

State of California
AIR RESOURCES BOARD

RESOLUTIONS

No.	Item	Staff	Hearing Scheduled	Date Adopted	+ EIS to Resources
87-1	Mrak	Legal	1/23/87	1/23/87	N/A
87-2	Schenker	"	1/23/87	1/23/87	N/A
87-3	UCI - Acid Air Pollutant \$278,183	RD	1/23/87	1/23/87	N/A
87-4	UCSF - Bronchoconstriction \$58,421	RD	1/23/87	1/23/87	N/A
87-5	UC-Riverside Measurement of Nit. Acid \$159,816	RD	1/23/87	1/23/87	N/A
87-6	Univ. of Wash. Cloud \$154,265	RD	1/23/87	1/23/87	N/A
87-7	UCSB - Snow \$365,002	RD	1/23/87	1/23/87	N/A
87-8	Wineries SCM	SSD	1/22/87	-----	---
87-9	Cadmium	SSD	1/23/87	1/23/87	1/13/88
87-10	Hazardous Waste Guidelines	SSD	1/23/87	1/23/87	N/A
87-11	Annual Toxics Report	SSD	1/23/87	1/23/87	N/A
87-12	Approval of Long-Range Research Plan	RD	2/26/87	2/26/87	N/A
87-13	UCD \$18,072 Ozone Exposure	RD	2/26/87	2/26/87	N/A
87-14	UCI \$301,220 Toxicity of Fine Particles	RD	2/26/87	2/26/87	N/A
87-15	UCLA \$145,299 Lung Function	RD	2/26/87	2/26/87	N/A
87-16	DGA \$4,919 SCAQS Measurements of PAN	RD	2/26/87	2/26/87	N/A

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AIR RESOURCES BOARD

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No.	Item	Staff	Hearing Scheduled	Date Adopted	+ EIS to Resources
87-17	Kern Co. SIP	TSD	2/26/87	2/26/87	3/12/88
87-18	UCD Methods Devel. \$146,927	RD	3/27/87	3/27/87	N/A
87-19	OMNI Env. Svcs. Particulate Matter \$245,967	RD	3/27/87	3/27/87	N/A
87-20	UCD Vapor Pressures \$29,539	RD	3/27/87	3/27/87	N/A
87-21	ERT, Inc. Data Mgt. SCAQS \$49,954	RD	3/27/87	3/27/87	N/A
87-22	Sonoma Tech. Inc. Augmentation A5-157-32 \$52,046	RD	3/27/87	3/27/87	N/A
87-23	UC Berkeley Activity Pattern \$199,386	RD	3/27/87	3/27/87	N/A
87-24	CIT Nitrogen \$199,727	RD	3/27/87	3/27/87	N/A
87-25	Cal. PH Found. Acidic Aerosol \$68,905	RD	3/27/87	3/27/87	N/A
87-26	Carnegie-Mellon Dry Dep. SCAQS \$58,708	RD	3/27/87	3/27/87	N/A
87-27	IIT Coarse Part. Nitrate & Sulfate \$5,000	RD	3/27/87	3/27/87	N/A
87-28	EDC	SSD	3/27/87	3/27/87	N/A
87-29	Wineries SCM	SSD	3/27/87	3/27/87	N/A
87-30	Motorcycle Regs	MSD	3/27/87	3/27/87	08/24/88
87-31	UCSB Watershed Study \$370,000	RD	3/27/87	3/27/87	N/A
87-32	CIT Clouds - Sierra Nevada \$267,901	RD	3/27/87	3/27/87	N/A

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RESOLUTIONS

No.	Item	Staff	Hearing Scheduled	Date Adopted	+ EIS to Resources
87-33	Harmon Wong-Woo	UK	3/27/87	3/27/87	N/A
87-34	Augment A5-188-32 Excess MV Emissions Sierra Research \$56,971	RD	4/23/87	4/23/87	N/A
87-35	Aromatics and Sulfur in MV fuels Arthur Little \$124,994	RD	4/23/87	4/23/87	N/A
87-36	Multi-Day Storage Patterns Valley Research Corp. \$99,985	RD	4/23/87	4/23/87	N/A
87-37	Benzene Emissions Southwest Research Inst. \$148,517	RD	4/23/87	4/23/87	N/A
87-38	Toxic Exhaust Emissions Southwest Research Inst. \$199,604	RD	4/23/87	4/23/87	N/A
87-39	Food chain Midwest Research Institute \$74,978	RD	4/23/87	4/23/87	N/A
87-40	Current Body Burdens Midwest Research Inst. \$149,930	RD	4/23/87	4/23/87	N/A
87-41	UCI Carbon Monoxide \$191,945	RD	4/23/87	4/23/87	N/A
87-42	UCSF NO ₂ \$119,486	RD	4/23/87	4/23/87	N/A
87-43	USC Pilot Study Lung Tissue \$219,330	RD	4/23/87	4/23/87	N/A
87-44	UCR Cultivar Responses to Ozone \$124,805	RD	4/23/87	4/23/87	N/A
87-45	Not Used				
87-46	SCAB Report	EO	4/23/87	4/23/87	N/A
87-47	<i>SAC CURR</i>	<i>EO</i>	<i>5/21/87</i>		
87-48	Hydrochemical Modeling at Emerald Lake, Sequoia National Park \$83,400	RD	6/11/87	6/11/87	N/A

