	10.6	10.9
1970	7.7	6.6
1971	3.0	1.7
1972	4.5	1.1
1973	7.1	7.1
1974	13.2	16.9
1975	N/A	3.9
Average 1969 - 1974	7.7	7.4
1969 - 1975	N/A	6.9

SOURCE: U.S. Department of Commerce; *U.S. Industrial Outlook 1976*; and Martin Marietta Aluminum Inc.

We disagree with Mr. Coughlin's projection that The Dalles plant could absorb the nonproductive costs of an auxiliary SO_2 scrubber without "major damage to its competitive condition."

Significant Impact on Return to Shareowners' Equity in The Dalles Plant

We have made a conservative estimate of each alternative investment's impact on net income attributable to The Dalles plant. In doing so, we made the simplifying assumption that the estimated tax savings to the company of the added annual cost is 48 percent, the legal limit to the Federal corporate tax rate. In fact, the effective tax rate for MMA is somewhat lower. We did not delve into insurance and property tax rates, nor did we concern ourselves with the complexities of financial plans and accounting adjustments such as accelerated depreciation and investment tax credit. Rather, we looked at the average annual impact on income.

Because nearly all aluminum plants have invested in dry scrubbers, and other nonferrous producers have had to invest in similar facilities, over the long run aluminum companies will probably recover their costs in these investments by passing the added cost along to aluminum consumers in the form of increased prices. However, the greater cost of either alternative 1 or alternative 3 over alternative 2 would not be recovered by MMA without impacting the profitability of The Dalles plant since the company must sell its product in the market at the same price as that charged by other producers. As shown in table 4, the reductions in net income each year with alternative 1 and alternative 3 are $463,000 and $622,000, respectively.

Accounting statistics on shareowners' equity in The Dalles plant per se are not available; but we have calculated the amount to be $29.7 million since the capital structure for The Dalles plant would be the same 69-percent ratio of equity to total capitalization as MMA. Details of this calculation are provided in appendix B.

If we assume a normal rate of return to equity of 10 percent (over 3 percentage points higher than MMA's 7-year average of 6.9 percent for 1969 through 1975), we can conservatively estimate that the reductions of The Dalles plant profit attributable to the added cost of alternative 1 and alternative 3 would be 16 percent and 21 percent, respectively. This is a very significant negative impact for any investment that has "no beneficial consequences."

Conclusions

Our general conclusions are as follow:

1. Alternative 2, which includes a dry scrubber, is by far the least costly of the three alternatives studied. On a present value basis, alternative 1, which includes a wet ESP, is about 2.3 times as expensive; and alternative 3, which includes a dry plus auxiliary SO_2 scrubber and clarifier, is about 2.75 times more expensive than alternative 2.

Table 4. THE DALLES PLANT ESTIMATED REDUCTION IN NET INCOME ATTRIBUTABLE TO ADDITIONAL CONTROL SYSTEM COSTS IN EXCESS OF ALTERNATIVE 2

	Alternatives[1]		
	1. Wet ESP	2. Dry Scrubber	3. Dry Scrubber With SO_2 Scrubber
	(thousand dollars)		
Average annual costs:			
Each alternative	$1,704	$ 812	$2,010
Alternative 2	812	812	812
Amount in excess of alternative 2	$ 892	--	$1,198
Tax saving (48%)	428	--	575
Reduction in net income	$ 463	--	$ 622
Normal net income assuming an average annual profit rate of 10 percent on share-owners' equity	$2,970	$2,970	$2,970
Percentage reduction in net income	16%	--	21%

[1] Listed by primary air quality systems. For full description of the three alternatives, see page 2 of this letter.

2. If we assume no additional environmental benefits result from alternative 1 or alternative 3 compared to alternative 2, the additional resources consumed in the construction and operation of either alternative 1 or alternative 3 would be wastefully misused. This is contrary to both economic and environmental principles.

3. Because no other aluminum producer is required to make the additional investment over that incurred with alternative 2, MMA's investment in either alternative 1 or alternative 3 would place The Dalles plant in a distinct competitive disadvantage. Under these circumstances cyclical decreases in demand for MMA's aluminum products could result in extraordinary production decreases at The Dalles plant, while the Goldendale plant remained at nearly full production.

4. There is no discernible trend of steady profits in the aluminum business.

5. MMA would not be able to recover added costs over those incurred with alternative 2 without impacting the profitability of The Dalles plant. We conservatively estimate that investments in alternative 1 and alternative 3 would decrease the profitability of The Dalles plant by 16 percent and 21 percent, respectively. Such a continuing drain on profits would constitute a major financial problem for almost any business.

If you have any questions or wish to discuss this further, please call us.

Yours very truly,

Frank R. Lanou, Jr.
Senior Economist and
Group Director

David A. Gray
Project Manager

Appendix A. COMPARISON OF COST ITEMS FOR AIR AND WATER QUALITY CONTROL AT THE DALLES PLANT: MMA VS. EPA ESTIMATES

Alternatives,[1] Cost Items	Source MMA	Source EPA
	(thousand dollars)	
1. Wet ESP		
Investment cost	$ 991	N/A
Operating cost	1,543	N/A
2. Dry scrubber:		
Investment cost		
Primary	$ 6,084	$ 5,800
Secondary	892	N/A
Total	$ 6,976	N/A
Operating cost		
Primary		
Operations	$ 177	$ 306
Materials recovery	(1,091)	(948)
Subtotal	(914)	(642)
Secondary	591	N/A
Total	($ 323)	N/A
3. Dry scrubber, auxiliary wet scrubber, and clarifier:		
Investment cost		
Primary	$ 9,671	$10,025
Secondary	892	N/A
Total	$10,563	N/A
Operating cost		
Primary		
Operations	$ 791	$ 525
Material recovery	(1,091)	(948)
Subtotal	(300)	(423)
Secondary	591	N/A
Total	$ 291	N/A

[1] Listed by primary air systems. For full description of the three alternatives, see page 2 of this memorandum.

N/A = Not available in Coughlin's 11 November 1976 report to Oregon DEQ.

Appendix B. CAPITALIZATION OF MARTIN MARIETTA ALUMINUM AND THE DALLES PLANT[1]

	Martin Marietta Aluminum	The Dalles Plant
	- - (million dollars) -	
Capitalization		
Long-term debt	$ 94	$13.4[2]
Shareowners' equity	212	29.7[2]
Total	$306	$43.1
Shareowners' equity as a percent of capitalization	69%	69%

[1] As of 12/31/75.

[2] Calculated based on the equity-to-capitalization ratio of Martin Marietta Aluminum.

SOURCE: Martin Marietta Aluminum Inc.

AIR CONTAMINANT DISCHARGE PERMIT

Department of Environmental Quality
1234 S.W. Morrison Street
Portland, Oregon 97205
Telephone: (503) 229-5696
Issued in accordance with the provisions of
ORS 468.310

ISSUED TO:	REFERENCE INFORMATION
Martin Marietta Aluminum, Inc. P. O. Box 711 The Dalles, Oregon 97058	Application No. 0817
PLANT SITE: Martin Marietta Aluminum, Inc. 3303 W. Second Street The Dalles, Oregon 97058	Date Received 5/17/76
ISSUED BY DEPARTMENT OF ENVIRONMENTAL QUALITY	Other Air Contaminant Sources at this Site: Source / SIC / Permit No. (1) (2)
William H. Young, *Director* — *Date*	

ADDENDUM NO.

In accordance with OAR, Chapter 340, Section 14-040, Air Contaminant Discharge Permit Number 33-0001 is modified.

Condition No. 1 is modified to read as follows:

a. Subject to review and approval of detailed plans and specifications the permittee may replace its wet ESP primary air pollution control system with a dry filter system provided sulfur dioxide control is applied after the dry filter which meets the following requirement:

1) 70% SO_2 removal or equivalent treatment.

(continued page 2)

Condition 2 is modified by addition of a new subsection d.

d. Upon operation of the dry filter system the total sulfur dioxide emissions from all sources shall not exceed 10.3 kg/ton (22.8 pounds/ton of aluminum produced) as an annual average and 11.0 kg/ton (24.4 pounds/ton of aluminum produced) as a monthly average.

Condition 4 is modified to read as follows:

4. The permittee shall conduct an approved monitoring program which shall include:

   a. Prescheduled plant wide emission testing for gaseous fluoride, particulate fluroide, total particulate and sulfur dioxide.

   b. Measuring of forage fluoride and sulfur.

   c. Measuring ambient air gaseous fluoride, particulate fluoride, suspended particulate, particle fallout, sulfur dioxide, submicron sulfate particulate and wind speed and direction.

Condition 5 is modified to include the following paragraph:

Details of the additions to the monitoring program required by this Addendum shall be submitted no later than March 1, 1977 for review and approval by the Department.

Condition 6 regarding monitoring and reporting is modified by addition of 6.c.4), and 6.d.4) as follows:

Parameter	Minimum Monitoring Frequency
c. Primary potroom control system emissions	
4) Sulfur dioxide	Three times per month or once per line per month whichever is greater with prior notice to the Department.
d. 4) Sulfur dioxide	Three times per month or once per line per month whichever is greater with prior notice to the Department.

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

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

To: Environmental Quality Commission

From: Hearing Officer

Subject: Second Addendum to Martin Marietta Public Hearing of December 9

Since the hearing on December 9 approximately 133 The Dalles area residents have written to express support of Martin Marietta's position that it should not be required to add a wet scrubber after its proposed dry scrubber for its primary air pollution control system at The Dalles plant. Of those writing, some 79 were signers of a total of four brief petitions. The remainder wrote letters expressing, in many cases, identical reasons for their views. Eleven writers and 30 petitioners stated themselves to be Martin Marietta employees. An attempt is made to summarize the comments with no attention to the number of writers who shared each comment. The letters, some of which have been forwarded to individual Commission members by their authors, will be present at the Commission meeting should further examination be desired.

SUMMARY OF COMMENTS

A. Economic comments.

Many of those who wrote said the Department's earlier proposal would constitute a useless misallocation of capital, energy, and raw material. It was contended that the result would unfairly discriminate against Martin Marietta, place them at a competitive disadvantage with others, give them incentive to shut the plant down, result in inflationary costs to the consumer, cause the company to run only the Goldendale plant, jeopardize the area economy by risking the five million dollar annual contribution of Martin Marietta. It was said to risk a mortal blow to The Dalles area tax revenues, jeopardize the area's only large industrial employer, and risk all of the jobs attendant to the plant. It was further contended that a balance between economy and environment should be stricken and that the plant had already exceeded standards at a considerable cost. One writer who professed a 19 year familiarity with plant efforts to control pollution praised the efforts and noted that for the first time in 19 years the plant was proposing a system which would realize a monetary return on the reuse of a valuable material. At least two other writers recalled as employees Martin Marietta's good economic efforts to reach and surpass standards. It was argued that the future of our children must be considered in the economic appraisal and that continued world population growth dictates continued improvement in energy resources, food production, and job opportunities. The cost of the Department's proposal was said to strip the project of any economic benefits, be prohibitive, use monies better spent on upgrading and expansion, make investment in chemical companies or other alternatives more attractive than continued operation of the plant, and, coupled with the risk of long and short term power shortages, add to incentives to shut the plant down or curtail operation. Charges levelled at the opposition of the company were that they are insensitive to The Dalles area economy and do not care if the area becomes depressed or, as one writer put it, an economic "basket case." It was stated generally that the economic advantages of using aluminum compared to alternative products are great and that full use of resources is necessary if we are not to move backward.

B. Comments on the soundness of a wet scrubber behind the dry scrubber.

Many writers stated that, after reviewing the testimony of the experts, they felt that the difference in ambient levels would be difficult to monitor, almost impossible to monitor, insignificant, and of no harm to vegetation. The proposed wet scrubber was said to be counter to standards for all other plants, counter to technology recognized world wide, wasteful of power and chemicals, and useless in terms of environmental protection.

One writer suggested a wet scrubber be added later only if the growers' fears prove founded.

C. Comments concerning air-water-solid waste tradeoffs.

The company's proposal was argued to be the soundest balance between concerns of air, water, and sludge disposal pollution problems. The need for clean water was cited. It was cited by one writer who is a sport fisherman. The sludge disposal problem which would allegedly attend the Department's proposal was cited as reason not to support it. It was noted that the company's proposal constituted a worthy effort to meet stricter water quality standards, and that it would result in better water quality than would the Department's proposal.

D. Comments on damage to vegetation.

Many writers cited or agreed with expert opinion from the Department, the EPA, or independent people that the chance of damage to vegetation from either SO_2 or SO_2 in combination with other pollutants would be remote or nonexistent. The experts were cited as independent, impartial, and reliable. One writer reported the repeated growth of cherries, prunes, plums, apples, grapes, vegetables, and flowers on property only 4400 feet from the cell room of the plant. He reported that with only normal care and effort his crops had been of very satisfactory quality and quantity.

It was one writer's information that during the periods of orchardists' smudging, the ambient SO_2 levels rose to 400 times the concentrations that would ever be caused by the plant.

It was argued that every year seems to bring on a better crop of cherries and that damages claimed in prior years were owing in large measure to aging orchards. The many newly planted orchards were said to belie the sincerity of grower complaints of damage.

One writer reported many years of picking cherries and her findings that the quality and quantity of the crops had always been good.

E. Comments on the company's opposition in The Dalles.

Many writers evaluated the growers as a vocal minority. It was said that those opposing the Martin Marietta proposal were the same who opposed the advent of Dow Chemical operations in Dallesport and the Western Zirconium project in Washington. They were declared to be "no-growth" advocates who would always oppose anything the company does except close its doors and who opposed any type of nonagricultural development in the area.

It was lamented that much publicity had been given to a minority opposition. Some writers characterized themselves as members of the silent majority. One writer wrote because he knew public sentiment would be weighed in the decision. Another wished the Commission could poll the area to see how many residents favor the company's position. Yet another writer warned against making decisions based on the actions of pressure groups. It was the advice of a few that the Commission carefully separate fact from conjecture, innuendo, scare tactics, etc. Expert testimony was urged as of greater value than nonexpert speculation.

The dispute was called a grudge match between factions that would never agree. The growers were found unfair by one writer who cited Martin Marietta's cooperation and actual use of a power consuming irrigation system in the area. It was asked why the growers did not have the same cooperative attitude as the company. Improvements were said to be more likely in an atmosphere of encouragement and praise than in one of objection and condemnation.

F. Comments about uniqueness of The Dalles airshed.

Many writers and petitioners disagreed with contentions that The Dalles airshed was unique. It was argued that Portland's airshed, the impact area for Reynolds, was a worse airshed based on indexes for particulates and haze and that Reynolds was allowed considerably more emissions. One writer cited as fortunate a strong west wind prevailing most of the year. It was noted that the hearing on whether the area should have been designated a special problem area had covered this ground before. One writer pointed out that prior to the 1974 SPA hearings, weeks of Commission hearings had resulted in the setting of standards which should not be tightened further. A writer contended that if the standards were appropriately adopted by persons who know their business, they should be relied upon and Martin Marietta should not be required to go beyond meeting them. Many writers pointed out that the Martin Marietta proposal would not come close to violating any standards.

G. Martin Marietta's community attitude.

At least three writer-employees cited long experience with the company to support their observation that the company has always tried to meet and exceed environmental standards. It was repeatedly mentioned that the company's efforts to date had been good efforts made at considerable cost to the company.

Past efforts were said to have resulted in the most environmentally sound aluminum plant in the Northwest.

1/12/77

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

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

January 4, 1977

To: Environmental Quality Commission

From: Hearing Officer

Subject: Addendum to Martin Marietta Hearing Report

The staff would point out that financial advantage as well as water quality control was an incentive which lead to the negotiations described in the first paragraph of the hearing officer's report.

Page two - SUMMARY OF TESTIMONY - fifth paragraph on the page - third line from the bottom: Here staff emphasizes that they had concluded that the staff proposal was environmentally the best of economically feasible alternatives.

Page five: We have checked Mr. Coughlin's report to see if our quote is accurate and it appears to be.

Page twenty-five - commencing with the last paragraph: It is important to note that the 16.3% figure assumes 10% money and a ten-year life on the equipment. Were we to assume a twenty-five year life on equipment the figure would be lower. Also, were we to assume a 4% rate of depreciation, the annual cost, if depreciation were used as a component, would be less than with a 10% depreciation rate. (Mr. Lanou did not use depreciation as a component).

After the hearing, Mr. Joe Byrne of Martin Marietta offered a letter in which the EPA was said to have postulated five mechanisms for the conversion of SO_2 to sulfate of which all had the common denominator of water. He argued also that visibility impacts would be increased at high humidity rates, citing "Position Paper on Regulation of Atmospheric Sulfates," EPA, September, 1975, PB 245 760.

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ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

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

To: Environmental Quality Commission

From: Hearing Officer

Subject: Hearing Report: December 9, 1976 Continuation of Public Hearing on Proposed Air Contaminant Discharge Permit Modification for The Dalles Martin Marietta Aluminum Plant

BACKGROUND

Since early 1976 Martin Marietta and the Department have been negotiating a modification of the plant's emissions control system to enable the plant to meet upcoming water quality standards whose violation would inferrably result as a by-product of the present air contaminant emissions control equipment.

Hearings on this matter were held directly before the Commission on October 15 and November 19 of this year. This report does not attempt to cover matters then directly before the Commission except insofar as they were the subject of clarification or elaboration on December 9 before a hearing officer.

SUMMARY

The hearing was convened at 10:00 a.m. in the conference room of the Department of Fish and Wildlife, 1634 S.W. Alder Street, Portland, Oregon. The purpose of the hearing was to receive testimony on a November 29 proposal by the Department of Environmental Quality to permit Martin Marietta to install a dry scrubbing system for primary treatment only if it is followed by a wet system designed to remove 95% of the SO_2 remaining after application of the dry system. While a proposed set of permit conditions was available, Martin Marietta did not comment specifically on the proposals, presumably because Martin Marietta remains in steadfast rejection of the concept of the proposed wet scrubber from the standpoints of feasibility, economy, environmental benefits, and potential side effects of water and solid waste pollution. The only regulatory provision in contention is OAR 340-20-001 which requires highest and best practicable treatment and control even where lesser treatment and control might result in compliance with all applicable emissions limitations, ambient standards, and other numerical criteria. As was the case in previous proceedings, there seems to be a consensus between the Department and the Applicant that whatever interpretation is to be given to the disputed regulation, it lies along both environmental and economic dimensions. There remains a vast difference between the Department and the Applicant as to the appropriate balancing of these interests and as to the degree of success to be expected with known technology.

An interpretive guide suggested by Counsel for Martin Marietta was the historical guide which might be gleaned from review of correspondence and analysis resulting in the Department's agreement in early 1976 to permit Reynolds to install a dry scrubbing system at its Troutdale plant. Mr. Ragen offered these documents to the record and requested staff's interpretation of the disputed regulation in the light of the Reynolds' permit. It was the hearing officer's conclusion that the question was primarily of a legal nature involving issues of Equal Protection, Binding Precedent, etc. which might or might not make the Reynolds transaction somehow binding on the Department in its application of the regulation to the Martin Marietta plant. For this reason, it was ruled the Department's Legal Counsel should be the source of comment on the matter. Since Counsel was not present, it was decided to refer the question to Counsel for later comment.

Counsel for Martin Marietta was permitted to inquire briefly into the basis for certain conclusions in the staff report that accompanied the November 29 proposed permit.

There followed several witnesses testifying at Martin Marietta's behest who commented negatively on the Department's proposal as is reflected below. In addition, the Department had earlier received several letters from The Dalles area residents which uniformly supported the Department's proposal for reasons similar to the previously summarized mail in opposition to Martin Marietta's proposal.

Also, as will be summarized below, Counsel for the Wasco County Fruit and Produce League introduced written testimony in support of the Department's proposal of November 29.

SUMMARY OF TESTIMONY

Mr. Douglas Ragen, of attorneys for Martin Marietta, offered both question and comment. He stated the Applicant's principal inquiry to be what criteria for a dry scrubber system alone would be acceptable to the Department, criteria of prevention of deterioration, ambient air quality, and economic impact (effects on plant profitability, installation cost, operating cost, etc.). He wished to know if there were some level of detriment to the ambient air in the vicinity of the plant which the Department would consider tolerable and not require the addition of a wet scrubber after the proposed dry scrubber. It was Mr. Kowalczyk's view that the interpretation of the requirement for "highest and best practicable treatment" would preclude the setting of any minimum degradation of the environment which would be accepted without the need to evaluate options of better treatment. He added that the Department had concluded its proposal to be economically feasible and to be the best of economically feasible options. He added that he felt the proposal would minimize visibility to the greatest extent of the options discussed.

In Mr. Ragen's understanding, the decision not to require a wet scrubber of Reynolds Metals was prompted by its projected six million dollar cost. He asked if there were a specific dollar limit beyond which Martin Marietta would not be asked to go. The answer was negative. It was the hearing officer's speculation that the regulation in issue had remained couched in subjective language to be applied on a case by case basis and had not been reduced to any numerical equations for general application. Mr. Kowalczyk stated that the Department attempted to uniformly apply the rule and was availed of a policy-making Commission to assist in interpretation when appropriate.

Mr. Ragen inquired of the basis for the 95% efficiency design of the proposed wet scrubber. The answer was that Research Cottrel had indicated to Martin Marietta that such a design could be accomplished. It was added that EPA publications on SO_2 technology indicate several systems can be designed to reach that level of efficiency. Mr. Kowalczyk was unable to recall specifically but was vaguely aware that the EPA documents studied had indicated that such systems were presently either in the design stage or under construction. It was agreed that the Department should respond further on this point after research, it being Martin Marietta's position that no such system was presently available.

An issue arose as to the propriety of the Department's dismissal of water to be released to the air from the wet scrubber as being a factor in the reduction of visibility. Minimizing visibility reduction had been a criteria set forth in support of the Department's proposal.

It was asked if Mr. Kowalczyk would agree that the burden placed on Martin Marietta was greater than the burden placed on Reynolds. It was ruled that the answer to this question would best come from the Department's legal counsel. It was Mr. Ragen's position that there should be some basis for discrimination in requiring Martin Marietta whose projected SO_2 emissions are far less than Reynolds' to put on a wet scrubber when Reynolds did not have to do so.

Mr. Ragen inquired if past claims of The Dalles area growers had weighed in the Department's decision to require a wet scrubber. It was reported they had not been considered other than as reflected in testimony before the Commission on October 15 and November 19. Mr. Ragen stressed for the record that all previous claims had dealt with alleged hydrogen fluoride damage. He noted that Martin Marietta's proposal to go to dry scrubbers could be expected to make no impact on hydrogen fluoride emissions. He added that the previous claims had not been based on SO_2 emissions.

Mr. Ragen asked if the Department was of the position that based on the best available evidence, the projected SO_2 emissions from the company's proposal would not damage the orchards. Mr. Kowalczyk referred to the staff report of November 19, 1976 which concluded inter alia that increases in SO_2 emissions as a result of Martin Marietta's proposal would not "... appear to pose a danger to sensitive vegetation in the community." He stated this position to have remained unchanged.

Mr. Ragen asked what the Department would assume as the inlet concentration of SO_2 to its proposed wet scrubber, assuming 2.8% sulfur content of coke used at the plant. Mr. Kowalczyk stated he would have to answer the question in writing at a later date, noting that there were figures available and that the Research Cottrell proposal had involved assumptions of this kind.

Mr. Ragen asked what assumptions the Department was making with respect to the cost of a 70% efficient SO_2 scrubber in terms of capitalization and annual operation. It was replied that the figures used were those submitted by Martin Marietta.

Finally, Mr. Ragen offered to the record a statement of Dr. George Edmonds (offered on October 15), and a letter from the Forest Service dated in 1960 (describing a pine scale infestation condition predating the plant's existence).

Mr. Ragen suggested further review of the economic analysis submitted by EPA's Robert L. Coughlin on November 11, 1976 and offered an additional copy to the record. It was his contention that the staff had misconstrued this analysis and he called attention particularly to pages containing the following language:

Page two:

> Although Martin Marietta can afford to install a wet scrubber, the addition would impose a distinct competitive disadvantage, in that no other plant in the industry is likely to face that particular cost. No environmental benefits are ascribed to SO_2 reduction in this case, so the efficiency of the investment is most questionable. There are also adverse incentive effects to be anticipated from a policy of inhibiting a producer from adopting a more efficient abatement technology solely because of the loss of collateral reductions obtained by a prior abatement system. Such a policy should cause unwillingness to attempt abatement until acceptable treatment methods are frozen into regulation so that the discharger is protected by uniform requirements.

Pages twelve-thirteen:

> The corporation, however, is scarcely the appropriate unit to determine financial impact. It is The Dalles reduction plant that will incur the added production costs and that will have to provide the cash flow to finance whatever pollution control features are found to be necessary...

Page fifteen:

> Even if proper allowance is made for all the unfavorable factors built into the values, it is clear that addition of wet scrubbing represents a significant (10% in a good year, 20% in a mediocre year) adverse influence on profits.

Page fifteen:

> Given a return on capital -- as net profit, cash flow from depreciation would be the same in either case -- varying from 10% to 18% according to business cycle stage, the major impact of investment in the scrubber would be foregone earnings of $400,000 to $700,000 a year and the compounding effect of their partial reinvestment.

Page sixteen:

On a net cash flow basis (assuming that the plant is capitalized and performs like the average plant model), installation of wet scrubbing for SO_2 reduction would reduce return on capital invested in fixed assets by about 14% -- i.e. from 24.3% to 21.3% at the 1974 operating rate. It would also increase sharply the downward leverage on profits in bad years, because of the introduction of incremental fixed charges and relatively inelastic operating costs.

There is almost no possibility that the relative disadvantage imposed by wet scrubbing would be offset by increased prices. The plant at The Dalles contains less than 2% of domestic primary aluminum cpacity. It cannot increase prices unilaterally to offset added production costs; and general price increases would not eliminate the unfavorable cost margin imposed by scrubbing.

The situation would seem to reduce itself to issues of equity and efficiency.

From the standpoint of equity, it appears that Martin Marietta may be faced with the imposition of a continuing competitive disadvantage.

Page seventeen:

The central fact is that in the event that wet scrubbing is required, resources will be consumed and aluminum production costs increased to purchase a reduction in SO_2 concentrations that has no beneficial consequences.

The minor issue of efficiency involved in the regulatory decision is its potentially malign incentive effect.

Mr. Ragen also offered copies of the statements of Mr. Shah and Mr. Furth in the October 15 hearing for reconsideration.

It was reported that Martin Marietta still stood by the cost figures submitted to the Department on November 17, 1976 regarding costs but that further clarification would be forthcoming later in the hearing by Mr. Lanou and Mr. Gray of CH_2M/Hill. It was recalled that the Commission had several questions of an economic nature which would be addressed by Mr. Lanou.

Mr. Ragen emphasized that the record before the staff and the Commission regarding Reynolds' Troutdale plant had indicated a six million dollar cost to install an additional wet scrubber after the dry system and that the interpretation of the economic side of the "highest and best practicable treatment" rule for the Reynolds situation had resulted in the decision that six million would be too costly. He urged that the estimated four million a wet scrubber would cost Martin Marietta was on the same order of magnitude, given that the Martin Marietta plant produces considerably less aluminum.

Mr. Ragen offered excerpts from the Reynolds situation to the record.

It was suggested that the proper interpretation of the rule would require that not only air quality, but water quality and sludge disposal, be taken into account.

Mr. Ragen argued that the rule would also be limited to the requirement that only presently available equipment be required of a source. It was the contention of Martin Marietta that there was no other known aluminum plant that has a system such as the staff would require and that the staff's conclusion that a system could be designed to 95% efficiency was not supported.

Turning to the staff's conclusion that the minimum actual expected performance of an SO_2 scrubber is 70%, Mr. Ragen asserted that expected efficiency would have to be based on assumptions about the concentrations of SO_2 entering the wet scrubber. It was the understanding of Mr. Ragen that the DEQ's estimate of inlet concentrations to be expected was more than double the estimate of Martin Marietta Aluminum. It was lamented that the present proceeding had to take place without any real agreement as to what inlet concentrations should be expected.

Citing the staff's conclusion that the projected costs of an SO_2 scrubber will not cause a major damage to Martin Marietta's competitive condition, Mr. Ragen refuted this, alluding to the above quoted language from Mr. Coughlin's report.

The staff's conclusion that The Dalles is a unique air quality area was also challenged. It was contended that there were no studies of other parts of Oregon, or of other locations of aluminum plants which had been presented as evidence that The Dalles is unique. It was asked if the Commission should disregard various witnesses in The Dalles and in Portland on November 19 who had mentioned early morning aerial surveys tending to show that there are frequent inversions in Fall and Winter and that a cloud hangs over the area which is not scoured until or unless winds reach a higher than usual velocity.

Mr. Ragen conceded that there were inversions but added that of the eleven other aluminum plants in the Northwest, some also experienced inversions. Hence, inversions were said not to be unique to The Dalles area. Further, he said eight of the eleven now have or soon will have dry scrubbers without a wet facility. He noted also that there were several other SO_2 sources in the State, (around Portland, Eugene, and Medford). All of these areas were said to experience inversions. Finally, he noted that there were no comparative studies in the record to justify the staff's conclusion in this regard. It was added that a photograph of air pollution in The Dalles which was in the EPA record was dated in 1969, three years before the present electrostatic precipitators (for dust removal) were put in operation at the plant. It was stated that the photo was designed to indicate visibility reduction as well as inversion and that the Company is now required to comply with opacity limitations applicable to the aluminum industry.

Mr. Ragen pointed out that in 1974 the Commission was presented with evidence on each of the five items proffered by the Department as components of the area's uniqueness and that the Commission then turned down a bid by some of the residents of The Dalles area to have the airshed there designated a special problem area.

It was Martin Marietta's further contention that the past history of claims of adverse effects did not relate to SO_2 and should not be a factor in considering the Company's present proposal.

While conceding there was more to learn about the relationship between SO_2 and agriculture, Mr. Ragen cautioned that there was no qualified evidence to the effect that projected SO_2 levels under the Company's proposal would have any adverse effect on agriculture. He cited statements in the record that the uncontradicted evidence is that there will be no adverse effect on agricultural interests from the projected levels. He quoted from a DEQ staff report the statement that the Company's proposal would violate no standards and would not appear to pose a danger to sensitive vegetation in the community.

It was stressed that, whether the area be labeled unique or not, the acceptable ground level projections for SO_2 of both Mr. Furth and the Department had taken into account the characteristics of the area. It was added that the work of Mr. Furth had been endorsed by the Environmental Protection Agency. There was offered to the record a letter to Mr. Furth from EPA Region X endorsing his approach and stating EPA's intention to use it to instruct applicants who were having difficulty filing acceptable information.

Mr. Ragen noted that the November 19, 1976 staff report had acknowledged difficulty in determining what visibility reduction could be expected from the installation of a dry scrubber. A guess had been that visibility would be reduced by 10%. He urged that the Commission consider all of the factors of reduced visibility, including the water vapor to be expected from a wet scrubber following the dry system.

It was projected that the use of a dry scrubber alone would add 20 pounds of additional SO_2 per ton of aluminum to the air. While addition of a wet scrubber would reduce SO_2 it would add 1100 pounds of H_2O per ton of aluminum, reducing visibility even further, he said. Finally, it was noted that there are many other local sources which impair visibility.

Turning to the need to allocate the airshed wisely in the light of considerations of significant deterioration limits, Mr. Ragen predicted that later testimony by Mr. Furth would show that in the area where future industrial growth is likely to occur, the Department's proposal, not the Company's, would result in the larger amount of deterioration.

In addition to the documents above mentioned, Mr. Ragen introduced to the record a November 2, 1976 letter to the Department from Martin Marietta along with a November 3, 1976 report of Mr. Furth (Further Environmental Assessment of SO_2 Ground Level Concentrations . . .). The above-mentioned letter from the EPA endorsing Mr. Furth's approach to the modeling, a report of Dr. Earle Blodgett (detailing observations in orchards in The Dalles in 1974), a June 12, 1960 letter of R.L. Furniss of the Forestry Department (detailing a long history of pine scale infestation in The Dalles area), an April 20, 1976 letter from Doctor Clyde Hill to the Department's Jack Payne (predicting that the company's proposal would not result in SO_2 injuries to cherries), an April 21, 1976 letter to Mr. Jack Payne from Doctor O.C. Taylor (predicting no adverse effects would befall either the cherries or any other vegetation in the area unless there were either a substantial SO_2 background or significant ozone levels), and a letter of April 22, 1976 from Doctor Leonard Weinstein to Mr. Payne (concluding that even the worst case projections as to the company's proposal could not be expected to damage even the most susceptible plant receptors, let alone sweet cherries). Mr. Ragen recounted that Dr. Hill, Dr. Weinstein, and Dr. Taylor had all been arbitrators in the previous damage suits in The Dalles area.

Also added to the record were resumes and lists of accomplishments of Dr. Weinstein, Dr. Edmonds, and Mr. I. Shah. Along with these were copies of the statements given by the latter two in The Dalles on October 15. Finally, the record was resupplied with the November 17, 1976 financial information given by Martin Marietta.

Dr. Leonard Weinstein of the Boyce Thompson Institute for Plant Research, Inc. outlined an extensive and impressive array of credentials and experiences, both on his own part and on that of his Institute. Dr. Weinstein's main area of expertise is that of a plant physiologist. Dr. Weinstein reported that in his capacity as an arbitrator in the Rankin v. Harvey Aluminum litigation, he had inspected orchards, ornamental plantings, and indiginous plant life around The Dalles. He reported himself to have had considerable experience in inspecting vegetation around other aluminum plants and industrial sites. He was invited to present a review on the effects of hydrogen fluoride with other pollutants at the third international conference of plant pathology in Munich in 1978. The issue of increased SO_2, alone or in conjunction with other pollutants, was reportedly to be discussed. Dr. Weinstein addressed himself to three issues: The probable effect of SO_2 concentrations on vegetation in The Dalles after the installation of the dry scrubbing system as proposed by Martin Marietta (using projected levels of SO_2), potential interactive effects of SO_2 with airborn fluoride, and the effects of recurring or periodic exposures on plant susceptibility.

It was lamented that sweet cherries had not commonly been the subject of investigation of plant susceptibility. However, Dr. Weinstein stated one could estimate the probability of reaction by observing the reactions of other species. He conceded that this could not be done without some risk.

Recalling that in April Mr. Jack Payne of the DEQ had set out the predicted SO_2 concentrations attendant to the Martin Marietta proposal and asked him to evaluate the danger the SO_2 concentrations would pose to sweet cherries, Dr. Weinstein reported his conclusion as was set out above. He reported that the predicted concentrations were so low that accurate analysis could be a problem. A study of yield and quality of spinach and gooseberries in 1960 in Beersdorf, Germany was cited. Here the seasonal seven month average of SO_2 was 0.01 ppm. However, the results in Beersdorf included maximum 30 minute peaks of up to 1.7 ppm. This last sum Dr. Weinstein reported is more than three times greater than the worst case annual average (predicted for the Martin Marietta proposal). Sweet cherries were among plants investigated in the Beersdorf study. From 1959 to 1962, no significant effects on shoot growth, radial growth, or bowl area were found with SO_2 concentrations mentioned above. Unfortunately the sweet cherries were not measured in terms of yield. Spruce, Scotts Pine and European Larch were not affected either. The seasonal mean SO_2 concentration was higher than .2 ppm during periods when a detectable level was present. 75% of the time there was no detectable level of SO_2, leading to Dr. Weinstein's conjecture that the mean seasonal average figure of 0.01 ppm over the seven-month season was overly laden with zero figures due to the limitation of the detection devices.

In these tests injury of sweet cherries was found only when all of the following conditions held: 1) A seasonal mean of .05 ppm.; 2) 30 minute peak values of about 2.3 ppm; 3) a seasonal mean of 0.38 ppm when ambient concentration of a detectable level was present. The threshold values for injury to sweet cherries were said to have been between .02 and .083 ppm on an annual mean. For Spruce, Scotts Pine and Larch, the values thresholding injury were between .01 and .02 ppm annual mean. Dr. Weinstein reported these figures to be well below the projected concentrations for The Dalles. He noted, however, that the peak values in Beersdorf were far higher than anything projected for The Dalles. Dr. Weinstein noted that the Beersdorf study was influencial to the establishment of the U.S. secondary standard of .02 ppm, annual mean (now withdrawn).

A 1973 study by Lindzon of the Ontario Department of Environment was said to have emphasized that, while injury to plants occurred when annual means reached or exceeded .02 ppm, the injury was probably caused by short term, acute exposure. He noted the values attendant to acute plant injury near a nickel smelter in Ontario had been .7 ppm for one hour, .4 ppm for two hours, .26 ppm for four hours, and .18 ppm for eight hours.

A study by experts of TVA, EPA Corvallis, and Ontario Department of Environment had, Dr. Weinstein reported, lead to the conclusion that the acceptable limits of SO_2 concentrations in vegetated areas should be in terms of SO_2/time concentrations that, when exceeded, cause permanent adverse effects on vegetation that can be measured by economic, aesthetic, or ecologic loss. It was pointed out that most vegetation is not visibly injured by continuous concentration of .1 to .2 ppm SO_2. It was stated that long term exposure to such concentrations alone or in conjunction with other pollutants might cause injury or reduced growth. Dr. Weinstein agreed with this conclusion, based upon his experiments with some susceptible species. He reported that the study had concluded that the following concentrations, if not exceeded more than once in one growing season, would be adequate to prevent significant damage to vegetation: 1 ppm maximum for one hour, .6 ppm two hour maximum, and .4 ppm for four hours (the latter two not to exceed a maximum peak for a shorter time of 1 ppm). No annual or seasonal mean was recommended.

Dr. Weinstein recalled that the advent of the April 29 annual air pollution workshop was scheduled for Corvallis shortly after he communicated to Mr. Payne. Consequently, he reported, Mr. Payne and other Departmental officials met with him, Doctors A.C. Hill, O.C. Taylor, H.C. Jones, Kruper, Benedict, and Mr. Mandl. All of these were known to be experts to Dr. Weinstein. At that meeting, all experts agreed, Dr. Weinstein reported, that the SO_2 concentrations predicted for The Dalles area attendant to Martin Marietta's proposal would not constitute a hazard to plants.

Dr. Weinstein was unable to recall if on that occasion interaction with other pollutants such as hydrogen fluoride was discussed.

Addressing himself to a second set of numbers recently provided to him by Mr. Werner Furth of the Martin Marietta Company, he described them as a series of worst case 24-hour mean values predicted to occur from 1.5 to 4 kilometers from the plant and a series of annual mean values predicted to occur at two and four kilometers from the plant. Dr. Weinstein said these values had done nothing to affect his opinion that there will be no detrimental effects of SO_2 on plants.

Dr. Weinstein then noted that, although beneficial effects of SO_2 on plants were a possibility sometimes misused, there is a large, solid data base to support the possibility. He added that when the sulfur content of the soil is inadequate, SO_2 can help remedy the shortage of sulfur, vital to plant growth. This would occur, he cautioned, only if the concentrations were not above the threshold for injury to plants. Here Dr. Weinstein presented a list of authors and articles on this subject. It was reported that in some cases the entire sulfur requirement for plant growth had been supplied by airborn SO_2. On this information, Dr. Weinstein said it is not inconceivable that the small concentrations of SO_2 predicted to result from the Martin Marietta proposal might supply a part of the need for sulfur by vegetation, assuming a shortage of sulfur in the soils.

Dr. Weinstein addressed himself to speculation that increased SO_2 emissions from The Dalles plant might act with hydrogen fluoride gases to produce more than an additive effect on plant life. Noting that there remain unknowns, Dr. Weinstein reviewed present knowledge on the subject.

The first study on synergistic detriment to plant life from the combined presence of SO_2 and hydrogen fluoride was reportedly done by Hitchcock and co-workers at Boyce Thompson in 1960. The conclusion was that leaf injury on Gladiolus from the two pollutants acting together was additive, no greater than if each were applied separately.

In 1972 a study at Riverside, California reported a similar result for citrus.

In 1975, Mandl, one of Dr. Weinstein's colleagues at Boyce Thompson Institute, reported for the first time that a greater than additive effect could be produced by these two pollutants. This occurred with regard to leaf injury on corn and barley, but not on beans. This synergistic effect was in the form of enhancement of a symptom that was produced by SO_2 alone. Subsequent unpublished studies tended to negate interactive effects on alfalfa, pine, gladiolus, soy beans, or cotton. In sunflower, an antagonistic effect was found (less than additive). Score over ten species: Two synergistic, seven additive, one antagonistic. Turning from leaf injury to fluoride accumulation yielded the more consistent result that most species showed a decrease in fluoride accumulation where SO_2 was present with the hydrogen fluorides. This had also been found where hydrogen fluoride and ozone had been applied in a reduced number of studies.

The most frequent combination of two pollutants to be studied was reported by Dr. Weinstein to be that of SO_2 and ozone. It was reported that synergism had occurred with tobacco, corn, and several other species.

Pine, bean, and alfalfa were cited as instances where antagonistic effects had been observed. Where dose response curves were carried out for varying degrees of SO_2 in the presence of a constant amount of ozone, or vice versa, it was reported neither synergistic nor additive effects resulted. It was conjectured on this information that synergistic or antagonistic effects may occur only within certain limited ranges of the combination of the two pollutants. He negated the notion that the combination of two pollutants would always produce a synergistic detriment to plant life.

Returning to the study by Mandl which was the first to indicate synergistic damage to some species from combinations of SO_2 and hydrogen fluoride, Dr. Weinstein noted that the levels of SO_2 used by Mandl and his associates were higher than those projected for The Dalles. It was reported that .07 ppm SO_2 was used continuously for up to twenty-four hours per day for twenty-seven days. It was noted that only .035 ppm was predicted for The Dalles as a two-hour worst case maximum and .015 ppm was the predicted worst case maximum for one day.

It was added that the fluoride concentration applied by Mandl was also applied for about twenty-seven days at a concentration of about .6 ppm. Dr. Weinstein noted that this rate of concentration, about .5 micrograms per cubic meter, was extreme.

It was added that the seasonal ambient values for fluoride gases in the six arbitration stations during the late sixties had been only about 0.15 micrograms per cubic meter.

Dr. Weinstein gave low probability to the possibility that, in combination or alone, the predicted hydrogen fluoride and SO_2 concentrations for The Dalles would injure the sweet cherries. He said it had been his experience in the past that where dry control systems are substituted for wet systems there had been a marked improvement in the condition of indigenous and cultivated plants with neither evidence of any potentiating or synergistic effects from the pollutant combination **nor evidence of SO_2 injury on** susceptible receptor species, such as alfalfa, bean, blackberry, ragweed and others.

A final area of possible controversy addressed by Dr. Weinstein was the possibility that repeated exposure to low concentrations of hydrogen fluoride over the years may sensitize plants to subsequent exposure. Dr. Weinstein noted that this issue had not been the subject of a specific investigation. He stated himself to be unaware of the occurrence of this type of injury. At Boyce Thomson, it was reported, the effects of acute hydrogen fluoride exposures over a period of years on apricot, eastern white pine, Montmorency cherry, and dwarf Elberta peach gave no evidence that prior exposure in one year had sensitized the plants to subsequent exposure in the next year, or even in the same year. A 1970 study conducted in Germany involved the exposure of plants to either clean air or a subtoxic concentration of SO_2. After this, damaging concentrations of SO_2 were used. Cereal grains and larch (a spruce plant) exposed to the lower dose of SO_2 were more resistant to injury from the higher dose than were those samples exposed only to clean air. This was not true for alfalfa and mustards. The study concluded that certain plants have an adaptive capacity.

Mr. Kowalczyk informed Dr. Weinstein that his previous information had been highly weighed by the Department, leading to its conclusion that the risk of damage to orchards would be either small or nonexistent, even with the highest feared SO_2 concentrations.

Unfamiliar with the sulfur content of the soils in Wasco County, Dr. Weinstein was unable to give an opinion as to whether airborne SO_2 in less than toxic concentrations would be a benefit to pine forests and orchard growths in Wasco County. He is here understood to have said that, if a soil analysis showed the Wasco County soils deficient in sulfur, airborne SO_2 would be helpful in low enough concentrations. He explained that analysis of the plants would not be the key. The soils were said to be determinative. It was explained that when too much sulfur is absorbed by plants, they are unable to oxidize it into sulfates. Then, it resides in the cells as damaging **sulfide** or a like substance. He stated all plants can convert sulfide into sulfate and those most able to do so were probably the most resistant to damage.

Dr. Weinstein agreed with the staff's previous conclusion that there simply was not enough information on the subject of synergistic damage to sweet cherries by combinations of SO_2 and either hydrogen fluoride or ozone.

It was Mr. Ragen's information that The Dalles area growers did, in fact, fertilize with ammonium sulfate.

Dr. Weinstein explained that the experiments which assessed damage in terms of foliar injury and fluoride accumulation could not be used as indicators of reduced crop yield. He noted that some types of plants could sustain the former injuries without reduced crop yield. The time in the evolution of the crop when injury is sustained was cited as a variable. For fruits, he noted, one would obviously be most concerned with preventing injury during the pollination and early developmental stages.

Dr. Weinstein stated that he had not concluded that susceptible species near alumina reduction plants were helped by SO_2. He did say he had never observed SO_2 injury to such plants and that SO_2 had never been singled out as the culprit in crop yield reduction. This issue, he said, had always centered on fluoride injury.

Mr. Joseph L. Byrne, the environmental control manager for Martin Marietta Aluminum's northwest operations, offered testimony. Mr. Byrne depicted on a blackboard a cross-section of a pot room at the plant, representing in the center a vertical stud pot. A skirt was depicted reaching downward around the bottom of the anode. The skirt was said to capture gases and draw them off into a burner. These gases, along with similarly captured gases from fifteen cells were ducted together and drawn to the courtyard for treatment by the present primary emissions control system. It was inevitable, he said, that some of the gases intended for the primary would escape and be entrained in the ventilation air of the room. Hence, a secondary system was used to treat these latter emissions. This, Mr. Byrne reported, was done by drawing them off through a dormer in the roof where they were scrubbed and exhausted through a fan. At present, it was reported, both systems were wet systems, the primary dealing with low volume, high concentration emissions, and the secondary treating an opposite category of emissions.