State of California
AIR RESOURCES BOARD

RESOLUTIONS

No.	Item	Staff	Hearing Scheduled	Date Adopted	+ EIS to Resources
87-49	Development of Watershed Models for Emerald Lake Watershed in Sequoia National Park and for Other Lakes \$150,000	RD	6/11/87	6/11/87	N/A
87-50	Enhanced Trickle-Down Model to Emerald Lake \$100,000	RD	6/11/87	6/11/87	N/A
87-51	Survey of Soils of the Sierra Nevada \$150,000	RD	6/11/87	6/11/87	N/A
87-52	Monitoring of Ozone and Atmospheric Particles, Sequoia Natl Park \$30,009	RD	6/11/87	6/11/87	N/A
87-53	Measurement of Atmospheric Dry Deposition at Emerald Lake \$21,219	RD	6/11/87	6/11/87	N/A
87-54	Dry Deposition Measurement During the Southern CA Air Qlty Study \$18,775	RD	6/11/87	6/11/87	N/A
87-55	Real Time Nitric Acid Measurements During SCAQS \$14,678	RD	6/11/87	6/11/87	N/A
87-56	Modeling of Cloudwater Chemistry in the South Coast Air Basin \$49,861	RD	6/11/87	6/11/87	N/A
87-57	Development of a State-Of-the-Art Acid Deposition Model \$197,050	RD	6/11/87	6/11/87	N/A
87-58	SCAQS Study (STI) \$99,318	RD	6/11/87	6/11/87	N/A
87-59	RTI \$21,559	RD	7/09/87	7/09/87	N/A
87-60	U. C. Davis \$16,242	RD	7/09/87	7/09/87	N/A
87-61	Acid Deposition Fee Program	RD	7/09/87	7/09/87	N/A
87-62	Benzene Emissions	SSD	7/09/87	11/13/87	1/13/88
87-63	Material Damages by Acid Deposition in SCAB \$179,873	RD	8/13/87	8/13/87	N/A
87-64	Effects Hydroxymethane Sulfonate Acid Fog on Airway Functions \$177,881	RD	8/13/87	8/13/87	N/A

State of California
AIR RESOURCES BOARD

RESOLUTIONS

No.	Item	Staff	Hearing Scheduled	Date Adopted	+ EIS to Resources
87-65	UCI - Pulmonary Function & Semiomatic Responses of Asthmatic to Ambient Acidic Atmosphere \$158,294	RD	8/13/87	8/13/87	N/A
87-66	Bromine (Unsaturation of Gasoline)	EO	8/13/87	8/13/87	N/A
87-67	Clean Air Act	EO	8/13/87	8/13/87	N/A
87-68	SCAQS \$50,000	RD	8/13/87	8/13/87	N/A
87-69	SCAQS(Installation&Operation of Type B Stations) \$711,947	RD	9/10/87	9/10/87	N/A
87-70	SCAQS(Measurement of Pexoryacetyl Nitrate [PAN]) \$61,151	RD	9/10/87	9/10/87	N/A
87-71	SCAQS(Acidic Aerosol Size Distribution During SCAQS) \$238,252	RD	9/10/87	9/10/87	N/A
87-72	SCAQS(Sample Analyses and Reporting) \$426,544	RD	9/10/87	9/10/87	N/A
87-73	SCAQS(Program Management) \$494,846	RD	9/10/87	9/10/87	N/A
87-74	SCAQS(Aircraft Measurements) \$334,878	RD	9/10/87	9/10/87	N/A
87-75	SCAQS(Meteorological Support Program) \$402,543	RD	9/10/87	9/10/87	N/A
87-76	SCAQS(Measurement of Nitrous Acid, Nitrate Radical, & Formaldehyde) \$173,020	RD	9/10/87	9/10/87	N/A
87-77	SCAQS(Continuous Particulate Organic Carbon Measurements) \$ 22,735	RD	9/10/87	9/10/87	N/A
87-78	SCAQS(Tunable Diode Laser Absorption Spectrometer Measurements of Peroxide) \$ 39,663	RD	9/10/87	9/10/87	N/A
87-79	SCAQS(Size-Resolved Particle Composition) \$ 22,055	RD	9/10/87	9/10/87	N/A
87-80	SCAQS(Size-Resolved Aerosol Carbon) \$ 12,384	RD	9/10/87	9/10/87	N/A

State of California
AIR RESOURCES BOARD

RESOLUTIONS

No.	Item	Staff	Hearing Scheduled	Date Adopted	+ EIS to Resources
87-81	SCAQS (this number requested by RD, but never used)	RD	9/10/87	-----	-----
87-82	Carbon Tetrachloride	SSD	9/10/87	9/10/87	08/24/88
87-83	New Motor Vehicle Certification Labeling (Bar Code)	SSD	9/10/87	9/10/87	08/24/88
87-84	SCM Boiler NO _x	SSD	9/10/87	9/10/87	N/A
87-85	UCD Toxic Compounds \$169,999	RD	10/08/87	--VOID--	
87-86	UCR Maintain Fumigation Facility \$37,454	RD	10/08/87	10/08/87	N/A
87-87	UCR Effects of Ozone on Oranges \$58,308	RD	10/08/87	10/08/87	N/A
87-88	UCR Effects of Ozone on Cotton \$188,218	RD	10/08/87	10/08/87	N/A
87-89	DOHS SCAQS - Fall Study \$44,677	RD	10/08/87	10/08/87	N/A
87-90	Test Methods	SSD	11/13/87	11/13/87	08/24/88
87-91	Ethylene Oxide as TAC	SSD	11/12/87	11/12/87	08/24/88
87-92	State Ambient Air Quality Standard for Ozone	SSD	11/12/87	11/12/87	08/24/88
87-93	Resignation of Harold Holmes as Board Secretary	EO	11/13/87	11/13/87	N/A
87-94	New and Used Aftermarket Catalytic Converters Offered For Sale	MSD	12/03/87	See 88-9	
87-95	Nonconformance Penalty Program for Heavy Duty Engines&Vehicles	MSD	12/03/87	12/03/87	08/24/88
87-96					

State of California
AIR RESOURCES BOARD

Resolution 87-1

January 23, 1987

WHEREAS, Emil M. Mrak, Ph.D., has served with distinction as Chairman of the Scientific Review Panel on Toxic Air Contaminants from June 1984 to December 1986;

WHEREAS, Dr. Mrak used his extensive experience with scientific review committees to greatly assist and guide the Panel to perform its unprecedented work;

WHEREAS, Dr. Mrak's willingness to serve as Chairman of the Panel has vested the Panel with high esteem and credibility in the eyes of the regulated community, local governments, environmental groups and the public;

WHEREAS, Dr. Mrak, as the Panel's first Chairman, has led the Panel through the difficult process of interpreting the Panel's responsibilities and instituting an expeditious and thorough review process for the substances presented to the Panel;

WHEREAS, under Dr. Mrak's leadership, the Panel has ensured that toxic air contaminants are identified on the basis of scientific evidence and analysis;

WHEREAS, on the basis of Dr. Mrak's and the Panel's work, the Air Resources Board is making substantial progress in the identification and control of toxic air contaminants; and

WHEREAS, Dr. Mrak has made significant contributions to the protection of public health in California through his work on the Panel.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board expresses its great appreciation to Dr. Mrak for his service and contributions to the cause of clean and healthy air in California.