The current proposal of Martin Marietta was said to be replacement of the present primary wet electrostatic precipitator with a dry scrubbing system.

He described The Dalles facility as consisting of five buildings, each approximately 1000 feet long, with eight exhaust fans. **He also described four treatment centers in the courtyard which receive the primary gases.**

Two factors, Mr. Byrne stated, had resulted in Martin Marietta's current proposal. First, the July 1, 1977 discharge limitations of the Federal Water Pollution Control Act made it necessary to step up treatment of the water returned to the river from both the primary and secondary systems, water used on a once-through basis and, in the case of the primary system, neutralized with lime before return to the river. To meet the 1977 standards, it was said, the return waters would have to be recycled, with neutralization and treatment prior to return to the river.

The second factor was what effect recycling of the treatment water would have on the quality of the emissions from the two air pollution control systems. It was reported that in September of 1974 pilot recycle systems were operational for both the primary and secondary systems. Installed in May of 1974, these pilot systems had been the subject of a Martin Marietta proposal to the Department in January of 1974.

Immediately it was discovered that the suspended solids load, primarily from the primary system, built up so rapidly in the water that it plugged the pilot recycle system. The next move, Mr. Byrne reported, was to separate the primary system from the recycle pilot system. Even recycling the lesser concentration from the secondary system alone, the recycling system reportedly destroyed itself in a matter of days. Due to the very abrasive nature of the alumina scrubbed out of the air, holes were bored in the pipes,and nozzles for the spray patterns were destroyed.

A way to get the alumina out of the recycling streams had been sought, Mr. Byrne reported, for two years without success.

Concurrently with the above events, the company was investigating dry scrubber technology being used by Alcoa and in Europe. The dry scrubber was found to have very great advantages, including its elimination of the water recycling problem. Another advantage was said to be the economical recapture of very costly raw materials. A third benefit was said to be the elimination of sludge. A dry scrubber would, in the company's estimation, eliminate some 5000 tons of sludge per year.

There ensued talks with vendors in 1972, a trip to visit European plants employing dry scrubbers in 1973, and further talks and investigations on into 1975.

To Mr. Byrne's knowledge, the only northwest aluminum plant that had neither changed to a dry scrubber nor elected to do so in the near future was the Longview plant where a unique cryolite recovery system followed the wet scrubbers, leading to a considerable economic advantage, the manufacture of a high quality, readily marketable cryolite.

It was Mr. Byrne's recollection that talks with water quality control personnel at both the Department and the EPA had resulted in the consensus that a fine solution to the problem of meeting 1977 standards would be to remove 85% of the current stream discharge by simply changing over to a dry scrubber for the primary control system, while still maintaining excellent air pollution control. This would enable the secondary wet system to keep on using once-through river water due to the low concentrations of pollution in its discharge.

Consequently, Mr. Byrne reported, application was made to the Department in January of 1976. Under the National Pollution Discharge Elimination System's federal guidelines, that application was approved by the Department and, in May of 1976, forwarded to the EPA administrator for his approval along with the Director's finding that "It is also apparent that the best practicable technology is that proposed by the company."

Following that action by the Department, notice of construction of a dry system was submitted to the Department, on May 3, 1976, within one week before the further submission of an application for modification of the company's air contaminant discharge permit. The requirement to modify the permit was based upon projected increases in SO_2 air emissions due to the change from a wet to a dry primary scrubber.

It was Mr. Byrne's information that the dry system would capture about 60% of the SO_2 inlet and return that 60% back to the cell with the alumina. The principle of the dry scrubber was said to be the introduction of alumina into the gas stream. The alumina, in turn, chemically reacts with and absorbs the fluoride in the gas stream, also picking up (without chemical interaction) SO_2. The resulting substances are recaptured in a baghouse with the essential aluminum fluoride being returned to the cell for reuse in the reduction process.

In Mr. Byrne's, theory, the surface bound SO_2 returned to the cell would be released once again and would be discharged into the secondary treatment system. This theory was based upon the reasoning that the addition of the alumina takes place essentially outside the above-described skirt (which captures emissions for the primary system). Also, the data taken from a Swedish plant similar to Martin Marietta's employing a dry scrubber indicated a 60% capture of SO_2 on the alumina. Finally, comparisons of ore from a similar plant with a dry scrubber indicated that ore run through the dry scrubber process, when subjected to the same eight hour time-temperature conditions to be expected upon its heating on the crust of the cell, released at least 85% of the SO_2 gathered in the scrubbing process.

Further, conversations with the operators of a similar plant in this country which had recently changed over to a dry system had indicated that they feel that essentially all the SO_2 which is captured in the dry system is introduced to the secondary system.

As a result of applying the above theory, the company projected that a dry scrubber would increase the SO_2 emissions from the plant from about 12.5 to 25 pounds per ton of aluminum produced and increase the concentrations of the emissions from about 70 ppm with the current system to about 90 ppm from the proposed dry scrubber. The concentrations from the secondary system were predicted to go from .4 ppm to 1.3 ppm.

The Department, Mr. Byrne stated, had not accepted the company's data on the distribution of SO_2 emissions between the primary and secondary systems for reasons not entirely clear to him. Mr. Byrne did not have in his immediate grasp information as to what percentage of the plant-wide 25 pounds of SO_2 per ton of aluminum the company expected would be emitted through the secondary system. He agreed to obtain those figures.

Mr. Kowalczyk noted that the staff report had evaluated the air quality impact based both upon its own assumptions and upon the company's assumptions as to the distribution of SO_2 emissions over the two treatment systems. He added that this was done because the Department simply did not feel that the company had sufficiently justified its assumptions.

Mr. Byrne noted that, if the Department's assumptions and not the company's were correct, the plant-wide emissions of SO_2 would rise to 32.8 pounds per ton of aluminum produced. The concentrations in the primary system emissions would go up from 70 ppm to 230 ppm. The concentrations from the secondary system would remain constant under the Department's assumptions.

Turning to the possible future increase in the sulfur content of coke, Mr. Byrne explained that the source of the SO_2 was oxidation of sulfur in the coke which, along with pitch, was consumed in the anode. It was the report of the company's coke supplier that, upon the advent of Northslope crude in the refinery in the Los Angeles basin, the sulfur content of coke could be expected to rise to about 2.8%. Mr. Byrne reported that there was some question as to whether the authorities would ever let tankers ship the crude into the Los Angeles area. A discussion by Mr. Furth of the impact of higher sulfur bearing coke was promised for later.

Addressing the Department's proposal to follow the proposed dry scrubber with a wet scrubber, Mr. Byrne predicted this would create a new waste water problem and a sludge disposal problem, restoring the problems the dry system would be intended to eliminate, and destroying the economic advantages the company seeks to gain.

Discussing the issues of ventilation and visibility, Mr. Byrne drew upon his twenty-seven years of work in the environmental field and his experiences in California, Idaho, Washington, Utah, and Oregon in offering his opinion that The Dalles area is neither better nor worse than most of the areas he had experienced. He thought The Dalles certainly no worse than the Salt Lake valley in Utah, the similarly sized Heber valley in Utah, the Southbay in San Francisco, the Delta area of Sacramento, and the Sauvies Island-Vancouver area of Clark County.

Mr. Byrne cited the scattering of light and simple obscuration as two components of visibility reduction. He argued that there were many parameters which must be explored before drawing much of a conclusion about visibility. He disagreed with the staff that any conclusions on present information could be drawn about visibility. (The Department had conjectured an impairment by 10% flowing from the company's proposal).

Mr. Kowalczyk noted that the Department's proposed SO_2 emission limits were based on the company's assumptions as to how the SO_2 would be distributed between the primary and secondary systems. These limits were said to be "worst case."

Mr. Byrne informed the hearing officer that the company's negotiations with vendors for the dry system had ever been predicated on the condition that the system would have to be designed to accommodate an additional system if, for whatever reason, the retrofit of one became necessary. This would leave open the option of later installing the Department's proposed wet system as well as any other options that new technology might dictate.

Mr. I.S. Shah addressed the hearing with an impressive list of credentials in the area of air pollution control, especially in the area of inventing, designing, and installing flue gas desulfurization devices.

Mr. Shah stated that present U.S. technology in SO_2 removal was developing exclusively in the treatment of flue gases from power plants. He submitted a list of flue gas desulfurization systems in operation as of July 1976.

Of this list, due to the sulfur content of the coal used in them, Mr. Shah found that the following systems were useful for analogy to Martin Marietta's problem of desulfurization.

1) The Arizona Public Service Cholla number 1 plant whose Research Cottrel Limestone Scrubbing system was averaging 58.5% efficiency in desulfurization with the plant's use of .44-1.0% sulfur coal.

2) The Montana Power Company Colstrip Number 1 plant whose Combustion Equipment Associates lime/alkaline flyash scrubbing system was averaging 60% efficiency in SO_2 removal with the plant's use of 0.8% sulfur coal.

3) The Nevada Power Company Reid Gardner Number 1 station whose Combustion Equipment Associates sodium carbonate scrubbing system was achieving 85% efficiency in SO_2 removal with the plant's use of 0.5-2.0% sulfur coal.

4) The Nevada Power Company Reid Gardner Number 2 station whose Combustion Equipment Associates sodium carbonate scrubbing system was removing SO_2 with 85% efficiency with plant use of 0.5-1.0% sulfur coal.

5) The Northern States Power Company Sherburne Number 1 plant whose Combustion Engineering limestone scrubbing system was guaranteed to remove SO_2 at 50% efficiency with the use of 0.8% sulfur coal.

To Mr. Shah's knowledge, no aluminum plants had ever installed or been required to install SO_2 removal systems. He stated that the need for SO_2 controls is not a feature of standard emissions controls for primary aluminum plants. It was noted that the emissions of SO_2 are very very low, not generally harmful **and hence not restricted by regulations.**

It was Mr. Shah's opinion that the reduction in SO_2 concentrations would have no beneficial effects. He recalled that the wet ESP system in place at The Dalles had been installed for dust collection and only coincidentally did the reactive dust remove some SO_2 from the flue gas. This had not been a regulatory requirement. Mr. Shah stated that to require Martin Marietta now to install SO_2 removal equipment were to penalize the company for having prematurely installed efficient equipment. He echoed Mr. Coughlin's statement in an economic analysis to the Department that if the system was to be required, Martin Marietta would have been better off to have resisted pollution controls until the acceptable methods were frozen into regulation.

Mr. Shah added that Martin Marietta was the first and the only aluminum facility asked by the Department to install an SO_2 removal system.

Further, Mr. Shah argued that the concentration of SO_2 in the flue gas which would be emitted from the proposed dry scrubber would be low, ranging between 90 and 126 ppm. These levels, Mr. Shah urged, would be below the levels detectable by the sense of smell, well below state and federal standards, and apparently nondangerous to vegetation.

He added that the maximum concentrations in the orchards would be only 15% of that allowable under the State's air quality standards.

Referring to the Department's November 29, 1976 staff report, Mr. Shah took issue with the conclusion that a wet SO_2 scrubber with a collection efficiency of up to 95% could be designed for Martin Marietta's proposed primary control system. Mr. Shah found this conclusion invalid and without support.

Mr. Shah conceded that one could design a system that would remove 100% of the SO_2 by placing several units in a series. He noted, however, that this might cost from 25 to 40 million dollars. He stressed that here we should be looking at the practical. He was of the belief that no one to date either had or was planning to design a 95% efficient system for concentrations as low as those to be expected from Martin Marietta's dry scrubber.

It was argued that no plant or facility in the county was asked to design for 95% efficiency without considering the inlet concentrations of SO_2.

It was Mr. Shah's contention that a letter from EPA dated November 17, 1976 made reference both to the Nevada Power Company's Reid Gardner facility operating at less than 85% efficiency (a system designed and installed by Mr. Shah) and a pilot scrubber at Allen Wood Steel Company in Pennsylvania where 50% efficiency was being attained. Based upon these stations, Mr. Shah found it inappropriate for the Department to require the design and installation of a 95% efficient scrubber at The Dalles.

Mr. Shah found it mistaken for the Department to ask for a 95% efficiency design simply because a vendor says it can be designed. Mr. Shah said he himself could design it, but at what cost? Secondly, he asked rhetorically if it were necessary. Rhetorically asked also was why only Martin Marietta of all the aluminum companies in the country was being asked to design a 95% efficient system when there would accrue no environmental benefit from it.

Mr. Shah was also curious as to the proposed requirement that a 95% design criterion should be set for a system whose performance criterion would be 70%.

Mr. Shah deemed the Department's proposed system a waste of energy, a waste of money, unnecessary to the environment, and potentially causing of new water pollution and solid waste problems. These water and land pollution problems, he warned, might add up to another two to four million dollars in costs.

At this point Mr. Shah reminded us of the Department's statements and those of the Environmental Protection Agency's regional economist which have been mentioned above. They were statements regarding the apparent lack of danger to vegetation, the proposal's obvious conformity with state and federal standards and the issue of imposing a requirement on Martin Marietta which was unique to the industry and would cause a distinct competitive disadvantage. He described the Department's proposal as punative in its treatment of the beneficial side effects of previous abatement efforts.

Given his rejection of the 95% design criterion as impractical, Mr. Kowalczyk inquired of Mr. Shah what percentage would be practical. Mr. Shah noted that the Nevada power station, with 300 ppm to 600 ppm coming in, was designed to remove 85% or less SO_2 at the 300 ppm level. This was said to be a unique situation wherein the scrubber made use of sodium alkali, leading to a solid waste problem which was solved only due to the dry, high temperature climate. Solar evaporation ponds were used to discharge the bleed stream from the scrubber system. Secondly, Mr. Shah reported, the two to two and a half year period of operation for the plant had been hampered by inavailability of alkali. To answer Mr. Kowalczyk's question, Mr. Shah steadfastly insisted that it was not practical to ask Martin Marietta to do more than any of the others in the industry were doing.

In response to Mr. Kowalczyk's inquiry on the subject of the Research Cottrel conclusion that a 95% efficiency design wet scrubber could be installed for three to four million dollars, Mr. Shah acknowledged that Research Cottrell was a reputable firm in the area of pollution control. He added, however, that their primary area had been that of dry scrubbers; that their expertise in wet scrubber technology had been gained only over the last few years; and that they had sold, to his knowledge, no systems involving the engineering involved in their conclusion. He added further that, if Research Cottrell could deliver as indicated, they were now the best in the field.

In such a pass, he said, it becomes difficult to believe that Research Cottrel has not sold one such system.

Mr. Ragen added that, to-date, despite their request for such, Martin Marietta had not received a guaranteed bid from Research Cottrel to build such a system.

Mr. Shah stated that Research Cottrel had but one operating system, the Arizona system. He said they'd been given a bid on a second system for the same company. It was asked if Research Cottrell should not offer to design to 95% efficiency if they had the ability to do so for the Arizona firm. Mr. Shah was unable to say what the present Arizona Power System, operating at 58% efficiency, had been designed to do. He argued, however, that the best service to a client to be given by a vendor was to design a system to operate only at what is required.

It was Mr. Shah's information that, except for Nevada Power, all of the west coast power plants had been asked to design and install scrubbers attaining about 60% efficiency so as to reduce the output of SO_2 to about 300 ppm. He stated the Nevada system to be unique in that no other system had used that technology to date.

Mr. Shah described the pulp and paper industry, for whom SO_2 recovery, (unlike for the aluminum industry) was an economic advantage, as an area where SO_2 recovery would be accomplished with vigor while H_2S recovery (economically useless) would lag. He argued that each industry would strive to recover that which it found economically advantageous. It was added that even though there presently is technology to remove 99.9% of flue gas SO_2, the pulp and paper industry won't do it because it is too expensive.

Asked to describe the predicted solid waste and water pollution control problems that might follow the Department's proposal, Mr. Shah stated that he would recommend for the wet scrubber the use of sodium as an alkali, either sodium hydroxide or soda ash. In such an event, sodium **sulfide** and sodium **bisulfide** would flow from the scrubber system in the return water. There would then be chemical oxygen demand and dissolved solids of a type unacceptable for water quality. The land disposal options were said to be very limited. It was reported very little could be done except with the use of solar evaporation systems as was done by Nevada Power Company. It was further stated that with a lime and limestone system, the water would be laden with calcium **sulfide,** calcium sulfate and a lot of other impurities not normally picked up by a dry system. He cited a case where lowered SO_2 emissions were wanted and achieved only to leave everyone worrying about the mercury, arsenic, and calcium sulfates going into the water.

Mr. Werner Furth of Martin Marietta addressed himself to the modelling results applied to the proposal of Martin Marietta. Mr. Furth noted that two sets of assessments had been presented to the Department at the Department's request. He dealt primarily with the second set of assessments which addressed themselves to comparisons between a lone dry scrubber as proposed by his company and a wet scrubber following the dry scrubber and operating at 70% efficiency.

It was emphasized that in both sets of assessments several different methods, such as the standard transport approach, were taken into consideration to ascertain various parameters of pollution. This included the increment toward deterioration, the maximum ground levels to be expected, and so forth. Mr. Furth once again stressed that a fundamental difference between the dry scrubber alone and the dry scrubber-wet scrubber configuration proposed by the Department would be the plume.

Included also were so-called "nonstandard" modelling techniques which account for conditions of stagnation which may exist in The Dalles. Mr. Furth reminded us that his first set of assessments involving the various techniques had been endorsed by the EPA to the extent that their use was considered in order for permit applicants in similar situations who had difficulty making proper assessments.

Mr. Furth again stressed that both the generally accepted Briggs Plume Rise formula and other formulas universally indicated that, no matter what set of meteorological data was given, a hot plume will tend to rise higher than a cool plume. Mr. Furth stressed the relevancy of this difference in that his information was that a dry scrubber alone would emit a hot plume. On the other hand, measurement of the existing wet scrubber's plume indicated its emission of a plume only a few degrees warmer than the normal ambient air.

(Chart Number Two which is appended hereto as Appendix A was offered both on October 15 and December 9 to illustrate the differences between the hot and cool plume rise. Note that the labelling on the chart of the hot and cool plumes is mistaken and should be interchanged.)

Mr. Furth stressed that the principles which argue that a hot plume will rise higher than a cool plume apply not only generally but to stagnation conditions as well.

It was reported that both **the Department and Martin Marietta agree** that either the use of a dry scrubber on the primary alone or a dry scrubber followed by a 70% **efficient wet scrubber will result in the violation of** no federal air quality standards, **neither ambient standards nor increment** limitations imposed by the prevention of significant deterioration regulations.

Further, Mr. Furth conceded that, at a sufficiently long distance from the plant, the ground level concentrations of SO_2 would be reduced with the addition of a 70% wet scrubber.

Mr. Furth turned to Charts 4a and 4b of our Appendix A and again explained the differences in the company's and the Department's assumptions as to the amount of SO_2 which would be distributed to the wet secondary system after going through the dry SO_2 scrubber as opposed to the amount that would escape through the dry scrubber and enter the Department's proposed wet scrubber. The above charts show the configuration of the plant's control system at present and as proposed. Also, pages 2 and 3 of Martin Marietta's "Further Environmental Assessment..." show figures illustrating the difference in emissions to be expected depending upon whose assumptions are accepted. That document is made Appendix B to this report.

Mr. Furth referred to charts 5a, 5b, and 5c which are part of our Appendix A. Charts 5a and 5b illustrate by percentages and actual ug/m^3 figures, the amount of allowable emissions (in terms of both the ambient standards and the prevention of significant deterioration limits) to be expected at maximum ground level concentration points and at the monitoring station 2.75 kilometers south-southwest of the plant. These figures are given for four cases: 1) the present system, 2) the proposed dry primary, 3) the Department's proposal working at 50% efficiency, and 4) the Department's proposal working at 70% efficiency. The present system uses 2% sulfur content coke. The proposed systems were analyzed assuming the use of 2.8% sulfur coke.

What Mr. Furth stressed heavily here was that in every case, the concentrations he had projected would be less with a dry system only than with the Department's dry-wet scrubbing proposal, even if it were operating at 70% efficiency. It was Mr. Furth's understanding that the Department had used these figures and, assuming the correctness of Martin Marietta's theory as to the distribution of the SO_2 between the primary and secondary control configurations, would agree with the figures.

Mr. Furth stated that his calculations indicated that only after one travels four kilometers or more from the plant site does the Department's proposed after-fit of a wet scrubber cease to result in poorer air quality along the parameters of ground level concentration and significant deterioration.

Also, Mr. Furth contended, while there were differences between the company and the Department, it was generally apparent that at the distances greater than four kilometers, the distinction between the dry and the dry-wet scrubber configuration were meaningless in that the concentrations in both cases were extremely low and the differences between the two levels even lower, so as to be practically indiscernible.

Mr. Furth then noted that, as is set forth in chart 5c of what we have labelled Appendix A, the Department's proposal, if perchance it resulted in only 50% efficiency and if the Department's assumptions about the distribution of the SO_2 over the two different emissions control configurations were correct, would exceed the twenty-four hour maximum ambient standard and the twenty-four hour PSD increment. (See the figures with the asterisks as compared to figures at the bottom of their respective columns on chart 5c). (2.8% sulfur coke was assumed.

In response to Mr. Kowalczyk's question, Mr. Furth estimated that, given a hot plume-cool plume comparison, unless 100% of the SO_2 was removed from the cool plume, wherever the amount of SO_2 in each plume was the same, there would always be some point at which the ground level concentrations for the cool plume would be worse.

Mr. Furth said he had not done calculations for percentages of efficiency of the proposed dry-wet system for other than the 70% and 50% figures offered. He felt that Mr. Kowalczyk might have made a mistake in one of his calculations which assumed 95% efficiency. He noted also that even if the efficiency figure were 100%, under the assumptions of the company about the amount of SO_2 that would be diverted to the roof monitor and out the secondary system, there would still be about a 20% to 30% increase in the 24-hour average.

Answering further inquiry, Mr. Furth stated that his assessments had included so-called "method c" to address the behavior of the pollutant during stagnation periods. Insofar as the comparison between a hot and cold plume was concerned, he felt that no one, including himself, knew enough about the situation to compare them. It was his supposition that there would be room for differences of opinion but that the two kinds of plumes might operate almost equally under stagnation. He added, however, that, in his assessment, a transport condition of approximately seven miles per hour, which was the basis of the above-mentioned charts, would probably address itself to more serious ground level conditions in the orchards than would occur under a stagnation condition.

It was explained that it would take about six months after startup with a dry scrubber only for the operators to learn whose assumptions were correct with regard to the amount of SO_2 that would be captured on the aluminum fluoride and returned to the secondary control system.

In addition, Mr. Byrne and Mr. Furth agreed that there was no instrumentation that could measure the differences in the ambient air well enough to learn whether the Department's or the company's projections were the more accurate.

Mr. Frank R. Lanou gave testimony, explaining that he and Mr. David Gray who helped prepare the economic analyses he offered were economic consultants with the firm of CH_2M/Hill and worked in Seattle for the firm.

Mr. Lanou gave testimony which was presented in writing and is here appended as Appendix C. To summarize briefly, Mr. Lanou and Mr. Gray had taken figures of Mr. Peterson (said to be more inclusive than those of Mr. Coughlin because of costs for secondary treatment omitted by the latter) which were said, in their overall economic impact, to be insignificantly different from those of Mr. Coughlin. Using the figures, cost analyses of two different kinds (present value analysis and average annual cost) were performed on three different alternatives: Alternative One was closest to the present system at the plant, **to retain the present systems with the** additional recycle of both primary and secondary scrubber water.