Jananne Sharpless, Chairwoman

George Bailey, Member

John S. Lagarias, Member

Eugene A. Boston, M.D., Member

Harriett M. Wieder, Member

Roberta H. Hughan, Member

Andrew Wortman, Ph.D., Member

Betty S. Ichikawa, Member

State of California
AIR RESOURCES BOARD

Resolution 87-2

January 23, 1987

WHEREAS, Marc B. Schenker, M.D., ^{M.P.H.} Ph.D., has served with distinction as a member of the Air Resources Board's Scientific Review Panel on Toxic Air Contaminants from April 1984 to January 1987;

WHEREAS, his dedication to his work as a member of the Scientific Review Panel has greatly assisted the Board in the successful implementation of the Toxic Air Contaminant Program;

WHEREAS, he has diligently reviewed and commented on all of the reports brought before the Scientific Review Panel;

WHEREAS, using his extensive knowledge of occupational and environmental carcinogens and environmental risk factors for respiratory disease, Dr. Schenker skillfully led the Scientific Review Panel's review of the asbestos report;

WHEREAS, he has exhibited the very finest attributes as a physician, scientist, and public official in carrying out his duties as a member of the the Scientific Review Panel; and

WHEREAS, through his activities with the Scientific Review Panel he has contributed greatly toward improvements in public health for the State of California.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board extends its deepest appreciation and thanks to Dr. Marc B. Schenker for his many contributions to environmental protection and the cause of clean air and health in California.

Jananne Sharpless, Chairwoman

George Bailey, Member

John S. Lagarias, Member

Eugene A. Boston, M.D., Member

Harriett M. Wieder, Member

Roberta H. Hughan, Member

Andrew Wortman, Ph.D., Member

Betty S. Ichikawa, Member

State of California
AIR RESOURCES BOARD

Resolution 87-3
January 23, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California, pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 139-20, entitled "Acid Air Pollutant Mixtures: Respiratory System Responses and Effects of Exercise," has been submitted by the University of California, Irvine to the Air Resources Board, and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

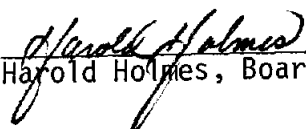
Proposal Number 139-20, entitled "Acid Air Pollutant Mixtures: Respiratory System Responses and Effects of Exercise," submitted by the University of California, Irvine for a total amount not to exceed \$278,183.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 139-20, entitled "Acid Air Pollutant Mixtures: Respiratory System Responses and Effects of Exercise," submitted by the University of California, Irvine for a total amount not to exceed \$278,183.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$278,183.

I hereby certify that the above is a true and correct copy of Resolution 87-3, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-2-4(b) 1
DATE: January 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 139-20 entitled "Acid Air Pollutant Mixtures: Respiratory System Responses and Effects of Exercise."

RECOMMENDATION: Adopt Resolution 87-3 approving Proposal No. 139-20 for funding in an amount not to exceed \$278,183.

SUMMARY: Previous experiments by the proponent have suggested that one of the important effects of acidic atmospheres may be to aggravate the effect of ozone. The objective of this proposed research project is to determine the extent of this acidic effect. High levels of atmospheric acidity are frequently associated with high levels of photochemical activity; thus, it is likely that individuals living in California may encounter conditions where ozone levels and acidity levels are elevated concurrently.

In these experiments, approximately 400 rats, both at rest and while engaged in moderate exercise, would be exposed to ozone alone and in combination with acidic air pollutants. Exercise is an important variable in the exposure regimen, because exercise has been shown to greatly increase the adverse effects of some air pollutants. The acidic air pollutants to be employed are a mixture of nitric and sulfuric acids, and also an atmosphere of hydroxymethanesulfonic acid (HMSA), all of which make a significant contribution to acidic air pollution in California. The experiments to investigate the effect of HMSA are a pioneering effort. HMSA has been found in substantial amounts in acidic fogs sampled in California. The effects of the exposures to pollutants will be assessed by measuring breathing pattern changes, histopathology, and chemical changes in important lung fluids. The research contractor is the University of California, Irvine, and the principal investigator is Dr. William Mautz.

B U D G E T S U M M A R Y

University of California, Irvine

"Acidic Air Pollutant Mixtures: Respiratory System
Responses and Effects of Exercise"

BUDGET ITEMS:

Salaries	\$139,674	
Benefits	38,794	
Supplies*	27,067	
Other Costs**	23,425	
Travel	3,000	
Consultant & Subcontract*** (Cal. State Fullerton)	<u>21,217</u>	
TOTAL, Direct Costs		\$253,177
TOTAL, Indirect Costs		<u>25,006</u>
	<u>TOTAL PROJECT COST</u>	<u>\$278,183</u>

* Supplies:

Laboratory rats	\$10,827	
Histology supplies	5,413	
Glassware, reagents and isotopes	5,413	
Tubing, filters, pumps	2,707	
Ion chromatography columns	2,707	

** Other costs:

Service contract, medical gas analyzer	\$ 3,125	
Service contract, FTIR spectrophotometer (Cal State Fullerton)	\$10,015	
Veterinary charges, animal facilities	3,383	
Copying, phones, library, publications	3,383	
Instrument maintenance	3,519	

*** Consultant and Subcontract:

Consultant: Stanley Trim, for computer-instrument interface and software development for rodent plethysmograph	\$ 6,664	
Subcontract: Barbara Finlayson-Pitts, lung surfactant analysis	\$14,553	

State of California
AIR RESOURCES BOARD

Resolution 87-4
January 23, 1986

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 107-16, entitled "Effects of Particle Size and Air Temperature on Aerosol Induced Bronchoconstriction," has been submitted by the University of California, San Francisco; to the Air Resources Board; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

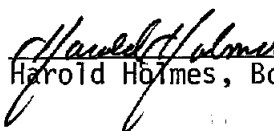
Proposal Number 107-16, entitled "Effects of Particle Size and Air Temperature on Aerosol Induced Bronchoconstriction," submitted by the University of California, San Francisco for a total amount not to exceed \$58,421.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 107-16, entitled "Effects of Particle Size and Air Temperature on Aerosol Induced Bronchoconstriction," submitted by the University of California, San Francisco for a total amount not to exceed \$58,421.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$58,421.

I hereby certify that the above is a true and correct copy of Resolution 87-4, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-2-4(b) 2
DATE: January 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 107-16 entitled "Effects of Particle Size and Air Temperature on Aerosol Induced Bronchoconstriction."

RECOMMENDATION: Adopt Resolution 87-4 approving Proposal No. 107-16 for funding in an amount not to exceed \$58,421.

SUMMARY: The objective of this study is to determine how the size of acidic fog droplets and cold air affect the airways of asthmatics. This proposal adds new procedures to an existing effort. The present work involves the use of six-micrometer droplets. The proposed work would include a group of exposures with smaller diameter aerosols. These smaller droplets, which are present in large numbers in some acidic fogs, are expected to be irritants to the airways. Work is also proposed to investigate the role of cold air temperatures, which can aggravate the effect of other irritants in asthmatics. The research contractor is the University of California, San Francisco, and the principal investigator is Dr. Dean Sheppard.

B U D G E T S U M M A R Y

University of California, San Francisco

"Effects of Particle Size and Air Temperature
on Aerosol Induced Bronchoconstriction"

BUDGET ITEMS:

Salaries	\$33,812
Benefits	8,998
Supplies*	4,900
Other Costs**	5,400
Travel	<u>-0-</u>

TOTAL, Direct Costs	\$53,110
TOTAL, Indirect Costs	<u>5,311</u>

TOTAL PROJECT COST \$58,421

* Supplies:	
Nebulizers, tubing, valves, charge neutralizers	\$1,400
Compressed gases, pneumotachograph, thermocouples	900
Reagents, glassware	1,300
Recorder and computer paper	1,300
** Other costs:	
Human subject compensation	\$5,400

State of California
AIR RESOURCES BOARD

Resolution 87-5
January 23, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a solicited research proposal, Number 1451-129, entitled "Measurement of Nitrous Acid, Nitrate Radical, and Formaldehyde, has been submitted by University of California, Riverside;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

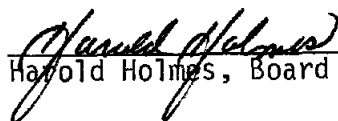
Proposal Number 1451-129, entitled "Measurement of Nitrous Acid, Nitrate Radical, and Formaldehyde," has been submitted by the University of California, Riverside, for a total amount not to exceed \$159,816.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 1451-129, entitled "Measurement of Nitrous Acid, Nitrate Radical, and Formaldehyde," has been submitted by the University of California, Riverside, for a total amount not to exceed \$159,816.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$159,816.

I hereby certify that the above is a true and correct copy of Resolution 87-5, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-2-4(b) 3
DATE: January 23, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Proposal No. 1451-129 entitled "Measurement of Nitrous Acid, Nitrate Radical, and Formaldehyde".
- RECOMMENDATION: Adopt Resolution 87-5 approving proposal no. 1451-129 for an amount not to exceed \$159,816.
- SUMMARY: The Southern California Air Quality Study (SCAQS) is a multi-year, integrated air quality study whose overall goal is to develop a comprehensive and properly archived air quality and meteorological data base for the South Coast Air Basin (SoCAB) that can be used to test, evaluate and improve elements of air quality simulation models for oxidants, PM₁₀, fine particles, toxic air contaminants and acidic species. The study will take place in the SoCAB during the summer of 1987 for 12 intensive sampling days and for seven intensive sampling days during the winter of 1987-88.
- The objective of this proposal is to provide in situ differential optical absorption spectroscopy (DOAS) measurements on a semi-continuous basis at both the source (Long Beach) and the receptor (Upland) sites during the summer phase of the study and at the source site only during the winter phase of the study. Using this technique, ambient concentrations of nitrous acid, formaldehyde, nitrogen dioxide and nitrate radicals will be measured.
- These measurements will provide critical data needed (a) as inputs to the various air quality/acid deposition simulation models to be used in development of future air quality control strategies, and (b) for validation of the photochemistry modules of those models.
- The research contractor is the University of California, Riverside, and the principal investigator is Dr. Arthur M. Winer.

B U D G E T S U M M A R Y

University of California, Riverside

"Measurement of Nitrous Acid, Nitrate Radicals, and Formaldehyde"

BUDGET ITEMS:

Salaries	\$93,764
Benefits	23,628
Supplies	11,950
Travel Expenses ¹	6,400
Equipment ²	5,000
Other direct cost ³	<u>5,000</u>

TOTAL, Direct Cost	\$145,742
TOTAL, Indirect Cost	<u>14,074</u>

TOTAL PROJECTED COST \$159,816

1. Includes \$5,200 for travel and per diem during field program.
2. Includes two chart recorders @ \$1,500 each and \$2,000 for DOAS system accessories.
3. Includes \$1,800 for maintenance of DOAS system and \$3,200 for machine, electronics and computer shop charges.