Parenthetically, it appears from Tables 2 and 3 of Mr. Lanou's report (Appendix C) that this system, due to the addition of recycling equipment to the secondary system also, would exceed the capital outlay of alternative numbered six by 479 thousand in additional costs and would cost 356 thousand per year more to operate. Either system would still cost well over a million per year to operate.

The second alternative is not unlike the alternative which Martin Marietta wishes. The difference as we understand it would be the installation of recycling equipment for the secondary system's scrubber water (now used on a once-through basis).

Parenthetically again, it appears from Tables 2 and 3 of Mr. Lanou's report that this system, due to the addition of recycling equipment to the secondary system also, would exceed the capital outlay of Martin Marietta's preferred proposal by 810 thousand dollars in capital outlay and would cost an additional 357 thousand dollars per year to operate. Here there is a significant change in yearly operating cost due to an increase of almost 50% between **case four and case two. It is unapparent why the capital** outlay estimated for equipment to recycle secondary system scrubber water is more expensive here than with case numbered 1. It is possible that since case one would require the equipment to recycle the primary scrubber water also, joint use of some equipment would make recycling of the secondary water cheaper than if equipment were installed, as in case two, to handle secondary scrubber water alone. It is also possible that Martin Marietta assumes that use of a dry scrubber will return more SO_2 to the secondary system than occurs with the wet WSP primary, rendering it more expensive to purchase and install recycling equipment adequate for the secondary system.

Finally, the third alternative analyzed by Mr. Lanou is not unlike the alternative the Department proposed. The only exception we can ascertain from the record is that the employment of alternative numbered 5 is cheaper by the costs of both initial capital expenditure and yearly operation. The former is a difference of 893 thousand and the latter is a difference of 473 thousand (again we employ Table 3 of Appendix C -- averaging those costs that were **arranged as we must guess was done by Mr. Lanou and** Company). Here again, recycle of secondary scrubber water poses the difference.

At this juncture we interrupt to speculate on the use of the three alternatives (4, 5 and 6) which were analyzed by Mr. Peterson and not by Mr. Lanou. We do so for the reason that the two analyses do not dovetail without some interpolation. A second reason is that on November 19 the Commission, through its members Somers and Richards, expressed interest in the return on investment (capitalization rate) of the alternatives. A third reason is Martin Marietta's expense and time in contributing Mr. Lanou's viewpoint which, fortunately or unfortunately, is an analysis which appears to lend itself to the interests of the Commission while not focused on the Department's apparent assumption that the best air-water-solid waste tradeoffs involve a variance to the June 1977 federal water quality standards by the EPA whose mention was entered to the record only cursorily. Attendant to this variance would be the possibility that the recycling of scrubber water from the secondary (roof dormer) system would not be necessary.

A final reason is that a report such as this on such a complex incomplete record can serve as a focal point to all concerned and enable them to isolate and address the hiata which, through lack of expertise or plain oversight, are visited upon the uninitiated (despite the gallant efforts of both the Department and the company to make both their viewpoints and misunderstandings with their opposition known). It might be added that a paramount concern is that these proceedings grasp that which might later prove decisive only after costly, formal, grueling litigation.

By the use of basic textbook tables and inferences permitted by the figures of Mr. Lanou, we have deduced an analysis of the last three alternatives which we infer would have been his result were he asked to do such analysis. The figures are as follows:

	4. Dry Scrub	5. Dry + Wet	6. Wet ESP
	No secondary recycle in any of these cases (thousands of dollars)		
Raw Costs:			
Capital cost	$ 6,166	9,670	512
Cost of operations	411	909	1,187
Chemicals recovery	(1,091)	(1,091)	-0-
Total operating cost	(680)	(182)	1,187

	4. Dry Scrub	5. Dry + Wet	6. Wet ESP
	No secondary recycle in any of these cases		
Present value of capital and operating costs:			
Initial year	6,166	9,670	512
10-year operation	(4,179)	(1,118)	7,294
Total	1,987	8,552	7,806
Average annual cost:			
Dept. service	1,004	1,574	83
Operating cost	(680)	(182)	1,187
Total	324	1,392	1,270

We make the same assumptions above that were made as footnoted in the first table of Mr. Lanou's report.

While our figures are roughly calculated here, it can be seen that in terms of both present value analysis and average annual cost, the three alternatives above parallel Mr. Lanou's examples, each costing somewhat less than its counterpart which includes recycle of secondary scrubber water. Since at least one of the options discussed must be implemented if the plant is to meet environmental standards, it seems fair to use the cheapest available alternative to determine the attractions of the other alternatives as investment opportunities.

If the necessary variance is not obtained, recycle of the secondary scrubber water must be done in any case. By Mr. Lanou's reasoning the Department's suggested configuration of a wet after a dry scrubber remains the least attractive option to the company if we accept the assumption of a ten-year life of the system. Mr. Lanou took some pains to explain to the undersigned layman the significance of present value analysis. If he is understood correctly, it is the initial capital outlay for the Department's proposal which tends to put it in the losing column. This is because the company could presumably buy the cheaper option and invest the difference at 10% today. The savings in operating costs under the Department's proposal cannot be invested until realized over successive tomorrows. Hence, their present value is less, dollar for dollar, than the extra cash in hand which would be left to the company.

Assuming a steady rate of return on investment, it is not until the total yearly operating profit (recovered materials minus operating costs) reaches about 16.3% of the initial investment that an investment in equipment to operate for ten years begins to break even. None of the six cases considered appears to have this attribute.

Because Mr. Peterson's report indicates internal planning for equipment with a 25-year life, we have determined that if the system were to operate for 25 years the retention of the present wet ESP would have a present cost of over eleven million while the Department's proposal would cost slightly over eight million (again assuming a 10% cost of money). The company's proposal, however, would actually pay for itself and be worth about six thousand dollars.

The record does not clearly show whether the cost figures for the Department's preferred alternative and for the options involving retention of the present wet ESP include solid waste disposal equipment.

In response to inquiry about available tax credits, Mr. Lanou explained that the economic analysis had assumed a tax rate of 48% for the company. This overstatement of taxes (the company actually pays at a rate of 40-42 percent) would, in Mr. Lanou's judgment, more than compensate for the omitted effects of any available pollution control tax savings.

Quoting some of the language from Mr. Coughlin's report, Mr. Lanou went on to agree with Mr. Coughlin that the Department's proposal would constitute a misallocation of resources in that no measurable environmental benefits would be realized in return for the additional money spent.

Mr. Lanou agreed further that the company, under the Department's proposal, would suffer a distinct competitive disadvantage other companies in the industry do not share. Further, Mr. Lanou noted that such a disadvantage would result in curtailment of operations at The Dalles plant, rather than the Goldendale plant, in times of low production. Mr. Lanou estimated that in 1973 cutbacks would have been 75% greater and in 1975, they would have been 55% greater. (Assuming that the Goldendale plant were allowed to install the dry scrubber without a wet scrubber following it). Also, Mr. Lanou agreed with Mr. Coughlin that the Department's proposal would penalize earlier attempts by the company to use optimal abatement techniques.

Mr. Lanou cited figures indicating a volatile profit rate for Martin Marietta, ranging from a low of 1.1% to a high of 16.9% since 1969. Based on this, he took exception to Mr. Coughlin's conclusion that the nonproductive costs of the Department's proposal could be absorbed by Martin Marietta without "major damage to its competitive condition."

As is demonstrated in Table 4 of Appendix C, Mr. Lanou concluded that, assuming a tax rate of 48% and a profit rate of 10% of shareholder's equity, the additional costs of options numbered one and three over option two would be 16 and 21 percent of net income respectively.

Offered for the record after the hearing were some nine pictures which, in slide form, were before the Commission on October 15 as identified by Dr. Edmunds in conjunction with his testimony identifying the cause of certain tree damage in The Dalles area to be pine scale infestation which in some cases predates the aluminum plant.

Mr. Arden Shenker an attorney representing the Wasco County Fruit and Produce League, offered written testimony to the record in support of the staff's proposal of November 29. In particular, Mr. Shenker contended that the 95% efficiency design criterion proposed by the Department for the wet scrubber was reasonable and supported by the record. He further contended that the Department's findings with respect to the particular problems in The Dalles airshed were accurate and supported by the present record as well as those of many previous proceedings.

It was urged that the 95% efficiency level should be made a goal of operation as well as a design criterion.

Arguing that the polluter, not the victims, should subsidize the cost of researching to discover the effects of pollution, Mr. Shenker proposed the following wording as part of Condition 6 to the air contamination discharge permit:

"The permittee shall cooperate with the coordinated work of the Department of Environmental Quality, the United States Environmental Protection Agency, the Wasco County Fruit and Produce League, and the Oregon State University Experiment Station at Hood River, Oregon, for such further research monitoring and testing as reasonably is necessary to conduct the research, perform the tests and make the determinations of the effects of the effluents and emissions generated by the permittee into the environment and atmosphere. The Department of Environmental Quality, not later than March 31, 1977, shall submit a program to effectuate the purposes of this condition, which shall be reviewed by the permittee, the United States Environmental Protection Agency, Oregon State University and the Wasco County Fruit and Produce League before the approval of such program by the Department."

Mr. Shenker pointed out that the public comment on the proposed permit would indicate that all those offering comment as residents of The Dalles area had indicated dissatisfaction with the present levels of pollution in the air due to Martin Marietta.

Mr. Shenker contended that the word "distinct" as used by Mr. Coughlin in his report did not mean **"significant," that the general conclusion of** Mr. Coughlin's report was that Martin Marietta, due to its diversified operations, **could bear the slight economic impact posed by the Department,** and that Martin Marietta was unique or distinct only in the sense that they were being asked to bear the cost of a new pollution control system which would save them money.

Mr. Shenker wished the record to show clearly that Dr. Edmunds had offered testimony in the matters of Wilson J. Meyer, et ux v. Harvey Aluminum et al (Hood River Circuit Court in 1970 and again in 1973) and Renken et al v. Harvey Aluminum (Federal District Court for Oregon) and that, despite his testimony to the effect that pine tree damage was owing to other causes, the triers of fact in both cases found the company liable.

In response to testimony concerning flue gas desulfurization in the utility industry, Mr. Shenker pointed out that the National Academy of Engineers accept 90% control as a criterion of system approval and that the controlled system at Arizona's Cholla plant operates at a consistent rate of 90% reliability and over 95% removal. (It is the average between this and another uncontrolled system which results in the plant's 58% efficiency average). Mr. Shenker reported that the industry now regards 70% efficiency such as that required for a new plant in Colstrip, Montana, to be "duck soup."

Mr. Shenker urged the Commission to consider Martin Marietta's admission that under the company proposal there will at certain times be more SO_2 in the air starting at four kilometers from the plant. He noted that this is right in the middle of the orchard country. He argued further that lessened levels of pollutants would be an environmental benefit per se despite the company's insistence that the Department's proposal would result in no environmental benefits.

Mr. Shenker urged the Commission not to permit Martin Marietta to degrade either land or water as a trade-off for air pollution abatement.

Finally, Mr. Shenker argued that a rigid, unbending uniformity in the administration of the law requiring highest and best practical treatment and control was not intended or required by the legislature or the rule itself. It was argued that, despite the company's insistence that objective criteria be used, the company's own evidence was merely the subjective estimation of an expert that no unreasonable risks would be involved in the company's proposal.

Apparent Issues to be Resolved

1. We are unsure of just how and why the company would not gain from a pollution control facility taxcredit more than the 6 to 8% overstatement of tax savings reflected in Table 4 of the CH_2M/Hill report.

   Perhaps it is simply the case that in any given year none of the company's tax bills from the state or county (income, excise, or ad valorem) are large enough to make a difference.

2. Also, it is unapparent whether there are presently any outstanding pollution control facility certificates whose abandonment would be a significant component of the cost of any alternatives contemplating existing equipment.

3. Martin Marietta is confronted with a possible expenditure of 23 million dollars to replace the present secondary wet system (assuming that meeting the water quality standards will require recycle of scrubbing water). Such an expenditure, if it is potentially the subject of a pollution control facility certificate, might mean that it would take the company so long to recover its tax benefits on all outstanding certificates that tax benefits for the alternatives here in issue are a negligible aspect of the cost evaluation.

4. The degree to which Reynolds incurred expenses in meeting Departmental demands would seem to be a barometer which should be applied only if it appears that, given the prevailing meteorological conditions at the two

sites, the similarities of the plant processes requiring controls, the type and degree of local pollution problems to be addressed, and the options available for each source, there is clearly a valid analogy to be drawn. For example, it appears that one of Reynold's options involved installation of a tall stack to increase inversion. The use of a tall stack by Martin Marietta appears not even to have been considered a feasible option.

5. There is at least to the undersigned some ambivolence in the record regarding the economic impacts of water quality and solid waste problems which might attend some of the options discussed and not others. For example, Mr. Shah testified (Tp67) that a two to four million dollar solid waste problem might be the result of the Department's proposal because of the unacceptable nature of neutralized ingredients from the proposed wet scrubber water (unacceptable from a water quality standpoint in terms of oxygen demand and dissolved solids.) This amount of money is on an order of magnitude not to be overlooked in "costing out" the alternatives.

6. It is apparent that the Department has no iron clad guidelines which would place dollars in one column and increments of pollution in another. It is probably correct to assume that as a case by case matter, the Department/Commission must (and perhaps should) use a global approach to interpreting the "highest and best practicable" rule, weeding out clearly unreasonable demands and using history and judgment to choose subjectively from the remaining options. However, while there have been expert opinions discounting the risk to vegetation, there has been much lay testimony by those who have stayed in their homes with doors and windows closed and those who have observed irritation to the eyes, respiratory ailments, etc. There has been little, if any, expert testimony regarding the health effects (if any there would be) to be expected from the company's proposal. This may tend to leave the Commission in an even more difficult situation than is presented by the evidence regarding potential damage to vegetation.

7. The position of the Wasco County Fruit and Produce League raises the issue of whether and to what extent the company can legally and financially be expected to further study the effects on vegetation which might result from its contribution to ambient pollution levels.

8. It will not be known what cost figures are in play until it is known whether Martin Marietta will receive the above-mentioned variance from EPA.

9. With regard to the testimony on damage to vegetation and health, continued distance between the proposals of the agency and the company will make it necessary at some point to determine as a matter of law whether the burden is on the applicant to establish a lack of detriment to the environment or on the agency to establish the presence of such a danger.

10. The incentives provided by imposing stringent controls which would perhaps not have been considered if it were not for the fortuitous SO_2 abatement advantages of the previous system (designed to reach fluorides in the best way then available) are placed in issue by the company.

11. Also in play is the question of whether Martin Marietta should or may be asked to bear a greater burden simply because there is the likelihood of increased pollution in the future from sources which may be on the Washington side of the river.

12. Mr. Coughlin's report cuts two ways in that it concludes Martin Marietta can afford courses of action other than their desired system while it concludes also that the plant itself would become disadvantaged as a production unit and this disadvantage could not be passed on to consumers. There is, of course, an issue as to whether the plant itself or the corporation is the proper measuring stick by which to gauge whether or not a given cost is reasonable. Also in issue as raised by Mr. Lanou is the question of whether the Department's proposal would result in future curtailment of operations at The Dalles. If this is the case, then inherent in the Department's proposal is a potential cost to The Dalles area economy. (This issue is also inherent with regard to any pollution control tax credits which might be applied to the ad valorem tax). It is not readily apparent that a 43.1 million dollar capital asset would fall into disuse solely because of an annual operating cost exceeding more efficient plants by $575,000. However, profits to the company in recent years have dropped as low as 1.1%. If such a condition were to occur at a time when there were curtailed demand, it appears that the Department's proposal might have an effect on a management decision as to the distribution of curtailed production between The Dalles and a more efficient Goldendale plant. (Mr. Lanou did not report if previous periods of low profit were accompanied by reduced demand, reduced production or both. Uncontroverted in the record is his conclusion as to the risk involved).

13. There still remain obvious differences between the Department and the company as to what may be expected in terms of technology and what sets of conditions may be expected from various alternatives. If we understand them correctly they include the issue of whether the company can find a vendor who would guarantee and bid on a system as proposed by the agency in the contemplated price range. The Company questions whether the desired degree of efficiency can be attained when the flue gas entering the proposed wet scrubber would have low concentrations of SO_2 and no solids to act as condensation sites. Also, the issues of whether the Department or the company is right in assumptions about the return of captured SO_2 to the anode and finally, to the secondary system. If we accept the Department's assumptions and the company's figures, the Department's proposal would appear to pose a danger that 24 hours maximum ambient and incremental ground level concentrations would be violated in the event of operation under worst case conditions with only 50% efficiency on the wet scrubber. (Assuming 2.8% sulfur coke)

    In issue also is whether the degree of improvement to be expected from the Department's suggested configuration would be so small, commence at such a distance from the plant, involve such worsened conditions near the plant, and occur in areas of such low background concentration as to be environmentally useless, regardless of cost.

14. Visibility as affected by H_2O emissions remains an issue also.

Recommendation

This report is to be sent to the company, the Department, and the Wasco County Fruit Growers' League so that its infirmities may be the subject of further communications to the Commission in a timely fashion.

As is customary in the case of informational hearings, it is deemed more appropriate for the technical experts on the Department's staff to make recommendations based on the record than for the hearing officer to do so.

Respectfully submitted,

Peter W. McSwain, Hearing Officer

BASES FOR CONCLUSIONS

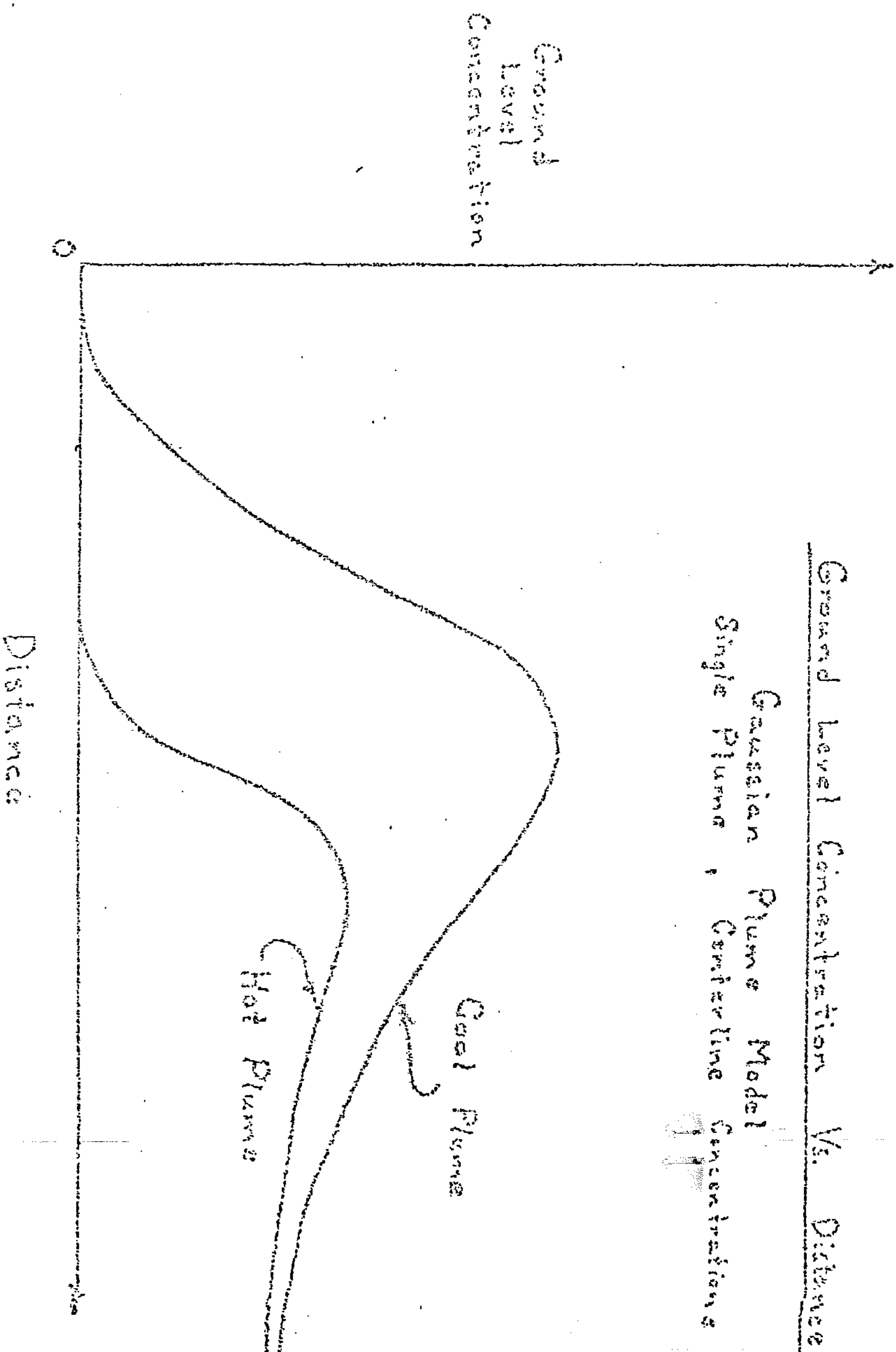
ON

PROPOSED SYSTEM

URED DATA BASE	OTHER CONSIDERATIONS
A wind data	vendor performance information
eorological data	federal and state standards for SO_2
itoring data (F, SO_2)	
t on scrubber alumina	
sent plant performance	

TECHNIQUE

EPA-approved modeling approach


Ground Level Concentration Vs. Distance
Gaussian Plume Model
Single Plume, Centerline Concentrations
Ground Level Concentration
0
Distance
Cool Plume
Hot Plume

GROUND-LEVEL CONCENTRATION

various meteorological conditions

ENDS ON:

SO_2 EMISSION RATE

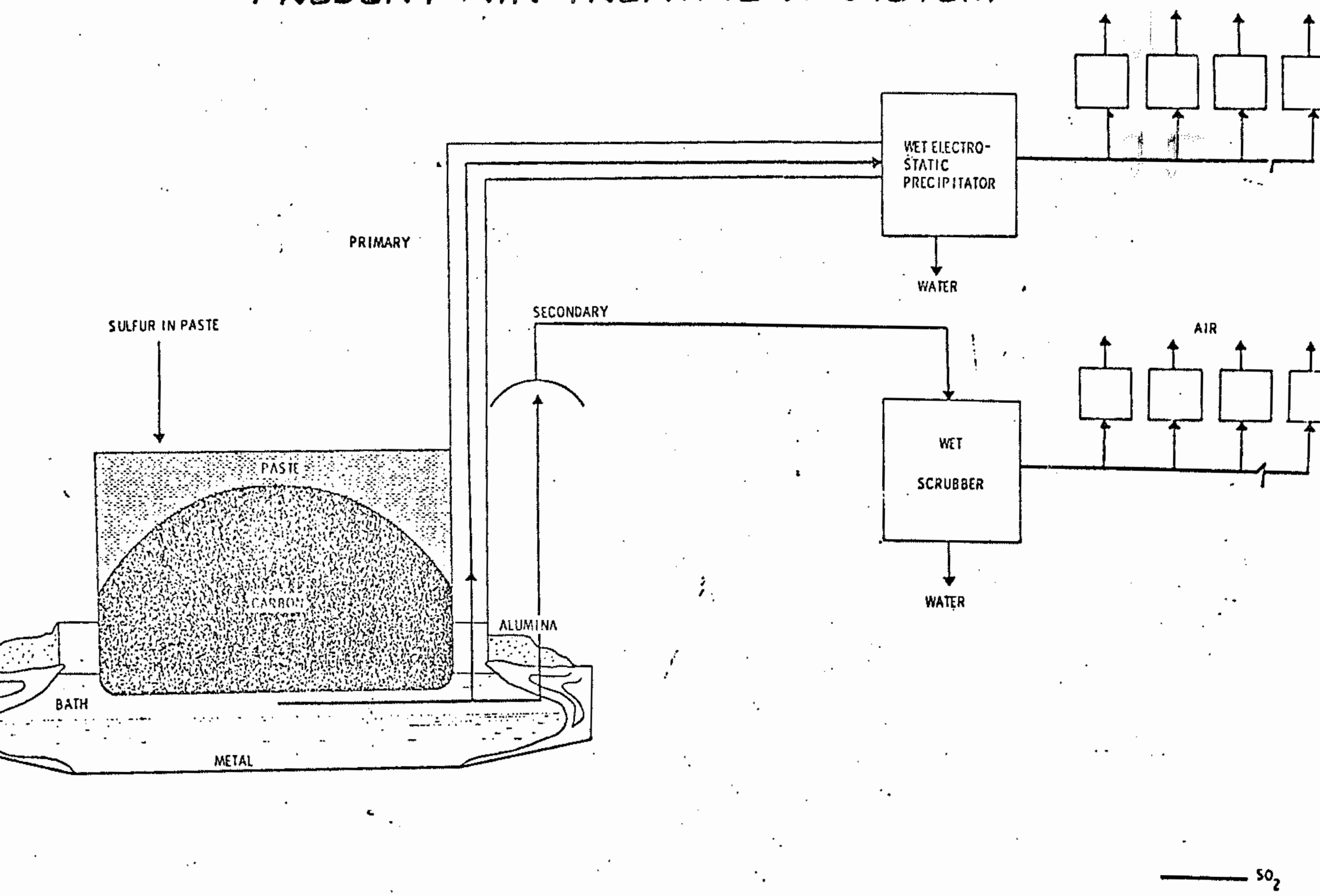
AND

METHOD OF EMISSION

cool plume
↓
high glc

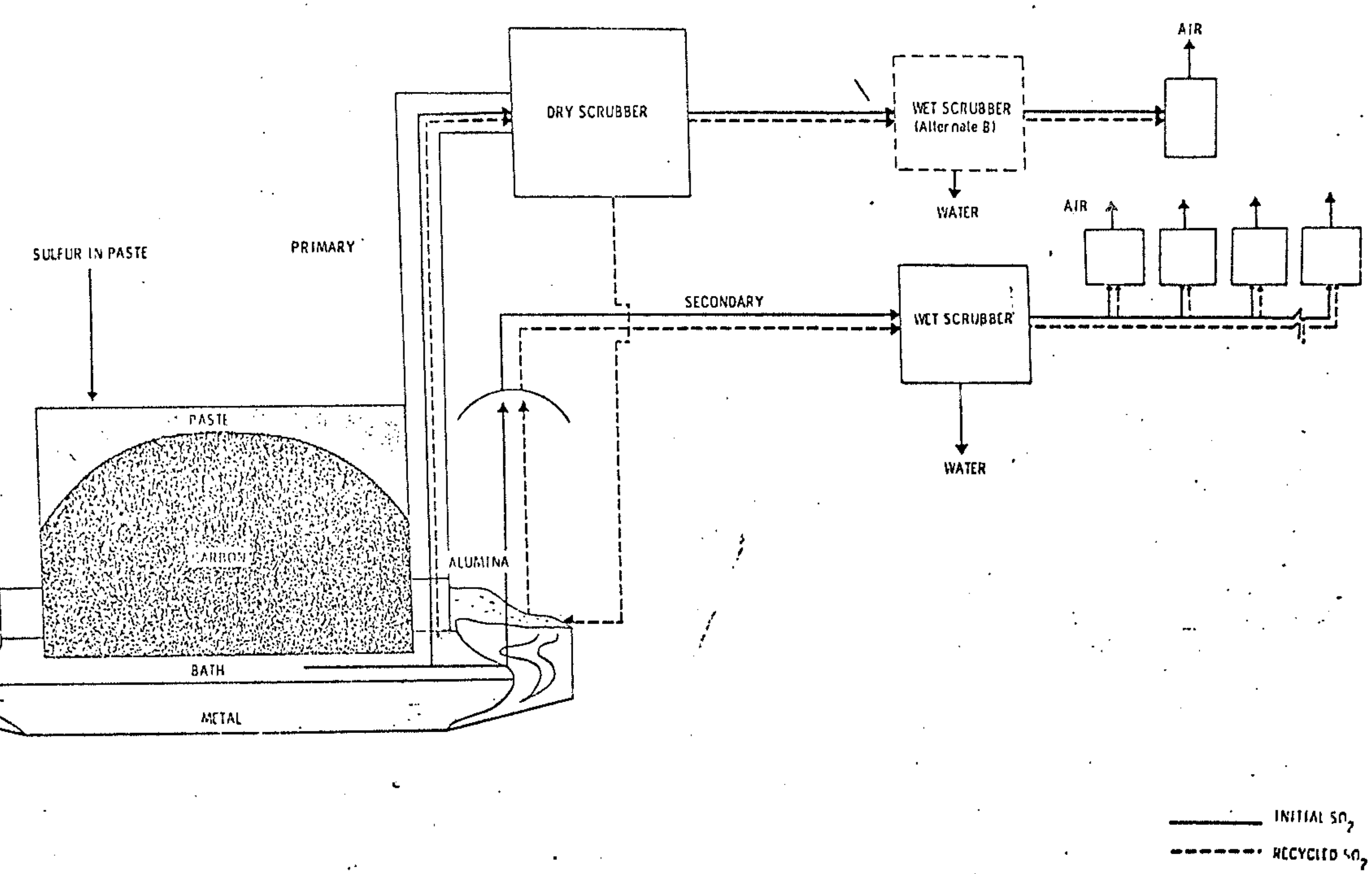
hot plume
↓
low glc

THE DALLES
PRESENT AIR TREATMENT SYSTEM



Martin Marietta Environ

THE DALLES
PROPOSED AIR TREATMENT SYSTEM



CALCULATED SO_2 GROUND LEVEL CONCENTRATIONS

% OF STATE AND FEDERAL LIMITS

	GROUND LEVEL CONCENTRATIONS			NON-DETERIORATION		
ABLE LIMITS	HIGHEST 3-HOUR 1300 ug/m^3	HIGHEST 24-HOUR 260 ug/m^3	ANNUAL AVERAGES 60 ug/m^3	HIGHEST 3-HOUR 700 ug/m^3	HIGHEST 24-HOUR 100 ug/m^3	AN AV 15
. G.L.C.						
	16 %	58 %	~75 %			
Dry Only	12 %	43 %	48 %			
+ 50% E.	24 %	84 %	77 %			
+ 70% E.	19 %	68 %	58 %			
Increase C. (PSD)						
Dry Only				7.3%	36%	2
+ 50% E.				19.7%	98%	7
+ 70% E.				12 %	59%	2
.75 km . OF Plant						
	2.0%	5.0%	1.7%	N.A.	N.A.	
Dry Only	3.3%	8.7%	2.3%	2.4%	9%	
+ 50% E.	4.1%	10.8%	3.3%	4.0%	14%	
+ 70% E.	3.7%	9.2%	3.0%	3.1%	11%	

% S Coke

2.8% S. Coke

2.5 kilometers away

CALCULATED SO_2 GROUND LEVEL CONCENTRATIONS

ug/m^3

	GROUND LEVEL CONCENTRATIONS			NON-DETERIORATIO	
ICABLE LIMITS	HIGHEST 3-HOUR 1300 ug/m^3	HIGHEST 24-HOUR 260 ug/m^3	ANNUAL AVERAGES 60 ug/m^3	HIGHEST 3-HOUR 700 ug/m^3	HIGHEST 24-HOUR 100 ug/m^3
ax. G.L.C.					
	211	150	~45		
l Dry Only	159	113	28.6		
l + 50% E.	310	220	46		
l + 70% E.	251	178	35.1		
:. Increase					
.C. (PDS)					
l Dry Only				51	36
l + 50% E.				138	98
l + 70% E.				84	59
.75 km.					
W. Of Plant					
	27	13	1.0	N.A.	N.A.
l Dry Only	43	23	1.4	16	10
l + 50% E.	53	28	2.0	26	15
l + 70% E.	48	24	1.8	21	11

2% S Coke

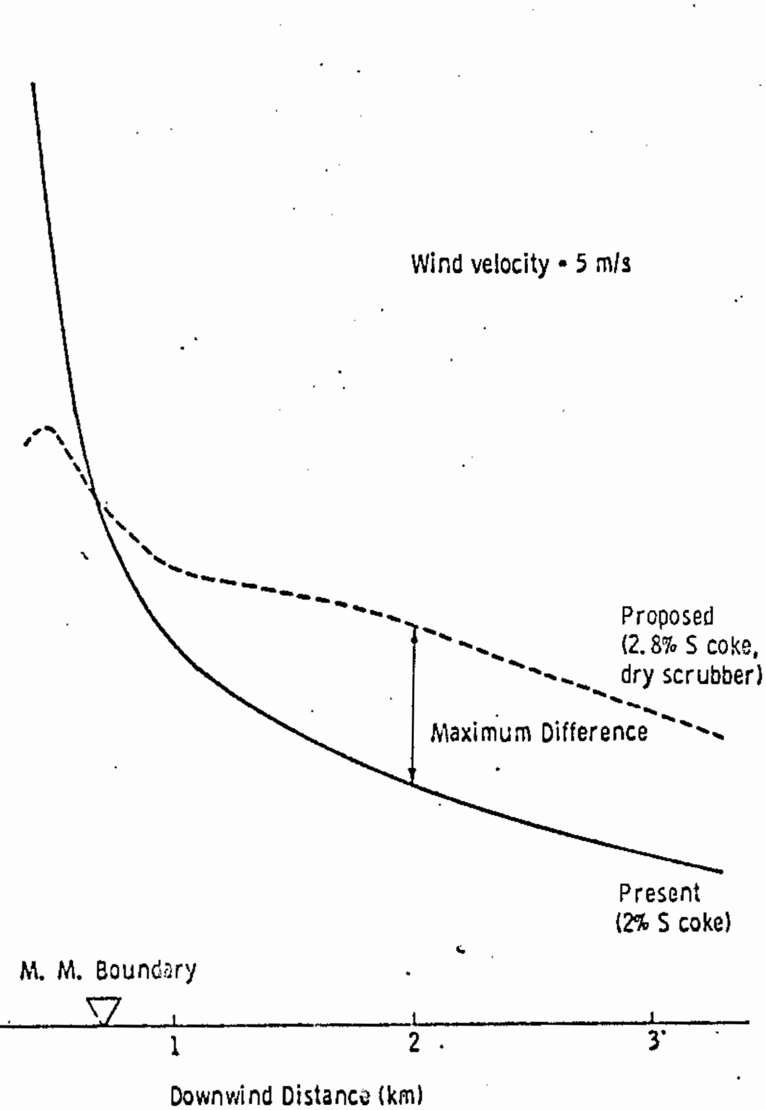
l 2.8% S Coke

RATION		MAXIMUM GLC ($\mu g/M^3$) 24 HOUR	MAXIMUM GLC ($\mu g/M^3$) ANN. AVG.	MAXIMUM INCREMENT((PSD) 24 HOUR	MAXIMUM INCREMENT((PSD) ANN.
ENT (2%S)		150	~45	—	—
OSED (2.8%S)					
RY	WET				
ass.	NONE	113	28.9	36	3.
	50%	220	46	98	6.
	70%	178	35.1	59	3.
ass.'	NONE	84	13.8	52	~3
	50%	299*	53	189*	~9
	70%	198	31.3	88	~5
TS		260	60	100	15

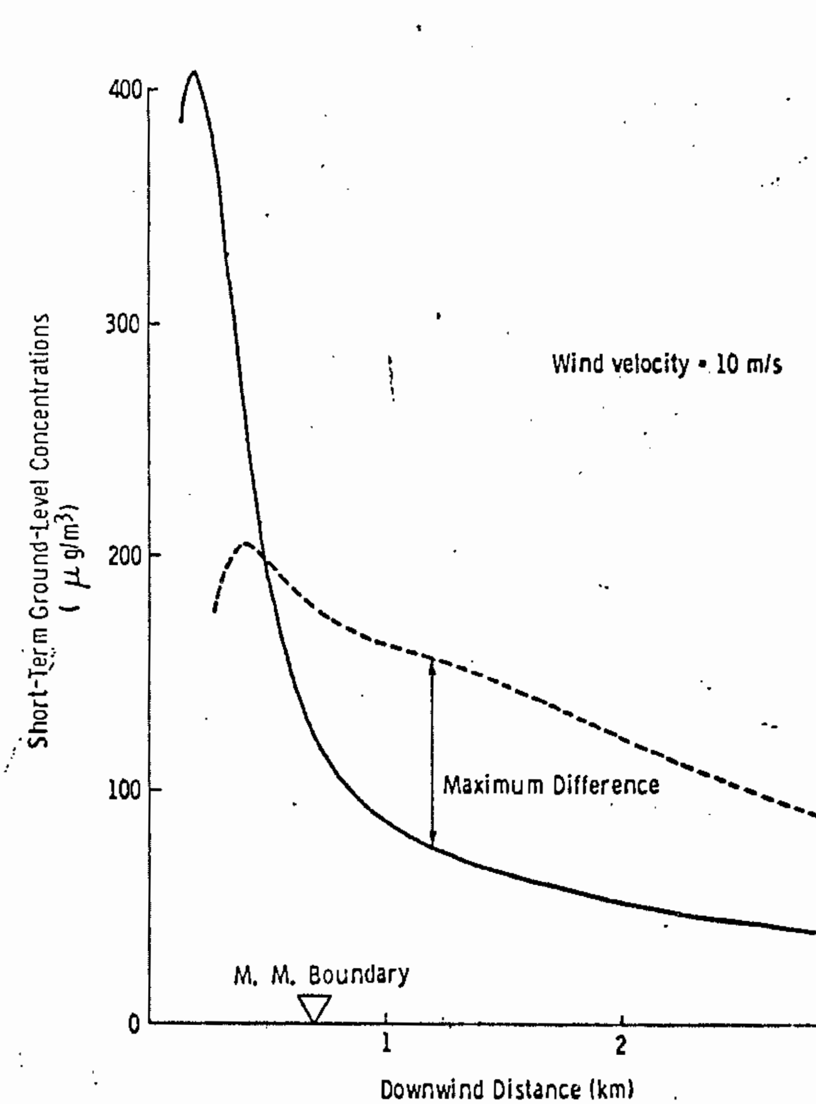
CESSIVE

DEQ [illegible] Assumption - at 3% S.

GROUND-LEVEL CONCENTRATIONS FOR
ND PRESENT PLANTS FOR v = 5 m/s



SHORT-TERM GROUND-LEVEL CONCENTRATIONS FOR
PROPOSED AND PRESENT PLANTS FOR v = 10 m/s



FURTHER ENVIRONMENTAL ASSESSMENT OF SO_2 GROUND-LEVEL CONCENTRATION FOR PROPOSED DRY-SCRUBBER MODIFICATION TO THE DALLES PLANT

November 3, 1976

By

Werner Furth

MARTIN MARIETTA CORPORATION
Environmental Technology Center
1450 South Rolling Road
Baltimore, Maryland 21227

APPENDIX B
HEARING OFFICERS REPORT

I. INTRODUCTION

At a meeting on 27 October 1976 between several members of DEQ and J. Byrne, D. Talbot, and W. Furth of Martin Marietta, DEQ requested additional information (Ref. 1). This memorandum supplies information on various calculated SO_2 ground-level concentrations expected at two sites, as requested in Items 1 and 2 of Ref. 1.

The models, assumptions, and methods used in the evaluation are described in Ref. 2 and will not be repeated here except as necessary for clarity, comparison, or where requested changes in these assumptions have been made.

The four methods (described in detail in Ref. 2) that will be used here are:

- Method A

  Ratioing method, may be modified for various emission configurations (p. 20, Ref. 2);

- Method B

  Standard EPA Plume Dispersion Modeling (p. 24-27, Ref. 2);

- Method C

  Box Model for stagnation conditions (p. 43-46 and Appendix 5, Ref. 2); and

- Method D

  Valley Model (p. 48-50, Ref. 2)

APPENDIX B
HEARING OFFICERS REPORT

II. DATA

A. Sulfur Dioxide Emission Rates

The expected sulfur dioxide emission rate for the two discussed configurations of the proposed plant are shown below (Ref. 1, 2).

SO_2 Emission Rate
(lb SO_2/ton Al)
(MMA Assumptions)

SO_2 In	% S Coke	Secondary	Primary	Total	Configuration Designation
		Dry Scrubber Only			
48.58	2.8%	18.169	15.545	33.714	PD
		70%-Efficient Wet Scrubber			
48.58	2.8%	18.169	4.663	22.833	PW

These numbers are based on the assumption that the scrubbed SO_2 is returned to the secondary. In contrast, DEQ has assumed that the scrubbed SO_2 is returned to the primary (Ref. 3) Furthermore, they have used a 3% S coke in their calculations. Under DEQ assumptions, the sulfur dioxide emissions would be (Ref. 4):

(lb SO_2/ton Al)
(DEQ Assumptions)

Dry Scrubber Only

SO_2 In	% S Coke	Secondary	Primary	Total	Configuration Designation *
51.73	3%	5.69	41.38	47.07	SD
		70%-Efficient Wet Scrubber			
51.73	3%	5.69	12.41	18.10	SW

The present plant, operating at a peak capacity of 247 tons Al/day, emits 12.6 lb SO_2/ton Al using 2% S coke (Ref. 2). If the sulfur content of the coke were increased to 2.8%, the SO_2 emission rate would be 17 lb SO_2/ton Al.

B. Locations for SO_2 GLC Evaluation

According to Refs. 1 and 5, the two sites at which GLCs for the proposed plant are to be determined are:

- MM Station 26, 2.75 km SSW of plant, elevation 500 ft above plant (hereafter designated as location M26);
- Bailey Station 4, 5.3 km S of plant, elevation 800 ft above plant (hereafter designated as location B4).

* The "D" and "W" configurations for either set of assumptions indicate whether a 70%-efficient wet scrubber is used. We can designate one or the other, depending on the degree of control desired for the primary. However, the "P" and "S" designations for the sets of assumptions indicate whether the SO_2 adsorbed on the alumina is returned to the secondary or the primary. These "configurations" are shown for comparison.

At station M26, the measurements were:

- Annual

  0.3 μg F/M^3 equivalent to 1.8 μg SO_2/M^3 (from Ref. 3)

- 24-Hour

  1.6 μg F/M^3 equivalent to 9.6 μg SO_2/M^3 (from Ref. 3)

- 2-Hour

  3.8 μg F/M^3 equivalent to 22.8 μg SO_2/M^3 (from Ref. 3).

C. Wind Rose

During the meeting on 27 October 1976, I stated that I thought the stagnation periods were the same for all four quarters. I was in error. Based on the 1964 wind rose from Dallesport, the fraction of calms by quarters and the stability classes by quarter are shown below.

Wind Speed Category

	Calm	0-3	(1-3)	4-6	7-10
DJF	0.32	0.38	(0.06)	0.31	0.19
MAM	0.12	0.15	(0.03)	0.22	0.23
JJA	0.10	0.13	(0.02)	0.16	0.23
SON	0.38	0.41	(0.03)	0.25	0.16
Annual	0.23	0.27	(0.04)	0.24	0.20

Stability Class

	A	B	C	D	E	F
DJF	0.00	0.03	0.07	0.53	0.14	0.23
MAM	0.01	0.06	0.08	0.57	0.12	0.16
JJA	0.02	0.06	0.12	0.56	0.10	0.14
SON	0.01	0.06	0.07	0.48	0.08	0.30
Annual	0.01	0.05	0.08	0.55	0.10	0.21

III. CALCULATED RESULTS -- METHOD A

The ratioing method, as practiced by either DEQ or MM, can be used only at locations for which we have data, i. e., M26 (MM Station 26).

If we assume that the meteorological conditions which occurred are such that the GLC is independent of the mode of emission, then we can simply take the ratio between the measured GLCs and the calculated SO_2 emission rates to obtain the GLCs from the proposed plant. For all practical purposes, this calculation is reasonable for configurations PW and SW (wet scrubber added). For configurations PD and SD, however, the method is dubious at a distance of 2.75 km (although it would be more accurate at station B4); the contribution to the SO_2 GLC from a buoyant stack is only 40% of that from the secondary at a wind velocity of 5 m/s,* even if we assume that there is no rotating wind shear, which would decrease the contributions from the single stack for configurations PD (and SD) for short averaging times. Consequently, we have:

Worst
Ground-Level Concentrations
at Station M26
($\mu g/m^3$)

Configuration	Straight Ratio 2-hour	Straight Ratio 24-hour	Ratio Adjusted for Different Contributions** 2-hour	Ratio Adjusted for Different Contributions** 24-hour
PD	61	26	31 to 44	13 to 19
PW	41	17	41	17
SD	85	36	18 to 40	7 to 17
SW	33	14	33	14

* At a wind velocity of 3 m/s, the ratio is about 10%.
** Velocity between 3 and 5 m/s.

Determining the peak 15-min average from these measurements is difficult. Data on the meteorological conditions that produced the measured GLCs are unavailable. However, some qualitative statements can be made.

If the peak GLCs are due to stagnation conditions, then the 15-min average would increase only slightly over the 2-hour average. If the peak 2-hour average occurs during highly stable flows (such as those considered for Method D), we know of no reasonable way of converting the 2-hour average to a 15-min average.

IV. CALCULATED RESULTS -- METHOD B

It is relatively easy to calculate "short-term average" ground-level concentration as a function of wind speed for the two locations mentioned before. As is pointed 6ut in Ref. 4, it is difficult to convert this short-term average to 2-hour and 24-hour averages for wind directions which occur only infrequently (such as winds blowing in the directions of the selected receptors). The approach that will be used here is to find the ratio between the "short-term" value and the 2-hour and 24-hour averages from the ratio between the calculated short-term value and the measured averages for the present plant.

In using the standard method for calculating GLCs, we assumed that the wind velocity would be at least 5 m/s for the maximum GLC and maximum degradations. To address the concerns expressed by DEQ (i.e., that low wind speeds may be the dominant influence on the measured GLC), the GLCs were recalculated for winds from 2 to 5 m/s. The results of these calculations are shown below.

Short-Term Ground-Level Concentrations ($\mu g/m^3$)

	Location M26			
	Wind Velocity (m/s)			
Configuration	2 m/s	3 m/s	4 m/s	5 m/s
PD	225	176	156	143
PW	291	217	169	139
SD	73	85	104	132
SW	253	187	146	120
Present	155	122	91	73
	Location B4			
PD	124	103	85	76
PW	149	105	79	63
SD	61	86	92	89
SW	118	83	63	51
Present	78	53	40	32

The configuration labeled "Present" is that calculated for the present plant at an emission rate of 12.6 lb SO_2/ton Al.

It can be seen from these computations that, at "low" wind speeds (e.g., 3 m/s), a dry scrubber only configuration produces lower GLCs at location M26 than the 70%-efficient wet scrubber, but does not at location B4. Whether or not the calculations are valid, they serve to illustrate the dilemma encountered when comparing a dry scrubber to a wet scrubber. At some locations (e.g., that of maximum GLC or the maximum degradations), the dry scrubber undoubtedly produces lower GLCs than a wet scrubber. But at other locations (e.g., location B4), the wet scrubber may be slightly superior, depending on wind speed. We discussed this problem in our testimony, as well as in Ref. 2. How to make a sound technical choice between two configurations is, presumably, a part of the judgment process.

To calculate the 2-hour and 24-hour averages for location M26, we ratio the calculated GLC from the proposed configuration to the calculated GLC from the present configuration and multiply by the observed averages.

Ground-Level Concentration
at Station M26
($\mu g/m^3$)

	2-Hour Average Wind Velocity (m/s)			
Configuration	2 m/s	3 m/s	4 m/s	5 m/s
PD	33.1*	32.9	39.1	44.7
PW	42.8	40.6	42.3	43.4
SD	10.7	15.9	26.1	41.2
SW	37.2	34.9	36.6	37.5
Present	22.8	22.8	22.8	22.8
	24-Hour Average			
PD	13.9**	13.9	16.5	18.8
PW	18.0	17.1	17.8	18.3
SD	4.5	6.7	11.0	17.4
SW	15.7	14.7	15.4	15.8
Present	9.6	9.6	9.6	9.6

* $\frac{225}{155} \times 22.8$ ** $\frac{225}{155} \times 9.6$

In order to calculate GLCs for similar average times at location B4 (keeping in mind that we have no data on B4), we will assume that the present values at B4 are equal to the values measured at M26, multiplied by the ratio of the calculated GLCs at both locations for the present plant. The values for the proposed configurations are then calculated in the same way as they were for M26.

Ground-Level Concentrations
at Station B4
($\mu g/m^3$)

Configuration	2 m/s	3 m/s	4 m/s	5 m/s
	2-Hour Average Wind Velocity (m/s)			
PD	15.9 *	19.4	21.3	23.8
PW	19.1	19.8	19.8	19.7
SD	7.8	16.2	23.0	27.8
SW	15.1	15.7	15.8	15.9
Present	10.0	10.0	10.0	10.0
	24-Hour Average			
PD	6.4 **	7.8	8.5	9.5
PW	7.6	7.9	7.9	7.9
SD	3.1	6.5	9.2	11.1
SW	6.1	6.3	6.3	6.4
Present	4.0	4.0	4.0	4.0

* $\frac{124}{78} \times 10$ ** $\frac{124}{78} \times 4$

These results depend on the velocity used; it is not certain which velocity should be chosen. Based on conversations with DEQ, it would seem that a velocity between 3 to 5 m/s would be appropriate.

The annual averages at each location, as calculated with the AQDM, are given below:

Annual Averages
($\mu g/m^3$)

	M26	B4
PD	1.4	< 1
PW	1.8	< 1
SD	1.2	< 1
SW	1.3	< 1

At the selected locations, the calculated annual average is sensitive to the frequency distribution of the low wind speeds, and the results may vary with computational approach.

V. METHOD C

If we assume that the GLC during stagnation conditions can be described as a time dependent diffusion process, then we can derive the Box Model, or Method C, as described in Ref. 2.

In the results reported in Ref. 2, it was assumed that only one-half of the SO_2 flux from buoyant plumes would be trapped inside the box. In Ref. 1, DEQ requested that this assumption be changed to 100% of SO_2 trapped.

A simple analysis was conducted to determine the penetration of a buoyant plume into a stable air layer above a low level mixing layer. The penetration occurs because the plume has vertical momentum and is still buoyant when it reaches the top of the mixing layer. The analysis used was the same as that used by Weil of ETC in Ref. 9 of Ref. 2. This analysis treats the rise of a buoyant plume across an interface between neutral and stable air, with stable air on the top. The plume is rising in the presence of a wind. In the present analysis, it was assumed that the mixing layer was 150 m in depth, with an isothermal layer existing above it. The mixing layer is assumed to have a dry adiabatic lapse rate.

Two cases of plume buoyancy were considered:

- a buoyancy flux of 43.5 m^4/sec^3 corresponding to the case of a stack emission with dry scrubbing only;
- a buoyancy flux of 3.3 m^4/sec^3 corresponding to the case of a dry scrubber followed by a wet scrubber.

The calculations were made for a wind speed of 1 m/sec. With a buoyancy flux of 43.5 m^4/sec^3, the final plume rise was calculated to be 60 m above the top of the mixing layer. With a buoyancy flux of 3.3 m^4/sec^3, the final plume rise was only 15 m above the top of the mixing layer.

We assume that one half of the dry scrubber plume would remain in the stable air above the mixing layer because the plume rise was calculated to be greater than the mixing depth. This assumption would appear to be reasonable for a buoyancy flux of 43.5 m^4/sec^3.

Independent of the above assumption, if we let

$$E = \frac{Q_s}{4\pi H_m D} \quad *$$

then,

$$c\,(r,t) = E \quad f\left(\frac{r^2}{4Dt},\ \frac{r}{2}\sqrt{\frac{\beta}{D}}\right)$$

for a low-buoyancy emission. At the distances we are concerned with (2.75 and 5.3 km), this equation will also describe the time-dependent GLC (i.e., c (r,t)) for buoyant plumes. When the integrals of Ref. 2 are evaluated, we have for the above function:

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* Please see Ref. 2 for notation.

time (hours)	r = 2.75 km	r = 5.3 km
0	0	0
2	.018	1×10^{-5}
4	.09	6×10^{-4}
6	.13	4×10^{-3}
8	.16	9×10^{-3}
10	.19	.014
12	.20	.02

In these calculations, $D = 100\ m^2/sec$, and $\beta = 0.167\ hour^{-1}$.

It can be seen that the peak 2-hour GLC, insofar as these calculations are concerned, is the same as the GLC at the last hour, and that the GLC at station B4 is at least a factor of 10 less than the GLC at M26.

For an 8-hour stagnation period, and a mixing layer 150 m deep, the calculated average GLCs over the eight hours are:

Calculated Ground-Level Concentration ($\mu g/m^3$)

	Station M26		Station B4	
	(a)	(b)	(a)	(b)
PD	17	13	0.6	0.5
PW	12	12	0.4	0.4
SD	24	14	0.9	0.5
SW	9	9	0.4	0.4

(a) 100% of emissions trapped
(b) 50% of buoyant emissions trapped

The calculated peak short-term GLCs are a factor of 2 and 3 higher at stations M26 and B4, respectively. The 24-hour GLCs are about a factor of 3 lower (depending on what we think may happen during non-stagnation periods).

If the height of the inversion layer increases, the GLC decreases. For stations M26, 500 feet above the plant, the inversion depth should be at least 150 m, for M26 to be immersed. Consequently, these computations may be very conservative.

VI. METHOD D

The Valley Model, described in Ref. 2, was used to estimate the 24-hour GLCs at the two selected locations. Before the results of these computations are shown, it may be well to recall the criticisms of this model (Ref. 2). To quote from Hoffnagle (Refs. 15 and 16 of Ref. 2), referring to results calculated for rough terrain:

> "The modeling results, when viewed along with on-site turbulence measurements, suggest that more dispersion exists in this complex terrain situation than would be expected from conventional measures of stability, such as the Pasquill-Gifford classes."

In a later report (Ref. 6), Hoffnagle compares measured and calculated GLC values and finds that the Valley Model overpredicts by a factor of 2 to 8 (geometric mean 3.0, Table II of Ref. 6). This occurred with ground releases, the most favorable conditions for use of the Valley Model. It is therefore, not at all clear how a "24-hour" Valley Model calculation can be converted to short-term averages, even if we assume that the 24-hour calculations are indicative of the GLC.*

When questioned by J. Weil, Slater (Ref. 14 of Ref. 2) reported that he considered the Valley Model "descriptive" in nature, i.e., given measurements and model results, proper correction factors can be calculated. We could conclude that, if a proposed configuration passes the Valley Model test, EPA may feel that they need not look further at any of the details of the Model results.

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* I have been informed by Mr. Kowalczyk that there is a later report giving different results. I have not seen this report.

For the wind frequencies encountered, the Valley Model calculations yield the following (p. 50 of Ref. 2, first paragraph):

- M26 5.4 $\mu g/m^3$ per 1000 lb SO_2/day
- B4 1.9 $\mu g/m^3$ per 1000 lb SO_2/day

Consequently, the 24-hour GLCs (in $\mu g/m^3$) are:

24-Hour Ground-Level Concentrations ($\mu g/m^3$)

	M26	B4
PD	45	16
PW	30	11
SD	63	22
SW	24	8

How these calculations can be converted to short-term averages is unclear.

VII. COMPARISON WITH PRESENT PLANT

Only the last three methods discussed are predictive. We will now compare the predictions for the 2-hour GLC for the present configuration at location M26.

- **Method B**

  For the infrequent wind direction at M26, we would suspect that the short-term average would decrease with $t^{-\frac{1}{2}}$. In that case, Method B predicts a 2-hour GLC between 35 and 21 $\mu g/m^3$ at wind velocities from 3 m/s to 5 m/s. It is not certain, however, that Method B can be applied to the so-called unique meteorology at The Dalles.*

- **Method C**

  At station M26, the calculated peak 2-hour GLC for an 8-hour stagnation period is about 10 $\mu g/m^3$. This is a factor of 2 less than that observed.

- **Method D**

  From the Valley Model, the peak 2-hour GLC is about 100 $\mu g/m^3$ to 200 $\mu g/m^3$ at M26. This is at least a factor of 4 higher than that observed.

The comparison is summarized below.

Measured	22.8 $\mu g/m^3$
Calculated, Method B	21 to 35 $\mu g/m^3$
Calculated, Method C	10 $\mu g/m^3$
Calculated, Method D	100 to 200 $\mu g/m^3$

* Assigning any great importance to the unique meteorology at The Dalles is debatable since all the sites at which we have conducted measurement programs have had unique properties. Interestingly, despite the unique nature of this site (The Dalles), the Gaussian dispersion model (as used by EPA) seems to yield one of the better fits between theory and observations here -- although only on a very limited data base (maximum GLC at two locations).

Consequently, of the three predictive methods employed, only one (Method B) seems to yield values consistent with the observed peak 2-hour GLC. We would therefore conclude that the results for Method B should be used in judging the relative merits between a dry scrubber and a wet scrubber configuration at locations M26 and B4.

REFERENCES

Ref. 1. Letter to Joe Byrne, from E. J. Weathersbee, Administrator, Air Quality Division, DEQ.

Ref. 2. Furth, W. "Environmental Assessment of SO_2 Ground-Level Concentration for Proposed Dry-Scrubber Modification to The Dalles Plant" July 1976.

Ref. 3. DEQ Worksheets, Jack Payne, dated May 24, 1976, received from Mr. J. Kowalczyk on October 27, 1976.

Ref. 4. Memo from W. Furth to J. Byrne, October 11, 1976. "Additional Air Quality Computations for The Dalles".

Ref. 5. Telephone conversation between J. Kowalczyk and W. Furth, October 28 and 29, 1976.

Ref. 6. Lantz, R. and G. F. Hoffnagle. 1975. A comparison of plume dispersion calculations with tracer measurements at Huntington Canyon, Utah. APCA. pp. 75-265. Presented at the 68th Annual APCA Meeting, Boston, Mass.

November 17, 1976

TO: Joe Byrne

CC: J. Doan
L. Ryssdal

FROM: W. S. Peterson

SUBJECT: Economic Analysis
Air and Water Quality Control Systems

In its letter of October 27, 1976, DEQ requested, "Complete detailed economic analysis of current and projected costs, savings and returns, on a directly comparable basis, and with conclusions as to the economic feasibility" for three alternative systems for control of air and water quality at The Dalles plant of Martin Marietta Aluminum, Inc.

This memo is in response to this request and includes three additional alternatives.

The details of the six alternative systems are presented in Table 1.

Conclusions

1. The only system which produces a positive cash flow is Case 4, the MMA proposal. In this case, a dry scrubber is used for primary air quality control, and the present wet spray system is used for secondary air quality control with once-through use of scrubber water. Total investment is about $6.2 million and a positive cash flow of about $316,000 per year is generated.

The dry scrubber recovers fluorides and alumina with a total value of between $1,091,000 and $1,252,000 per year. The amount of these materials recovered is dependent upon mode of operation and the use or non-use of multicyclones located before the dry scrubber to remove iron-containing solids. I have taken a conservative approach and used the lower value of recovered products in these calculations.

2. The adverse economic effect of not installing a dry scrubber can be seen by comparing Case 4 with Case 1 where Case 1 requires the treatment and recycle of both primary and secondary scrubber streams with expensive chemicals in order to meet the 1977 water quality requirements and no usable products are recovered.

For a capital expenditure of about $6.2 million, the dry scrubber turns the cash flow from a negative $1,593,000 per year in Case 1 to a positive $316,000 per year in Case 4 or an effective increase of nearly $2.0 million per year. Other aluminum companies with dry scrubbers now enjoy this kind of economic advantage which flows from the recovery of valuable fluorides and alumina captured in the dry scrubbers.

3. Cases 1, 2, and 3 all involve treatment and recycle of scrubber water through the present secondary wet system. We have no assurance that this approach will be successful in terms of maintaining air quality. In fact, our experience to date shows that it is quite possible that the present secondary system at The Dalles plant with its many miles of small diameter pipe, nearly 10,000 fine spray orifices, etc., can not handle the treated water containing increased fluorides and other chemicals, and increased suspended solids without a massive and costly maintenance program. The pilot plant recycling tests to date have not resolved these problems.

The capital costs for facilities to treat and recycle scrubber water in Case 1, 2, and 3 will increase about $23 million if a new wet secondary system is required.

4. Case 6 has the lowest capital cost requirement (just over $500,000), but produces a negative cash flow of about $1.2 million per year. In this case, the present wet primary system is maintained with treatment and recycle of scrubber water and the present wet secondary system is operated with once-through use of scrubber water. I am advised, however, by Seton, Johnson, & Odell Consultants that the bleed stream from the primary will add another 100 to 300 pounds of fluoride per day to the scrubber water sent to the river for a total of 1800 to 2000 pounds of fluoride per day.

5. In Cases 3 and 5, addition of a wet scrubber following the dry scrubber in the primary system to remove 70% SO_2 results in very high capital costs (order of $10 million). In Case 3 where treatment and recycle of scrubber water is required in the secondary system, the negative cash flow is from about $600,000 to $1 million per year. In Case 5 where the secondary system scrubber water is used on a once-through basis, the negative cash flow is between about $174,000 to $427,000. Thus, the requirement of a SO_2 scrubber to follow the dry scrubber largely negates the economic advantage of the dry scrubber.

6. In Cases 3 and 5, the large uncertainty about capital and operating costs is due to the lack of definitive information at hand on systems which can remove SO_2 at the low concentrations in the primary gas, particularly, where no solids are present in the gas as condensation sites. I have chosen to use the cost ranges provided to us by I. S. Shah Consultants (copy attached).

Definitive information on costs will require study of the various systems available, engineering analysis and system selection, cost estimation by vendors, and willingness on the part of vendors to guarantee results. The latter is important since at this time we know of no SO_2 removal systems in this country at our scale of operation where the gas to be treated is free of solids and has a starting SO_2 concentration of only 250 to 300 milligrams per cubic meter.

The fact is that SO_2 control technology has not been developed for the aluminum industry. Nearly all aluminum reduction plants in this country now use dry scrubbers and none of these have had any reason to install SO_2 removal devices following the dry scrubbers. The EPA Performance Standards covering new aluminum reduction plants states that, "SO_2 control technology has not been demonstrated. ...For these reasons, standards of performance were not proposed for SO_2 ...emissions."*1

Table 2 presents a summary of estimated capital costs and total cash flows for the six cases.

Table 3 presents more detailed information on the components of capital cost and operating cost for the six alternatives.

The DEQ should be advised:

All costs in this memo are in 1976 dollars.

These calculations reflect best estimates rather than "hard" data.

MMA uses a 25-year depreciation rate for emission control equipment since it is included in the Machinery and Equipment category.

Pre-operation and start-up costs are depreciated over a 5-year period.

*1 Federal Register, Volume 41, No. 17, January 26, 1976, page 3827.

The cost of money (interest) is 10%. The interest cost shown in the tables is an average for a 10-year payback period.

The property tax in Wasco County is $29 to $30 per $1000 assessed value.

I have not assigned any tax credits or other tax considerations in these simplistic financial considerations.

Worksheets

Because of the bulk, I am not attaching worksheets to this memo. However, these sheets are available for review.

W. S. Peterson

WSP:ph
Attachments

APPENDIX C
HEARING OFFICERS REPORT

TLX 360477 MM AL DLLS
W S PETERSON MARTIN MARIETTA ALUMINUM REDUCTION DIVISION
THE DALLES OR 97050

BT
FLUE GAS LEAVING THE PROPOSED DRY SYSTEM AT THE DALLES FACILITY OF MARTIN MARIETTA ALUMINUM SHALL BE 164,000 ACFM AND SHALL HAVE 250-300 PPM SULFUR DIOXIDE CONCENTRATION. THE FLUE GAS DESULFURIZATION SYSTEM FOR 70 PERCENT REMOVAL OF SULPHUR DIOXIDE WOULD COST BETWEEN 3-4 MILLION DOLLARS. THE FLUE GAS VOLUME OF 164,000 ACFM IS EQUIVALENT TO APPROXIMATELY 50 MW POWER PLANT CAPACITY. TODAYS INSTALLED COST FOR FLUE GAS DESULFURIZATION SYSTEM RANGES BETWEEN $60 TO $80 PER KILOWATT. THUS FOR A 50 MEGAWATT FACILITY THE COST FOR THE SYSTEM SHALL BE 3 TO 4 MILLION DOLLARS THIS PRICE INCLUDES UPGRADING OF DRY SYSTEM FANS, DUCT WORK, PIPING, INSTRUMENTATION, SCRUBBERS, ALKALI STORAGE AND PREPARATION SYSTEM, PUMPS, DAMPERS ETC. THE PRICE ALSO INCLUDES SITE PREPARATION, FOUNDATIONS AND ERECTION OF THE SYSTEM.

RESEARCH COTTRELLS ESTIMATED BUDGET PRICE OF 2.64-3.33 MILLION DOLLARS IN A BUDGET PRICE ONLY, AND IS DESIGNED TO HANDLE ONLY 89.5 PER CENT OF FLUE GAS. THEY ALSO ASSUME THAT 95 PERCENT OF SULFUR DIOXIDE CAN BE REMOVED EVEN AT THESE LOW SULFUR DIOXIDE CONCENTRATIONS. IF WE CAN WORK THESE BUDGET PRICEES TO HANDLE 100 PERCENT OF THE FLUE GAS, THEN THE PRICE SHALL BE 3.173-3.72 MILLION DOLLARS, WHICH IS FOR ALL PURPOSE SAME AS 3-4 MILLION DOLLARS. WHEN THIS BUDGET PRICE IS FIRMED UP, I WOULD NOT BE SURPRISED IF THE FINAL PRICE IS MORE THAN 4 MILLION DOLLARS.

THE OPERATING COST OF $350,000 TO $750,000 MENTIONED BY ME INCLUDES COSTS FOR ALKALI, ELECTRIC POWER, WATER, MAINTENANCE AND OPERATING LABOR. THE $350,000 COST REPRESENTS USE OF LIMESTONE AS SCRUBBING ALKALI AND SURPRISINGLY THIS NUMBER MATCHES WITH RESEARCH COTTRELLS NUMBER. THE $750,000 COST REPRESENTS USE OF MAGNESIUM OXIDE AS SCRUBBING ALKALI. USE OF LIME WILL RESULT IN OPERATING COST OF $400,000 TO $500,000 PER YEAR. THESE OPERATING COSTS ARE BASED UPON $10. PER TON OF LIMESTONE, $25 PER TON OF LIME AND $100 PER TON OF MAGNESIUM OXIDE.

BOTH CAPITOL AND OPERATING COSTS WILL SIGNIFICANTLY INCREASE WHEN WE ADD THE COST FOR WASTE DISPOSAL. IT IS MY GUT FEELING THAT 3 TO 4 MILLION DOLLARS CAPITOL COST IS ON THE LOW SIDE.

AT SUCH A LOW CONCENTRATION OF SULFUR DIOXIDE THE MOST REASONABLE AND PRACTICAL REMOVAL EFFICIENCY WILL BE IN THE RANGE OF 70-75 PERCENT LIMESTONE AS A SCRUBBING ALKALI WOULD NOT BE EFFECTIVE AND ONE SHOULD CONSIDER LIME AND OTHER ALKALI.