State of California
AIR RESOURCES BOARD

Resolution 87-6
January 23, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a request for budget augmentation for Contract Number A4-143-32, entitled "Cloud and Precipitation Scavenging Processes in the South Coast Air Basin," has been submitted by the University of Washington;

WHEREAS, the Research Division staff has reviewed and recommended this augmentation for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding the augmentation:

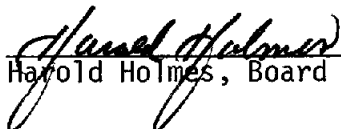
Contract Number A4-143-32, entitled "Cloud and Precipitation Scavenging Processes in the South Coast Air Basin," has been submitted by the University of Washington, for a total amount not to exceed \$154,265.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Contract Number A4-143,32, entitled "Cloud and Precipitation Scavenging Processes in the South Coat Air Basin," has been submitted by the University of Washington, for a total amount not to exceed \$154,265.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$154,265.

I hereby certify that the above is a true and correct copy of Resolution 87-6, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-2-4(b) 4
DATE: January 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Request for Budget Augmentation for Contract A4-143-32 entitled "Cloud and Precipitation Scavenging Processes in the South Coast Air Basin."

RECOMMENDATION: Adopt Resolution 87-6 approving a budget augmentation of Contract A4-143-32 for an amount not to exceed \$154,265.

SUMMARY: The originally planned study of cloud scavenging processes by the University of Washington was modified and the contractor has been redirected by ARB staff and the Scientific Advisory Committee on Acid Deposition to provide airborne air quality measurements during the Southern California Air Quality Study (SCAQS). This revised work plan requires a minimum of 72 hours of flight time. However, the original contract (\$141,743) with UW included only 23 hours of flight time. An additional \$154,265 is needed to defray the cost of the increased flight time and sampling.

The University of Washington's Convair C131A research aircraft would be used in the summer field experiments to determine the three dimensional distribution of ozone, nitrogen oxides, sulfur dioxide, nitric acid, peroxyacetylnitrate, hydrogen peroxide and ammonia concentrations and the chemical composition and concentrations of aerosols, and hydrocarbons throughout the South Coast Air Basin. The aircraft will make two flights per day, each lasting between 3 to 4 hours, in the early morning and in the afternoon. Flights will be made on twelve days in 2 to 3 day sequences over a six-week period.

Airborne measurements are required to determine the pollutant distribution in the vertical dimension. They are especially important for documenting initial conditions, pollutant carryover, mixing layer height, representativeness of surface measurements, and nighttime chemistry aloft and are essential for the development and testing of air quality simulation models. The contractor is the University of Washington and principal investigators are Drs. Peter Hobbs and Dean Hegg.

B U D G E T S U M M A R Y

University of Washington
Seattle, WA

"Cloud and Precipitation Scavenging Processes
in the South Coast Air Basin"

BUDGET ITEMS:

Salaries	\$35,802	
Benefits	7,574	
Supplies	5,500	
Travel Expenses ¹	32,085	
Subcontract ²	21,999	
Aircraft Operation	124,830	
Other direct cost ³	<u>16,550</u>	
TOTAL, Direct Cost		\$244,340
TOTAL, Indirect Cost		<u>51,668</u>
TOTAL COST		\$296,008
LESS ORIGINAL CONTRACT		<u>141,743</u>
AUGMENTATION AMOUNT		<u>\$154,265</u>

-
1. Includes \$29,085 for per diem and travel during the six week field program.
 2. Subcontract with Dr. Donald Stedman, University of Denver for high resolution, high sensitivity measurements of nitrogen species.
 3. Includes \$4,000 for aircraft ground fees, \$5,500 for computer services, and \$2,200 for publication services

State of California
AIR RESOURCES BOARD

Resolution 87-7
January 23, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 141-20, entitled "Snow, Snow Melt, Rain, Runoff and Chemistry in A Sierra Nevada Watershed," has been submitted by the University of California, Santa Barbara;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

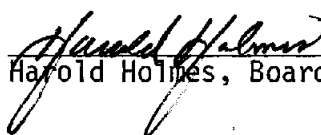
Proposal Number 141-20, entitled "Snow, Snow Melt, Rain, Runoff and Chemistry in a Sierra Nevada Watershed," has been submitted by the University of California, Santa Barbara, for a total amount not to exceed \$365,002.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 141-20, entitled "Snow, Snow Melt, Rain, Runoff and Chemistry in a Sierra Nevada Watershed," has been submitted by the University of California, Santa Barbara, for a total amount not to exceed \$365,002.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$365,002.

I hereby certify that the above is a true and correct copy of Resolution 87-7, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-2-4(b) 5
DATE: January 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 141-20 entitled "Snow, Snow Melt, Rain, Runoff and Chemistry in a Sierra Nevada Watershed"

RECOMMENDATION: Adopt Resolution 87-7 approving Proposal No. 141-20 for funding in an amount not to exceed \$365,002.

SUMMARY: The major objective of this study is to characterize snow and hydrologic processes in the Emerald Lake Basin, Sequoia National Park, as part of the ARB's Integrated Watershed Study (IWS). This field and modeling study is a continuation of work begun in 1984 to determine the effects of acid deposition on a representative, high-elevation watershed of the Sierra Nevada.

The IWS Study is a coordinated series of studies at a high-elevation site (9200') in the Sierra Nevada designed to monitor potential effects of acid deposition on the biogeochemistry of a subalpine system. To determine the effects of acid deposition to Sierra watersheds, it is necessary to understand the chemistry of snow inputs, which often represent greater than 90 percent of the total wet deposition to these systems. It is also crucial to understand the way water flows through the Basin during snowmelt and summer storm events. These flow paths determine the amount of buffering materials that reach the lake and neutralize acidic materials.

To accomplish these objectives, the proponents will collect field data at the IWS site during two winter seasons, and during the summer 1987. These measurements will include: total deposition volume and chemistry, surface and groundwater flows and storages, meteorological variables and snowmelt runoff and episodic stream chemistry.