I HOPE THIS EXPLANATION PROVIDES NECESSARY CLARIFICATIONS AS DISCUSSED WITH MR WEATHERSBY OF DEQ.
I S SHAH SHAH CONSULTANTS INC

NNNN
2143 EST

[illegible] DLLS

APPENDIX C
HEARING OFFICERS REPORT

TABLE 1

SYSTEMS CONSIDERED FOR AIR AND WATER QUALITY CONTROL
AT THE DALLES PLANT

Proposed Alternative	Facility Required: Primary System	Facility Required: Secondary System
ain the present air quality control n to meet EPA wastewater discharge rements by the most cost effective d.	Wet ESP* with recycle of scrubber water	Water spray with recycle of scrubber water
ll the proposed dry scrubber system eet EPA wastewater discharge rements by the most cost effective d.	Dry system	Water spray with recycle of scrubber water
ll the proposed dry scrybber system 70% SO_2 removal in the primary m and meet EPA wastewater discharge rements by the most cost effective d.	Dry system	Water spray with recycle of scrubber water
Proposal) Install the proposed dry ber system and operate the present secondary system with once-through of scrubber water.	Dry system	Water spray with no recycle of scrubber wa
ll the proposed dry scrubber system 70% SO_2 removal in the primary em and operate the present wet ndary system with once-through use crubber water.	Dry system	Water spray with no recycle of scrubber wa
ain the present air quality control em and install equipment to treat recycle the primary scrubber water operate the present wet secondary em with once-through use of scrubber r.	Wet ESP* with recycle of scrubber water	Water spray with no recycle of scrubber wa

trostatic Precipitators

TABLE 2

SUMMARY OF SIMPLISTIC FINANCIAL CONSIDERATIONS
FOR AIR & WATER QUALITY CONTROL SYSTEMS
THE DALLES PLANT
1976 DOLLARS - ROUNDED TO NEAREST THOUSAND

Air and Water Quality Control System	Minimum Capital Cost	Additional Capital Cost Which May Be Required	Cash
Present System - Treat and recycle both primary and secondary scrubber water streams.	$ 991,000	$ 28,000,000	Negative
Dry scrubber primary system plus present wet secondary. Treat and recycle secondary scrubber water stream.	$ 6,976,000	$ 28,000,000	Negative
Dry scrubber plus wet scrubber for 70% SO_2 removal in primary system plus present wet secondary. Treat and recycle secondary scrubber water stream.	$10,063,000 to $11,063,000	$ 28,000,000	Negative t Negative
Dry scrubber primary plus present wet secondary. Once-through use of secondary scrubber water.	$ 6,166,000	-0-	Positive
Same as 3, but once-through use of secondary scrubber water.	$ 9,170,000 to $10,170,000	-0-	Negative Negative
Present system. Treat and recycle primary scrubber water. Once-through use of secondary scrubber water.	$ 512,000	Not determinable at this time - no technology available.	Negative

TABLE 3

FINANCIAL CONSIDERATIONS BASED ON COST ESTIMATES
1976 DOLLARS
THE DALLES PLANT @ 90,000 TONS/YEAR AL

	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	C
CAPITAL COST						
Vendor Prices	$ 595,000	$ 6,505,720	$ 9,505,720 to 10,505,720*1	$6,083,220	$ 9,000,720 to 10,000,720*1	$
MMA Cost	352,440	352,440	352,440	-	-	
Inventory Cost	18,400	10,110	14,710	-	4,600	
Subtotal	965,840	6,868,270	9,872,870 to 10,872,870	6,083,220	9,005,320 to 10,005,320	
Pre-Operating & Start-up Cost	25,000	107,500	190,000	82,500	165,000	
TOTAL CAPITAL COST	$ 990,840	$ 6,975,770	$10,062,870 to 11,062,870*1	$6,165,720	$ 9,170,320 to 10,170,320*1	$
ADDED CAPITAL COST IF NEW WET SECONDARY SYSTEM IS REQUIRED	$23,000,000	$23,000,000	$23,000,000	-0-	-0-	
OPERATING COST PER YEAR						
Operating Cost	$ 1,543,434	$ 767,749	$ 1,182,429 to 1,582,429	$ 410,914	$ 806,729 to 1,009,621	$1,
Depreciation - 25 Years	38,634	274,730	394,915 to 434,915	243,329	360,213 to 400,213	
Start-Up Depreciation - 5 Years	5,000	21,500	38,000	16,500	33,000	
Avg. Interest Over 10 Years - 10%	49,541	348,789	503,144 to 553,144	308,286	458,516 to 508,516	
TOTAL OPERATING COST PER YEAR	$ 1,636,609	$ 1,412,768	$ 2,118,488 to 2,608,488*1	$ 979,029	$ 1,658,458 to 1,951,350*1	$1
RECOVERY OF PRODUCT PER YEAR	-0-	$ 1,090,980	$ 1,090,980	$1,090,980	$ 1,090,980	
NET COST INCREASE OR (DECREASE) PER YEAR	$ 1,636,609	$ 321,788	$ 1,027,508 to 1,517,508	($ 111,951)	$ 567,478 to 860,370	$1
CASH FLOW						
Before-Tax Loss	($ 1,636,609)	($ 321,788)	($ 1,027,508) to (1,517,508)	-	($ 567,478) to (860,370)	($1
After-Tax Savings	-	-	-	$ 55,976	-	
Depreciation	43,634	296,230	432,915 to 472,915	259,829	393,213 to 433,213	
TOTAL CASH FLOW POSITIVE (NEGATIVE)	($ 1,592,975)	($ 25,558)	($ 594,593) to ($ 1,044,593)	$ 315,805	($ 174,265) to ($ 427,157)	($1

*1 Capital and operating cost of SO_2 scrubbers uncertain - dependent upon agent and system used for neutralizing.
*2. Not determinable at this time - no technology available.

HILL
engineers
planners
economists
scientists

December 8, 1976

Martin Marietta Aluminum Inc.
P. O. Box 711
The Dalles, Oregon 97058

Attention: Mr. Jack P. Doan

Subject: Economic Evaluation of Alternative Omission Control Systems for Martin Marietta Aluminum Inc.'s Plant in The Dalles, Oregon

Gentlemen:

Pursuant to your request, we have studied the economics associated with three alternative emission control systems that would meet 1977 EPA water quality requirements at Martin Marietta Aluminum's plant in The Dalles. This includes a review of financial analysis of the three alternatives by Dr. Peterson of Martin Marietta Aluminum, a review of the related study by Mr. Robert L. Coughlin of the Environmental Protection Agency for the Oregon Department of Environmental Quality, and our own analysis of the three alternatives and the impact each might have on the economics of The Dalles plant.

Summary

Most aluminum producers in the United States have already installed a dry scrubber system similar to the one that Martin Marietta Aluminum (MMA) proposes for its aluminum reduction plant in The Dalles, Oregon. Of the three alternatives analyzed herein, the dry scrubber without auxiliary SO_2 removal (Alternative 2) is the least costly.

The DEQ could order the company to purchase and operate a more costly alternative system that uses an auxiliary SO_2 scrubber and clarifier. These are not required under existing state or Federal emission standards and not required of any other aluminum producer. This would put The Dalles plant in a significantly disadvantageous competitive position and would be unduly burdensome to its operation. Because there apparently would be no detectable benefits resulting from the additional investment over those offered by the dry scrubber alone for primary air control, the added

APPENDIX C
HEARING OFFICERS REPORT

investment and its operation would be contraproductive because it would misallocate limited resources.

We estimate that the added cost of investing in and operating an auxiliary SO_2 scrubber and clarifier would reduce net income at The Dalles plant by over 20 percent.

Our conclusions are listed on pages 8 and 10 of this letter.

Alternatives Studied

The three alternatives we were asked to study are:

- Alternative 1 - Primary air quality control system: wet electrostatic precipitator (ESP) with recycle of scrubber water. Secondary air quality control system: water spray with recycle of scrubber water.

- Alternative 2 - Primary air quality control system: dry scrubber. Secondary air quality control system: water spray with recycle of scrubber water.

- Alternative 3 - Primary air quality control system: dry scrubber system with an auxiliary wet scrubber for SO_2 removal and a clarifier. Secondary air quality control system: water spray with recycle of scrubber water.

We understand these are the three alternatives for which the DEQ in its October 27, 1976, letter requested the company to prepare a detailed comparable economic analysis. Time did not allow study of three other alternatives presented in Dr. Warren S. Peterson's November 17, 1976, memorandum to Joseph L. Byrne, copy attached. Those three alternatives are:

- Alternative 4 - Primary air quality control system: Dry scrubber system. Secondary air quality control system: water spray with once-through use of scrubber water.

- Alternative 5 - Primary air quality control system: dry scrubbers system with an auxiliary wet scrubber for SO_2 removal and a clarifier. Secondary air quality control system: water spray with once-through use of scrubber water.

- Alternative 6 - Primary air quality control system: wet electrostatic precipitator (ESP) with recycle of scrubber water. Secondary air quality control system: water spray with once-through use of scrubber water.

We understand that Martin Marietta Aluminum proposes Alternative 4 as the most economically and environmentally sound system available and the only alternative for which there is demonstrated technology and reliable capital cost data.

Cost Comparison of the Three Alternative Systems

As Mr. Coughlin of the EPA states in his 11 November 1976 report to Mr. E. J. Weathersbee of the DEQ, it is not uncommon to have varying cost estimates for installing and operating emission control equipment. The cost estimates included in Mr. Peterson's 17 November 1976 memo to Mr. Joe Byrne of MMA differ somewhat from those presented by Mr. Coughlin. However, the differences appear to be inconsequential in evaluating the overall economics of the three alternatives. The two sets of cost estimates are compared in appendix A. We have used Mr. Peterson's cost estimates in our analysis because they include secondary treatment costs not considered by Mr. Coughlin and are therefore more complete. We have not attempted to evaluate the accuracy of cost estimates by either Mr. Peterson or Mr. Coughlin.

We are told that it has not been established that the present wet secondary system at The Dalles plant can be used with the treated and recycled scrubber water as provided in Alternatives 1, 2, and 3, and that the capital costs for these cases increase about 23 million dollars if a new wet secondary system is required. This possibility has not been included in our analysis.

Cost analysis of the three alternatives is shown in table 1. Alternative 1, which includes a wet scrubber for primary air control, requires relatively low capital costs of about $1 million, but requires about $1.5 million per year to operate. Alternative 2, which includes a dry scrubber for primary air control, requires about $7 million in capital cost, but

Table 1. PRESENT VALUE AND ANNUAL COST OF THREE ALTERNATIVE CONTROL SYSTEMS WHICH WOULD MEET EPA 1977 WATER QUALITY REQUIREMENTS AT THE DALLES PLANT

	Alternatives[1]		
	1. Wet ESP	2. Dry Scrubber	3. Dry Scrubber With SO_2 Scrubber
	(thousand dollars)		
Raw costs:			
Capital cost	$ 991	$6,976	$10,563
Operating cost			
Cost of operations[2]	1,543	768	1,382
Chemicals recovery	--	(1,091)	(1,091)
Total operating cost	$ 1,543	($ 323)	$ 291
Present value of capital and operating costs:[3]			
Initial year	$ 991	$6,976	$10,563
10-Year operation	9,480	(1,985)	1,788
Total	$10,471	$4,491	$12,351
Average annual cost:			
Debt service[4]	$ 161	$1,135	$ 1,719
Operating cost	1,543	(323)	291
Total	$ 1,704	$ 812	$ 2,010

1 Listed by primary air quality systems. For full descriptions of the three alternatives, see page 2 of this letter.

2 Includes labor, maintenance, water, power, lime, and other supplies.

3 Calculated assuming a 10-percent opportunity cost rate of money.

4 Interest and amortization calculated assuming a 10-year loan and a 10-percent interest rate.

actually reduces operating costs by about $323,000 per year as a result of recovery of fluoride and other chemicals. Alternative 3, which includes a dry scrubber with an auxiliary scrubber and clarifier for primary air control, is the most expensive investment at $10.6 million and would add $291,000 to the plant's annual operating costs.

The proper way to evaluate these costs is to determine the present value of each alternative. Present value analysis makes adjustments for the time value of money and, in effect, accounts for timing variation in the cost flow. Because money spent in future years has less value than money spent at present, it is appropriate to discount future amounts to obtain a single measurement which is comparable to other discounted time-streams of monetary values. Alternative 2 is by far the least cost alternative at $4.5 million, followed by alternative 1 at $10.5 million, and alternative 3 at $12.4 million.

A second way of analyzing the alternative cost flows is to determine the average annual cost of each investment. Average annual cost is the sum of debt service on the investment (level interest and amortization payment) plus annual operating costs. Under average annual cost analysis, alternative 2 is again the least cost alternative at $812,000 per year followed by alternative 1 at $1.7 million per year and alternative 3 at $2 million per year.

Misuse of Limited Resources

Even though such investments are considered to be "nonproductive" in their direct impacts on the investing firm, the cost of many emission control investments by industry and others is outweighed by the benefits of a resulting cleaner environment. However, in cases where emission control investment and operation result in undetectable environmental benefits, the cost of the facility and its operation represents a misallocation of limited resources. In fact, since such an action diverts resources from productive to nonproductive avenues, it is contraproductive. In MMA's case, if the company were forced to invest in alternative 1 or 3 rather than alternative 2, it appears that, on a present value basis, $6 million to $8 million would be misallocated from the opportunity to invest in production of goods and services. As Mr. Coughlin states on page 2 of his report, "No environmental benefits are ascribed to SO_2 reduction in this case, so the efficiency of the investment is most questionable." On page 17 of his report, he emphasizes that "The central fact is that in the event that wet scrubbing (of SO_2) is required, resources will be consumed and aluminum production costs increased to purchase a reduction in SO_2 concentrations that has no beneficial consequences." This consideration alone should dissuade a regulatory agency from forcing MMA to invest in either of the more costly alternatives.

Inequitable Treatment = Competitive Disadvantage

External Disadvantage

We agree with Mr. Coughlin that, if MMA were not allowed to select alternative 2, The Dalles plant would face an inequitable "distinct competitive disadvantage" since none of the plant's competitors are likely to have to absorb the additional costs inherent in either alternative 1 or alternative 3. In addition, it would be inequitable to, in effect, penalize MMA for its early investment in emission control. As Mr. Coughlin states on page 17 of his report, "The plant at The Dalles faces (auxiliary) SO_2 reduction costs only because of its early efforts to control air pollution through the use of suboptimal technology." It is my understanding that this technology was the best available at the time of the investment.

Internal Disadvantage

MMA owns and operates two aluminum reduction plants: one at The Dalles and one at Goldendale, Washington. If MMA were permitted to proceed at its Goldendale plant with the installation of a dry scrubber system without the added cost of an auxiliary SO_2 scrubber and clarifier, but were forced to invest in alternative 1 or alternative 3 at The Dalles plant, then under normal circumstances the latter would be more costly to operate and would become the company's marginal aluminum reduction plant. Under these conditions, if demand for MMA's aluminum slackened, corporate management would have incentive to cut production at the marginal cost plant in The Dalles while the Goldendale plant remained at nearly full production. Such an occurrence would have resulted in much greater production drops at The Dalles plant in 1973 and 1975. If MMA had not cut production at both plants, as shown in table 2, and instead had reduced output at The Dalles plant only, cutbacks at The Dalles would have been over 75 percent greater in 1973 and over 55 percent greater in 1975. We have not studied the prospect in any detail, but future extraordinary reductions at The Dalles plant would have an important impact on employment in The Dalles and on the regional economy in general.

The Aluminum Industry - Volatile Profit Rates

The profit rate in the aluminum industry is quite volatile as it is in most primary metals industries. As shown in table 3, profit rates of three large aluminum producers in the United States have ranged from 3.0 to 13.2 percent since 1967. The profit rate of MMA is even more volatile, ranging from 1.1 to 16.9 percent since 1969. There is thus no discernible trend of steady profits in the aluminum business. The added cost of an auxiliary SO_2 scrubber may well in some years eliminate profits attributable to The Dalles plant.

Table 2. MARTIN MARIETTA ALUMINUM INC. ALUMINUM PRODUCTION BY PLANT 1972 THROUGH 1975

	Actual Production			Estimated Decrease From Normal, Planned Production		
Year	The Dalles	Goldendale	Total	The Dalles	Goldendale	Total
	(thousand short tons)					
1972	89,130	101,947	191,077	--	--	--
1973	73,220	89,713	162,933	15,800	12,300	28,100
1974	88,642	102,282	190,924	--	--	--
1975	75,700	94,330	170,030	13,300	7,700	21,000

Table 3. PROFIT RATES OF ALUMINUM COMPANIES IN THE UNITED STATES

	Rate of Return to Shareowners' Equity	
Year	Three Large U.S. Producers (percent)	Martin Marietta Aluminum Inc. (percent)
1967	10.3	N/A
1968	8.4	N/A
1969	10.6	10.9
1970	7.7	6.6
1971	3.0	1.7
1972	4.5	1.1
1973	7.1	7.1
1974	13.2	16.9
1975	N/A	3.9
Average 1969 - 1974	7.7	7.4
1969 - 1975	N/A	6.9

SOURCE: U.S. Department of Commerce; *U.S. Industrial Outlook 1976*; and Martin Marietta Aluminum Inc.

We disagree with Mr. Coughlin's projection that The Dalles plant could absorb the nonproductive costs of an auxiliary SO_2 scrubber without "major damage to its competitive condition."

Significant Impact on Return to Shareowners' Equity in The Dalles Plant

We have made a conservative estimate of each alternative investment's impact on net income attributable to The Dalles plant. In doing so, we made the simplifying assumption that the estimated tax savings to the company of the added annual cost is 48 percent, the legal limit to the Federal corporate tax rate. In fact, the effective tax rate for MMA is somewhat lower. We did not delve into insurance and property tax rates, nor did we concern ourselves with the complexities of financial plans and accounting adjustments such as accelerated depreciation and investment tax credit. Rather, we looked at the average annual impact on income.

Because nearly all aluminum plants have invested in dry scrubbers, and other nonferrous producers have had to invest in similar facilities, over the long run aluminum companies will probably recover their costs in these investments by passing the added cost along to aluminum consumers in the form of increased prices. However, the greater cost of either alternative 1 or alternative 3 over alternative 2 would not be recovered by MMA without impacting the profitability of The Dalles plant since the company must sell its product in the market at the same price as that charged by other producers. As shown in table 4, the reductions in net income each year with alternative 1 and alternative 3 are $463,000 and $622,000, respectively.

Accounting statistics on shareowners' equity in The Dalles plant per se are not available; but we have calculated the amount to be $29.7 million since the capital structure for The Dalles plant would be the same 69-percent ratio of equity to total capitalization as MMA. Details of this calculation are provided in appendix B.

If we assume a normal rate of return to equity of 10 percent (over 3 percentage points higher than MMA's 7-year average of 6.9 percent for 1969 through 1975), we can conservatively estimate that the reductions of The Dalles plant profit attributable to the added cost of alternative 1 and alternative 3 would be 16 percent and 21 percent, respectively. This is a very significant negative impact for any investment that has "no beneficial consequences."

Conclusions

Our general conclusions are as follow:

1. Alternative 2, which includes a dry scrubber, is by far the least costly of the three alternatives studied. On a present value basis, alternative 1, which includes a wet ESP, is about 2.3 times as expensive; and alternative 3, which includes a dry plus auxiliary SO_2 scrubber and clarifier, is about 2.75 times more expensive than alternative 2.

Table 4. THE DALLES PLANT ESTIMATED REDUCTION IN NET INCOME ATTRIBUTABLE TO ADDITIONAL CONTROL SYSTEM COSTS IN EXCESS OF ALTERNATIVE 2

	Alternatives[1]		
	1. Wet ESP	2. Dry Scrubber	3. Dry Scrubber With SO_2 Scrubber
	(thousand dollars)		
Average annual costs:			
Each alternative	$1,704	$ 812	$2,010
Alternative 2	812	812	812
Amount in excess of alternative 2	$ 892	--	$1,198
Tax saving (48%)	428	--	575
Reduction in net income	$ 463	--	$ 622
Normal net income assuming an average annual profit rate of 10 percent on share-owners' equity	$2,970	$2,970	$2,970
Percentage reduction in net income	16%	--	21%

[1] Listed by primary air quality systems. For full description of the three alternatives, see page 2 of this letter.

2. If we assume no additional environmental benefits result from alternative 1 or alternative 3 compared to alternative 2, the additional resources consumed in the construction and operation of either alternative 1 or alternative 3 would be wastefully misused. This is contrary to both economic and environmental principles.

3. Because no other aluminum producer is required to make the additional investment over that incurred with alternative 2, MMA's investment in either alternative 1 or alternative 3 would place The Dalles plant in a distinct competitive disadvantage. Under these circumstances cyclical decreases in demand for MMA's aluminum products could result in extraordinary production decreases at The Dalles plant, while the Goldendale plant remained at nearly full production.

4. There is no discernible trend of steady profits in the aluminum business.

5. MMA would not be able to recover added costs over those incurred with alternative 2 without impacting the profitability of The Dalles plant. We conservatively estimate that investments in alternative 1 and alternative 3 would decrease the profitability of The Dalles plant by 16 percent and 21 percent, respectively. Such a continuing drain on profits would constitute a major financial problem for almost any business.

If you have any questions or wish to discuss this further, please call us.

Yours very truly,

Frank R. Lanou, Jr.
Senior Economist and
Group Director

David A. Gray
Project Manager

Appendix A. COMPARISON OF COST ITEMS FOR AIR AND WATER QUALITY CONTROL AT THE DALLES PLANT: MMA VS. EPA ESTIMATES

Alternatives,[1] Cost Items	Source MMA (thousand dollars)	Source EPA (thousand dollars)
1. Wet ESP		
Investment cost	$ 991	N/A
Operating cost	1,543	N/A
2. Dry scrubber:		
Investment cost		
Primary	$ 6,084	$ 5,800
Secondary	892	N/A
Total	$ 6,976	N/A
Operating cost		
Primary		
Operations	$ 177	$ 306
Materials recovery	(1,091)	(948)
Subtotal	(914)	(642)
Secondary	591	N/A
Total	($ 323)	N/A
3. Dry scrubber, auxiliary wet scrubber, and clarifier:		
Investment cost		
Primary	$ 9,671	$10,025
Secondary	892	N/A
Total	$10,563	N/A
Operating cost		
Primary		
Operations	$ 791	$ 525
Material recovery	(1,091)	(948)
Subtotal	(300)	(423)
Secondary	591	N/A
Total	$ 291	N/A

[1] Listed by primary air systems. For full description of the three alternatives, see page 2 of this memorandum.

N/A = Not available in Coughlin's 11 November 1976 report to Oregon DEQ.

Appendix B. CAPITALIZATION OF MARTIN MARIETTA ALUMINUM AND THE DALLES PLANT[1]

	Martin Marietta Aluminum	The Dalles Plant
	- - (million	dollars) -
Capitalization		
Long-term debt	$ 94	$13.4[2]
Shareowners' equity	212	29.7[2]
Total	$306	$43.1
Shareowners' equity as a percent of capitalization	69%	69%

[1] As of 12/31/75.

[2] Calculated based on the equity-to-capitalization ratio of Martin Marietta Aluminum.

SOURCE: Martin Marietta Aluminum Inc.

APPENDIX C
HEARING OFFICERS REPORT

ENVIRONMENTAL QUALITY COMMISSION

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

ROBERT W. STRAUB
GOVERNOR

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. G, January 14, 1977, EQC Meeting

Discussion of Pending Legislation

At its December 20, 1976 meeting, the Commission requested discussion at its next meeting on January 14, 1977, of the Department's legislative proposals. Chairman Richards subsequently identified certain information that would be of particular interest to the Commission related to legislation. Accordingly, written reports are being prepared on the following two topics, which will be mailed to the Commission on or before January 10-11, 1977:

1. Staff Comment on the Proposed Department of Resource Management

   Senior staff will review the Governor's proposal, then briefly evaluate (a) how their programs might be affected; (b) the administrative structure--i.e., the working relationship between the Commissions, Divisions, and the Department Director; (c) how the proposal could be most effectively implemented; (d) any other concerns that occur to them. These comments will be condensed into a brief summary report, which will be reviewed by senior staff before its transmittal to the Commission.

2. DEQ Legislative Proposals which were not Presession Filed.

   Six DEQ legislative proposals were rejected by the Executive Department, preventing pression filing; and one bill approved by the Executive Department was withheld by the DEQ Director for further study. Very brief written summaries for each of these seven bills will indicate whether staff believe that the bills are of sufficient importance to their program to warrant revision and resubmittal for Executive Department reconsideration. These staff comments will also be condensed into a single memorandum which staff will review before it goes out to the Commission.

Since these two reports will be mailed later than the other staff reports for the January 14, 1977 meeting, they will be brief. This unusual timetable was chosen to allow staff in all divisions to study the subject legislation and to draft comments themselves, rather than have a single staff person draft all of the analyses of legislation.

A third report (attached) describes how DEQ plans to organize to handle information requests related to legislation during the 1977 Legislature.

Please refer to the legislative package distributed at breakfast on December 20, 1976, which contained: (1) copies of all 25 of DEQ's legislative proposals -- both the 18 bills that DEQ filed on December 15, 1976, and the seven bills that were not filed, and (2) a cover summary containing brief Summary and Justification statements for each of these 25 proposals. Division Administrators will be present at breakfast and luncheon with the Commission to respond to any question about this legislative package, or about the proposed Department of Resource Management. Bob Gay and Jim Swenson will be available to discuss the proposal for handling legislative information requests. If necessary, these discussions of legislative matters can be continued in the regular Commission meeting.