These data, along with existing data bases, will be used to formulate snowmelt and runoff routing models for the Basin. The data will be used to validate the models. These models will be formulated so that they can be used as part of a biogeochemical model of the watershed to predict the response of the watershed to various levels of acid deposition.

B U D G E T S U M M A R Y

"Snow, Snow Melt, Rain Runoff and Chemistry
in a Sierra Nevada Watershed"

BUDGET ITEMS:

Salaries	\$213,495	
Benefits	26,849	
Supplies	29,930*	
Equipment	7,500**	
Other Costs	31,510***	
Travel	<u>23,218</u>	
TOTAL, Direct Costs		\$332,502
TOTAL, Indirect Costs (10%)		<u>32,500</u>
	<u>TOTAL PROJECT COST</u>	<u>\$365,002</u>

* Sample collection materials, laboratory chemical supplies and personnel field equipment for collection and analysis of approximately, 1,000 samples.

** Equipment includes an autotitrator (\$4,500) and a capacitance meter for liquid water content measurements (\$2,000)

*** Includes computer time (\$19,500), satellite data (\$9,900) and aerial overflights (\$4,000) for data and modeling purposes.

87-8
Missing
Resolution

State of California
AIR RESOURCES BOARD

Resolution 87-9

January 23, 1987

Agenda Item No.: 87-2-1

WHEREAS, Sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the "Board") to do such acts and to adopt such regulations as may be necessary for the proper execution of the powers and duties granted to, and imposed upon, the Board by law;

WHEREAS, Chapter 3.5 (commencing with Section 39650) of Part 2 of Division 26 of the Health and Safety Code establishes procedures for the identification of toxic air contaminants by the Board;

WHEREAS, Section 39655 of the Health and Safety Code defines a "toxic air contaminant" as an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health;

WHEREAS, Section 39662 of the Health and Safety Code directs the Board to list, by regulation, substances determined to be toxic air contaminants, and to specify for each substance listed a threshold exposure level, if any, below which no significant adverse health effects are anticipated;

WHEREAS, in California, cadmium (metallic cadmium and cadmium compounds, hereinafter "cadmium") is emitted from certain industrial processes such as secondary smelting operations, cement manufacturing, and combustion of fossil fuels, and has been measured in the atmosphere;

WHEREAS, pursuant to the request of the Board, the Department of Health Services (DHS) evaluated the health effects of cadmium in accordance with Section 39660 of the Health and Safety Code;

WHEREAS, DHS concluded in its evaluation that cadmium is an animal carcinogen with epidemiological evidence of carcinogenicity in humans; cadmium should be treated as a substance without a carcinogenic threshold; health effects other than cancer are not expected to occur at existing or expected ambient levels of cadmium; and the maximum excess lifetime cancer risk from cadmium exposure is estimated to range from 2 to 12 cases per million people exposed per nanogram per cubic meter;

WHEREAS, for the reasons set forth in its evaluation, DHS has concluded that, in the absence of strong positive evidence that cadmium acts only through mechanisms which ought to have a threshold, cadmium should be treated as acting without a threshold, and DHS has determined that there is not sufficient available scientific evidence at this time to support the identification of a cadmium exposure level below which carcinogenic effects would not have some probability of occurring;

WHEREAS, upon receipt of the DHS evaluation, staff of the Board prepared a report including and in consideration of the DHS evaluation and recommendations and in the form required by Section 39661 of the Health and Safety Code and, in accordance with the provisions of that section, made the report available to the public and submitted it for review to the Scientific Review Panel (SRP) established pursuant to Section 39670 of the Health and Safety Code;

WHEREAS, in accordance with Section 39661 of the Health and Safety Code, the SRP reviewed the staff report, including the scientific procedures and methods used to support the data in the report, the data itself, and the conclusions and assessments on which the report was based, considered the public comments received regarding the report, and on October 30, 1986, adopted for submittal to the Board findings which included the following:

- "1. Cadmium is an animal carcinogen for which there is epidemiologic evidence of carcinogenicity in humans exposed in occupational settings.
- "2. Cadmium is emitted into the air by a variety of sources in California, and its presence has been documented in the ambient air around the state.

The SRP notes that the sub-population of Californians who smoke tobacco or breathe second-hand tobacco smoke will be exposed to cadmium at concentrations several orders of magnitude greater than the exposure of the general population.

The SRP also wishes to emphasize that estimates of cumulative exposure to cadmium should account for cadmium levels in indoor air which, in the absence of tobacco smoke, may be lower than those in outdoor air.

- "3. Adverse health effects other than cancer are not expected to occur at measured or predicted cadmium concentrations in the ambient air.
- "4. Based on available scientific information, a cadmium exposure level below which carcinogenic effects are not expected to occur cannot be identified.

- "5. Based on an interpretation of available scientific evidence by DHS, the range of lifetime excess cancer risk from exposure to 1 ng/m³ of atmospheric cadmium based on the best estimate of risk and the upper 95% confidence limit is estimated to be 2 to 12 cases per million people exposed; it is unlikely that the risk will exceed this range, and may be lower.

"NOTE: DHS has assumed that the carcinogenic dose response of cadmium is linear and that dose rate does not influence the magnitude of carcinogenic effects. These assumptions are justified by DHS on the basis of being health conservative. While the SRP understands the reasons for this, weighing of the available scientific evidence indicates that the upper bound of the low dose risk estimate obtained by using these assumptions is likely to be high. The available data are also consistent with the possibility that the risk of lung cancer from current ambient exposures to cadmium in California may be vanishingly small."