William H. Young

WILLIAM H. YOUNG
Director

RLG:cs
1-5-77
Attachment (1)

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE MEMO

To: All Immediate Staff, Division Administrators, Regional Managers

Date: January 5, 1977

From: Bill Young RL Gay for WH Young

Subject: The DEQ at the 1977 Legislature

In order to respond to the needs of the 1977 Legislative Assembly, the following system is hereby established. Please inform others of the procedures.

Basically, I will be primary spokesman for the agency at the Legislature. At times technical back-up personnel will be brought in. At times the EQC Chairman or other members will testify.

Bob Gay will manage a Legislative Information Clearinghouse in the Portland headquarters.

Jim Swenson will be the Legislative liaison, working mostly in Salem.

<u>The Clearinghouse (Gay) will</u>:

* Obtain requested information from programs and regions.
* Coordinate technical and fiscal reviews and draw reports together through a "conference" process.
* Schedule testimony by DEQ employees.
* Track bills of interest to the DEQ and interface with Executive Department tracking scheme.
* Maintain records of any contacts between legislators and DEQ staff and comprehensive files on legislation.
* Brief staff weekly on legislation, with Salem liaison.

<u>The Liaison (Swenson) will</u>:

* Maintain daily contact with legislators, staff, executives, lobbyists, press.
* Head off and filter requests for DEQ information.
* Alert Department to anticipated needs, strategies, etc.
* Deliver fulfilled information requests to legislators, committees, etc.
* Pinchhit for the Director when necessary.
* Prepare and distribute weekly status report on DEQ priority bills.

Many others will be periodically involved:

<u>Division Administrators</u> will be responsible for assuring that requests for information from the Clearinghouse are filled quickly. One suggestion is to designate a person and back-up within the division to expedite requests. Sometimes less than one-day turn around can be anticipated.

Regional Managers may be contacted for assessments of impacts in the regions. They may also be requested to provide information on various legislators (areas of interest, concern).

Administrative Services will perform fiscal and budget reviews.

Attorney General's Office will perform legal reviews.

THE KEY to holding this process together is to keep the information flowing through Swenson and Gay. They'll be in almost constant communication and keeping the Director informed on the wonderful goings on.

Attached are some general guidelines that employees should follow during the session.

mjb
Attachment

cc: EQC members
Janet McLennan
Ray Underwood
John Vlastelicia

CLEARINGHOUSE (Portland) 229-6408 (Bob Gay)

LIAISON (Salem) 378-8240 (Jim Swenson)

DEQ EMPLOYEES AND THE 1977 LEGISLATURE

GENERAL POLICIES TO FOLLOW IN MOST CASES*

The purpose of these general guidelines is to help serve the Legislature by providing quick, accurate, comprehensive responses to requests for legislative information that are credible and in keeping with DEQ policy.

1. Refer most requests for information pertaining to legislation to the Portland Clearinghouse, unless you can answer them yourself and the material is not considered controversial.

2. In all cases report information contacts to the Clearinghouse immediately by phone, so the Director and Salem liaison can be kept abreast of information we are putting out.

3. Testimony by DEQ personnel in Salem will be scheduled by the Clearinghouse, after consulting with the Director and our Salem liaison.

4. When giving information to a legislator or committee staff person, be sure to distinguish between your opinion and Department policy. In almost every case, simple statements of fact are safest and most useful to the legislato...

*There are always exceptions.

CLEARINGHOUSE (Portland) 229-6408 (Bob Gay)

LIAISON (Salem) 378-8240 (Jim Swenson)

DEQ EMPLOYEES AND THE 1977 LEGISLATURE

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CLEARINGHOUSE (Portland) 229-6408 (Bob Gay)

LIAISON (Salem) 378-8240 (Jim Swenson)

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE MEMO

To: EQC Members

Date: 1-10-77

From: Bill Young RRD for WHY

Subject: Staff Analysis of DEQ's "Rejected" Bills

Seven of DEQ's 25 draft bills were rejected by the Executive Department or the Director (the other 18 bills were filed on December 15th). Program staff have summarized below (1) their understanding of the reasons for the rejections, and (2) whether or not the bill is of sufficient importance to warrant revision and resubmittal for reconsideration by the Executive Department. Additional Air Quality Division comments on legislation related to the motor vehicle inspection program are also included.

1. Draft Bill DEQ-340-18
   Executive Department Rating: D (Needs further work)
   Subject: Mandatory Registration of Off-Road Vehicles
   Comments: The objective was to require registration of off-road vehicles as a mechanism to attain compliance with noise standards. Bud Kramer asked that we try to find another method of controlling off-road vehicle noise without requiring registration. John Hector has begun drafting another bill that would require off-road vehicles operated on public lands to have exhaust system certified and identified to meet DEQ noise standards, and authorize and direct enforcement by Federal/State and local officials.

   This bill would operate in conjunction with new DEQ rules that would prohibit sale of new vehicle and after market exhaust systems unless certified and identified as meeting DEQ noise standards.

2. Draft Bill DEQ-340-16
   Rating: C (not supported by Executive Department)
   Subject: Prohibits DMV to register any vehicle not certified as meeting DEQ noise standards.

   This bill was intended to work in conjunction with 340-18 and is not necessary unless registration of off-road vehicles is required. Together the two bills could have prevented registration of vehicles which do not comply with noise standards, except as racing vehicles.

3. Draft Bill DEQ-340-9
   Rating: C
   Subject: Noise Permits

   If SB 242 is passed, granting noise source plan review and approval authority, the authority to require noise permits is not necessary at this time. Future strategy for the noise program may include permits when the program expands to warrant the use of permits. DEQ still could have legal problems with the specification of noise conditions in existing AQ permits that passage of this bill would have resolved.

4. Draft Bill DEQ-340-12
Rating: C
Subject: Pollution Control Grants and Loans

This bill was drafted at the request of Bud Kramer and we need to discuss his reasons more fully with him. It appears that this could be a mechanism for providing the local match for federal funds to construct noise barriers to reduce noise from roads and highways. We would be hard put to estimate fiscal/organizational impact which could be considerable. John Hector is investigating this further with the State Department of Transportation and the Federal Highway Administration.

5. Draft Bill DEQ-340-13
Rating: C
Subject: Authorized DEQ to conduct experimental program to test subsurface sewage disposal alternatives, and appropriate money.
Comments: We believe Executive Department opposition to 340-13 was based on the potential for federal funding. If federal funding falls through, we believe the Executive Department may well support a modest state funded program. DEQ-340-13 is being revised to eliminate section 2 regarding authority to contract with OSU, because general authority for contracting already exists, and because of legislative opposition in 1975 to substantial OSU involvement. DEQ has proceeded with preparation of a budget and project description for a state funded, DEQ-conducted experimental program (in case federal funding was not forthcoming).

The EQC, at its July 30, 1976 meeting in Medford, instructed the staff to prepare a funding bill for experimental programs. This was done. (DEQ-340-13) Then, after EPA advised the Department of potential federal funding for an experimental subsurface alternative program, DEQ obtained E Board approval to pursue the federal grant in November 1976. In view of the attached EPA letter indicating that this funding now appears unlikely, DEQ will explore all ways to introduce a revised DEQ-340-13 proposing a state funded experimental program. Similar legislation (SB 388) was introduced in the 1975 session with the intent that Oregon State University would do the work under contract with DEQ. The bill was not passed.

6. Draft Bill DEQ-340-19
Rating: C
Subject: Increased DEQ's revolving fund from $5,000 to $10,000
Comments: This change was incorporated into DEQ's budget request, so this separate bill became unnecessary.

7. Draft Bill DEQ-340-23
Rating: B (approved by Executive Dept for filing but withheld by Director)
Subject: Authorizes EQC to initiate formation of a sanitary authority.
Comments: The Department decided to not file this bill, after review with Bill Young, who felt strongly opposed to supporting single purpose agencies, such as a sanitary authority, to do what general purpose local governments should do. The staff feels that, in an emergency situation involving sewage work, the Commission can initiate the formation of a County Service District. This would seem to be better approach to solve this type of problem than a sanitary authority.

Motor Vehicle Emission Testing Program

The report on Motor Vehicle Emission Program (Agenda Item E, January 14, 1977 EQC Meeting) recommends four areas of legislation for positive consideration by the 1977 Oregon Legislature as follows:

-- Legislation should be enacted to implement an annual test cycle.

-- The Legislature should act to clarify the applicability of the inspection requirements for commercial vehicles operating under reciprocity agreements and for fixed load vehicles.

-- The Legislature should act to require motor vehicles licensed by the government and which do not require registration renewal to meet inspection requirements.

-- The Legislature should consider the alternative of having a private contractor operate the inspection program.

None of the above items are covered by bills filed by DEQ. The Division of Motor Vehicles has filed HB 2144 which would return vehicle registration to an annual cycle. The Department considers an annual test cycle essential to a fully successful emission testing program and attainment and maintenance of CO standards in Metropolitan Portland.

Two other draft bills related to motor vehicle inspection have been sent to DEQ for comment on their fiscal/organizational impact. These bills were drafted by Legislative Counsel for Representative James Chrest (LC 545), and for the Legislative Fiscal Office (LC 797). To our knowledge neither has been filed yet. LC 545 requires EQC to contract with private enterprise to operate the motor vehicle inspection program. LC 797 would require DMV to collect the test fees, which would not exceed (a) $5 for the initial test; (b) zero for the second test; (c) $7 for the third test; (d) $8 for the fourth, etc.

/cs

cc: Janet McLennan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

January 6, 1977

Dr. Robert L. Gay
Department of Environmental
Quality
1234 S. W. Morrison Street
Portland, Oregon 97205

Dear Dr. Gay:

Due to recent changes in planning strategy, we do not anticipate supporting on-site system demonstrations until FY 78. I realize this is an unfortunate turn of events from your standpoint, but several heretofore unanticipated pressures and high priority work assignments have forced this change.

I do wish to retain your preproposal for doing field-evaluation work for review at the appropriate time in order to evaluate it against other similar submissions which have been received.

I regret the delay in responding to your submission.

Sincerely yours,

J. F. Kreissl

James F. Kreissl
Sanitary Engineer
Urban Systems Management Section
Systems & Engineering Evaluation Branch
Wastewater Research Division, MERL

Technical Programs Office
Dept. of Environmental Quality
RECEIVED
JAN 10 1977

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE MEMO

To: EQC Members

Date: 1-11-77

From: Bill Young RLD for WHY

Subject: Initial DEQ Staff Comment on Proposed Department of Resource Management

Senior DEQ staff have reviewed and discussed the draft bill proposing a Department of Resource Management, and Bud Kramer's printed remarks on this proposal. The following is a brief summary of their initial comments.

> DEQ staff recognize the proposal's potential for improving all aspects of natural resource management. These potential improvements depend upon many factors, many of which could not be addressed in the materials available for review. Accordingly, it should not be surprising, or interpreted as a lack of DEQ staff support for the concept, that most of the comments below express questions or concerns. DEQ staff will work to make this effort successful.

Authority and Responsibility

The Act says the Director (1) exercises "general supervision" and "shall coordinate the plans, policies, activities and regulatory responsibilities of ... divisions and boards or commissions." and (2) he "may reorganize the Department in whatever manner he deems necessary." The Act also establishes four divisions and five boards or commissions within the Department, and sets their powers, duties and responsibilities.

1. What does the Director's authority to "coordinate" consist of? Is it less authority than if the Act required him to "manage the agency," or to "approve" plans, policies, etc., or to be "responsible for providing" the services rendered by divisions and boards?

2. Since each division's powers, duties, and responsibilities are established in statute, is the Director prevented from organizing Department functions, except within divisions?

3. To what extent can the Director reorganize boards and divisions?

4. If boards and commissions arrived at conflicting interpretations of their jurisdictional responsibility, can the Director resolve such conflicts by interpreting applicable statutes?

5. Section 4(10) says the Director can make any "necessary" rules not otherwise provided by law, but appears to reserve most rule making related to natural resource programs to boards and commissions. The Governor's office has indicated the following general intent with respect to rule making: (a) boards and commissions should retain all of their existing policy setting and rule making functions; (b) a strong Policy Services Branch will work with boards and commissions to help them review and set policy; (c) the Director should have rule making authority only as it already existed in agencies being combined, which is generally limited to housekeeping rule making -- e.g., for personnel administration, etc.

A. Section 48(3) and 48(4) transfer the EQC's powers, duties, and responsibilities related to solid waste and environmentally hazardous waste management to the Land Management Division, "execpt as otherwise provided in the Act." Does this transfer rule making and policy setting authority to this Division too?

B. Section 24 transfers all statutory noise authority under ORS Chapter 467, except rule making from the EQC to the Air Quality Division Administrator. This would seem to indicate that the AQ Division Administrator will impose the civil or criminal penalties authorized by law. If so, would the Director's approval be necessary to impose these sanctions? Would appeals be taken to the Director or the EQC?

6. In recent years, statutory requirements for broad public participation have become common, including public notice and hearing prior to important agency decisions. Perhaps section 1 of the act should include a specific finding that such public participation is desirable. Perhaps public participation should be added to the list of things which the Director must coordinate.

7. Section 49(7) removes low-level radioactive wastes and their containers from the category of environmentally hazardous wastes. Section 51 transfers licensing authority for disposal of such wastes from the EQC to the Energy Facility Siting Council.

Responsibility for environmentally hazardous wastes is already divided between DEQ/EQC, the Public Utility Commissioner, and the Agriculture Department. DEQ has introduced several bills to deal with problems related to this fragmented authority (SB 236, SB 237, SB 238) which include transfer of existing authority over storage, handling, and transportation of such wastes to DEQ.

Under the new federal Recycling and Resource Recovery Act, EPA will soon establish criteria for solid waste and environmentally hazardous waste disposal, then determine what each state must do to meet these criteria. DEQ staff believe that the best way to deal with these wastes, and to take maximum advantage of the federal act in establishing Oregon's program, is to consolidate all such authority in one agency.

8. Except for the low-level radioactive waste transfer, there appear to be no other substantial changes in DEQ regulatory authority. One area in which DEQ authority might be reviewed and strengthened, is the regulation of forest/slash burning for air quality purposes.

a. DEQ's authority for unconsented entry upon property to investigate conditions related to pollution control is not as clear as it should be, causing problems. The Act should clarify this authority. One suggestion is to include clear provisions for obtaining warrants, similar to provisions in the State Occupational Health and Safety Law.

Agency Structure

The separate agency functions selected for combination into the new agency make good sense. The following questions relate to structure into which these pieces are fitted.

9. Technical support services (laboratory, etc.) is not mentioned in the Act. Is it presumed to be a part of the Compliance and Administrative Branch? DEQ staff believe that technical data gathering works best if it is separate from enforcement activity. People being monitored appear to more readily supply good data to a neutral, scientific laboratory than to investigative personnel who may also levy penalties. Cooperative data supply by regulated sources is vital. Consolidating technical support services from all the combined agency functions in a single, separate division would appear to have the best chance of realizing the benefits expected from the proposed reorganization.

10. Putting the Compliance and Administrative Branch in the Office of the Director makes compliance activities appear to be a "staff" function. DEQ compliance activities have worked best as a "line" function within the Regional Operations Division, while several DEQ staff specialize in enforcement work, many regional staff carry out not only enforcement related duties, but also duties related to processing permits, Providing technical assistance, etc. Thus, "line" personnel in the field offices bring all other DEQ "line programs (air, water, noise, etc.) into harmony to provide coherent service to the public. How will program and enforcement staff work together? Whose decisions will trigger enforcement actions?

11. Placement of DEQ's solid waste and hazardous waste disposal programs in the Land Management Division does not reflect (a) the primary relationship of such waste disposal to water quality protection; (b) its growing relationship to air quality protection, as recycling and combustion processes are encouraged, and (c) its diminishing relationship to land management, as dumps are phased out and other forms of land disposal are discouraged as long-term solutions.

Management

The following points relate to potential management consequences of the structure and authority created by the act.

12. Will "program budgeting" be frustrated by the director's (a) ability to transfer funds within, but not between, divisions; (b) and his apparent lack of authority to reorganize Department functions among divisions?

13. Is it likely that all major divisions of the new Department cannot be physically located together, perhaps not even in the same city?

14. Combining field staff from all agencies may allow more field offices to be established, with less territory to be covered per office, thereby reducing field staff time spent in travel. However, will the additional field staff available adequately cover the additional field activities required, in order that the overall field effort not be diluted? Considerable attention is needed on how the reorganized program divisions will mesh with regional office staff to deliver all of the new agency's services in the field, including enforcement activities.

15. Combining so many unpopular regulatory functions in one Department may be especially tough on field personnel, if their jobs become the focus of generalized public resentment toward governmental regulation.

16. Preparing for and attending the meetings of many different boards and commissions could require considerable staff time, especially for the Water Division, which would have to relate to nearly all boards and commissions. Consideration should be given to consolidating the policy and rule-making functions by reducing the number of boards and commissions. This would facilitate resolution of policy issues or program actions which are of interest to more than one of the existing boards and commissions.

Timing

17. The act allows the Director up to 18 months to submit a plan to the Governor and the Legislature on how to integrate various agency enforcement functions, and he may report sooner, if he can. However, most enforcement powers appear to be transfered "on the effective date of the Act." Does this mean that the new Department will receive its enforcement powers, before it can complete a plan to integrate them?

18. Similarily, the timetable for transfering other agency functions to the new Department varies from immediately upon the effective date of the Act, through July 1979 (LCDC). However, there is no provision in the act for a study to plan these multiple transitions.

19. Major new federal environmental legislation is still being passed by Congress. Major reviews of the Clean Air Act and Federal Water Pollution Control Act are also pending and their planning requirements are in the early stages of implementation. Would it be better to delay combination of natural resource agencies,until their statotory basis for environmental protection is more stabilized?

Personnel Administration

20. Making Division Administrators unclassified raised some questions, including:

   A. If the Director removes the Division Administrator, does the Administrator have the option of returning to a comparable, classified position in state government? This option would appear to be compatible with recent proposals by the Governor's Management Council.

   B. In recruiting unclassified Division Administrators, what relative importance would be placed upon (1) experience and technical background in the field he or she will administer; (2) general management experience in other fields; (3) other political credentials?

   C. Will Division Administrators be recruited from among the ranks of existing agency program administrators? Will existing program administrators be retained, but subordinate to new, unclassified Division Administrators?

D. Would members of the Director's staff also be unclassified? Would the chief enforcement officer be unclassified?

Communication

Figures A and B attempt to illustrate that the proposed new agency will have several new elements that make lines of communication and responsiveness more complex, including: (1) unclassified Division Administrators, who serve at the pleasure of the Director, and who may or may not have much experience or technical background in common with their technical staff; (2) A Policy Services Branch in the Office of the Director, which will play a large role in helping boards and commissions set policy; (3) enough separate boards and commissions that it will be difficult for the Director to spend very much time with any one of them; (4) a Director would with ~~be~~ the apparent authority to reorganize boards and commissions.

Lines of Communication

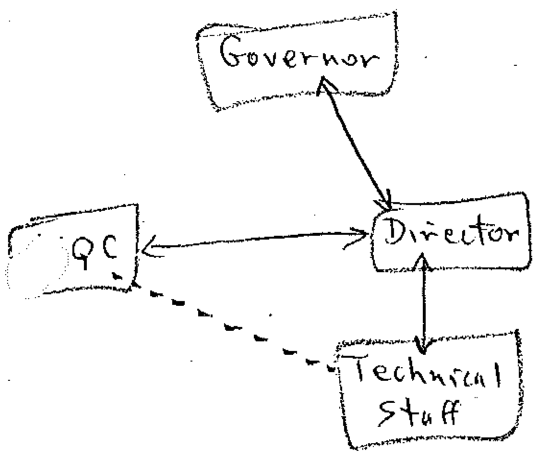

Figure A. "Before" (now)

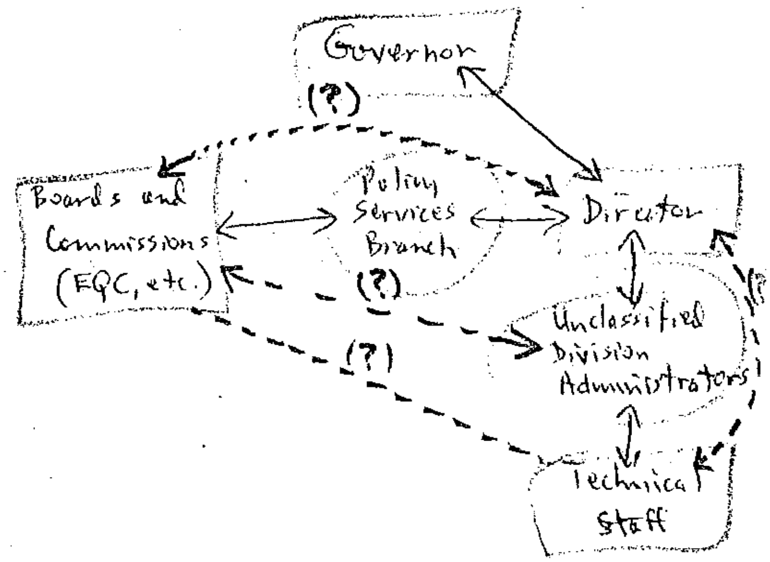

Figure B. "After"

21. Will the Director be able to relate to the multiple boards and commissions directly and often enough to clearly translate the Governor's policy and program objectives?

22. Division Administrators could become the primary top management contact for boards and commissions instead of the Director. If they receive different policy guidance from the Director than from their board or commission, how should they resolve this situation?

23. Can unclassified division administrators be able to coordinate divisional programs better because they are part of the Governor's Management Team, or will political rivalry diminish such cooperation?

24. To what extent will agency decision making at the higher management levels become more politicized--and what positive or negative effectives will this have on environmental protection, staff moral, and public service?

SUMMARY

Potential Advantages of the Proposed Reorganization

1. Retains citizen boards and commissions which have served well in their policy review and rule making roles.

2. Policy Branch can devote considerable time to helping the Director and boards or commissions resolve complex policy questions.

3. Top administrators will be more accountable to the Governor--therefore, more responsive to his policy and management objectives.

4. Better coordination and management of natural resource protection functions, including better utilization of existing staff resources.

5. More consistent, understandable, state natural resource policy and practice.

6. Less confusion within Government and less confusion among the public about their government.

Potential Disadvantages

1. Greater insulation of boards and commissions from the Director and from working units of the Department (technical staff), hampering policy setting and review.

2. Greater insulation of technical and field staff from policy setting and establishment of agency objectives, adversely affecting morale and eventually, service to the public.

3. Increasing policitizing of decision making by top agency management, which could result in increasing deference to special interests, at the expense of the public interest.

4. Decreased stability and continuity in program management, due to too-frequent turnover of unclassified division administrators, or reorganizations by them.

5. Less technical experience at the Division Administrator level.

6. Less public awareness of, or input into, important natural resource management decisions--e.g., if issues tend to be resolved quietly within the agency, (i.e., separate agencies might advocate the alternatives more passionately and publically) unless strong public participation guidelines go in.

/cs

cc: Janet McLennan