WHEREAS, the SRP found the staff report to be without serious deficiency, and included in its findings the statement that it agreed that cadmium should be listed by the Air Resources Board as a toxic air contaminant, and that there is not sufficient available scientific evidence at this time to support the designation of an exposure level below which carcinogenic effects would not have some probability of occurring;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of the Government Code;

WHEREAS, in consideration of the staff report, including DHS' evaluation and recommendations, the available evidence, the findings of the SRP, and the written comments and public testimony it has received, the Board finds that:

Cadmium is an animal carcinogen with epidemiological evidence of carcinogenicity in humans;

Health effects other than cancer are not anticipated at existing ambient cadmium exposure levels;

There is not sufficient available scientific evidence to support the identification of a threshold exposure level for cadmium; and

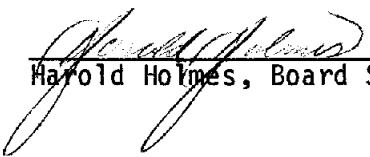
Cadmium is an air pollutant which, because of its carcinogenicity, may cause or contribute to an increase in mortality and an increase in serious illness, and poses a hazard to human health; and

WHEREAS, the Board has determined, pursuant to the requirements of the California Environmental Quality Act and Board regulations, that this regulatory action will have no significant adverse impact on the environment.

NOW, THEREFORE BE IT RESOLVED, that the Board approves the proposed regulatory amendments to Section 93000, Title 17, California Administrative Code, as set forth in Attachment A.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt the amendments, as set forth in Attachment A, after making it available to the public for a period of 15 days, provided that the Executive Officer shall consider such written comments regarding the changes in the regulations as originally proposed as may be submitted during this period, shall make such modifications as may be appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if he determines that this is warranted.

I hereby certify that the above is a true and correct copy of Resolution 87-9, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

Amend Title 17, California Administrative Code, Section 93000 to read as follows:

93000. Substances Identified As Toxic Air Contaminants. Each substance identified in this section has been determined by the state board to be a toxic air contaminant as defined in Health and Safety Code Section 39655. If the state board has found there to be a threshold exposure level below which no significant adverse health effects are anticipated from exposure to the identified substance, that level is specified as the threshold determination. If the board has found there to be no threshold exposure level below which no significant adverse health effects are anticipated from exposure to the identified substance, determination of "no threshold" is specified. If the board has found that there is not sufficient available scientific evidence to support the identification of a threshold exposure level, the "Threshold" column specifies "None identified."

<u>Substance</u>	<u>Threshold</u>
Benzene (C ₆ H ₆)	None identified
Ethylene Dibromide (BrCH ₂ CH ₂ Br; 1,2-dibromoethane)	None identified
Ethylene Dichloride (ClCH ₂ CH ₂ Cl; 1,2-dichloroethane)	None identified
Hexavalent Chromium, Cr(VI)	None identified
Asbestos [asbestiform varieties of serpentine (chrysotile) riebeckite (crocidolite) cummingtonite-grunerite (amosite), tremolite, actinolite, and anthophyllite]	None identified
Dibenzo-p-dioxins and Dibenzofurans chlorinated in the 2,3,7 and 8 positions and containing 4,5,6 or 7 chlorine atoms*	None identified
<u>Cadmium (metallic cadmium and cadmium compounds)</u>	<u>None identified</u>

NOTE: Authority cited: Sections 39600, 39601 and 39662, Health and Safety Code. Reference: Sections 39650, 39660, 39661 and 39662, Health and Safety Code.

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Public Hearing to Consider the Adoption of a Regulatory Amendment
Identifying Metallic Cadmium and Cadmium Compounds as Toxic Air
Contaminants

Agenda Item No.: 87-2-1

Public Hearing Date: January 23, 1987

Response Date: March 2, 1987

Issuing Authority: Air Resources Board

Comments: No comments were received identifying any significant environmental
issues pertaining to this item. The staff report identified no
adverse environmental effects.

Response: N/A

CERTIFIED:

Pat Hutchins for Harold Holmes
Board Secretary

Date:

9/21/87

State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : November 19, 1987

Subject : Filing of Notice
of Decisions of
the Air Resources
Board

Harold Holmes
Harold Holmes
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

ATTACHMENTS

86-68
86-70
86-71
86-94
86-98
86-99
86-115
87-9
87-61
87-66

State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : January 13, 1988

Subject : Filing of Notice
of Decisions of
the Air Resources
Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

ATTACHMENTS

86-68
86-70
86-71
86-94
86-98
86-99
86-115
87-9
87-61
87-62
87-66
88-1
88-8

State of California
AIR RESOURCES BOARD

Resolution 87-10

January 23, 1987

Agenda Item No.: 87-2-2

WHEREAS, Health and Safety Code Section 41805.5 requires the Air Resources Board ("Board"), in coordination with the air pollution control districts, to develop and publish test guidelines for landfill gas and ambient air testing at active solid waste disposal sites on or before February 1, 1987;

WHEREAS, the Board approved "Testing Guidelines for Active Solid Waste Disposal Sites" at a public meeting held December 18, 1986;

WHEREAS, Health and Safety Code Section 41805.5 defines a solid waste disposal site to include sites which accept or have accepted hazardous waste;

WHEREAS, the Air Resources Board staff, with the participation of representatives of local air pollution control districts, the Department of Health Services and the Water Resources Control Board, have prepared a proposed guidance document titled "Hazardous Waste Disposal Site Testing Guidelines" ("guidelines");

WHEREAS, Health and Safety Code Section 41805.5 requires owners of active solid waste disposal sites to submit a solid waste air quality assessment test report to the local air pollution control districts;

WHEREAS, Health and Safety Code Section 41805.5 requires the Air Resources Board to publish guidelines specifying air contaminants to be tested for and identifying acceptable testing, analytical and reporting methods;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as proposed if feasible alternatives or mitigation measures are available;

WHEREAS, the Board has held a noticed public meeting to consider approval of the proposed guidelines and has received and considered the comments presented by its staff, representatives of the districts, affected government agencies, affected businesses, and other interested persons and agencies on the proposed guidelines; and

WHEREAS, the Board finds that:

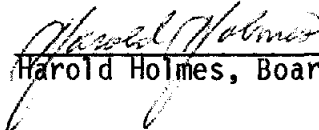
The proposed "Hazardous Waste Disposal Site Testing Guidelines," with the "Testing Guidelines for Active Solid Waste Disposal Sites" adopted December 18, 1986, fulfill the requirements of Health and Safety Code Section 41805.5; and

No significant adverse environmental impacts associated with the proposed guidelines have been identified, and no potentially adverse environmental effects are likely to result from the implementation of the proposed guidelines.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board approves the "Hazardous Waste Disposal Site Testing Guidelines" dated January 23, 1987, as set forth in Attachment A.

BE IT FURTHER RESOLVED that the Executive Officer shall forward the guidelines to air pollution control districts for their use in evaluating solid waste disposal site air quality assessment test reports.

I hereby certify that the above is a true and correct copy of Resolution 87-10, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

JANUARY 1987

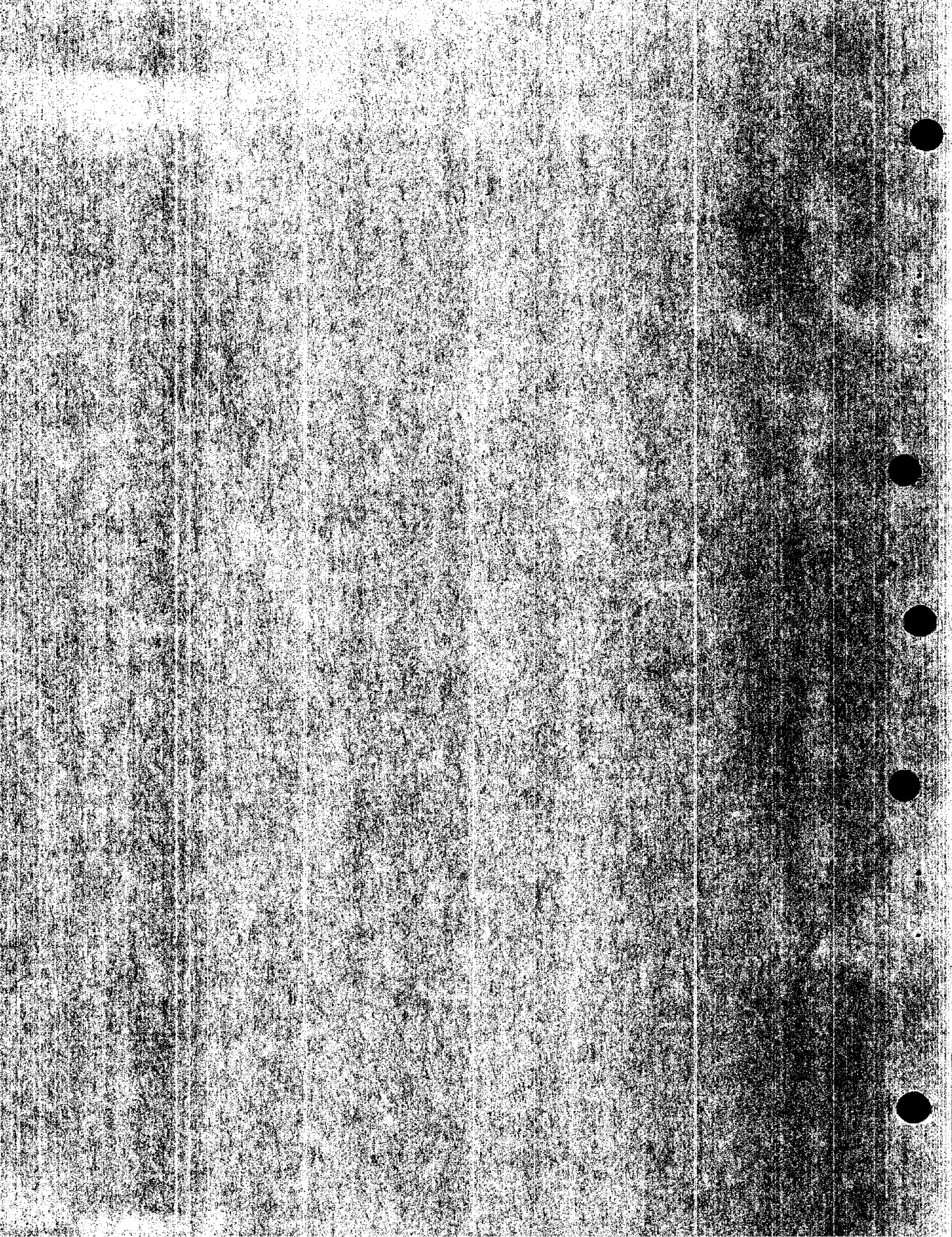
Testing Guidelines

Hazardous Waste Disposal

State of California

AIR RESOURCES BOARD





AIR RESOURCES BOARD

1102 Q STREET
P.O. BOX 2815
SACRAMENTO, CA 95812



February 2, 1987

Dear Sir or Madam:

Enclosed are testing guidelines which were prepared to meet the requirements of Health and Safety Code Section 41805.5 (AB 3374, Calderon, 1986). The Testing Guidelines for Solid Waste Disposal Sites, approved by Air Resources Board on December 18, 1986, were prepared for solid waste disposal sites which have accepted only non-hazardous waste. The Hazardous Waste Disposal Site Testing Guidelines, approved by the Air Resources Board on January 23, 1987, were prepared for sites which have accepted hazardous waste or both hazardous and solid waste (co-disposal).

If you have any questions regarding the Testing Guidelines for Solid Waste Disposal Sites, please call Kerry Holliday at (916) 322-6005. For questions regarding the Hazardous Waste Disposal Site Testing Guidelines, please call Lynn Baker at (916) 323-8511.

Sincerely,

A handwritten signature in cursive script, appearing to read "Bob Barham".

Bob Barham, Manager
Source Evaluation Section

State of California
AIR RESOURCES BOARD

Resolution 87-10

January 23, 1987

Agenda Item No.: 87-2-2

WHEREAS, Health and Safety Code Section 41805.5 requires the Air Resources Board ("Board"), in coordination with the air pollution control districts, to develop and publish test guidelines for landfill gas and ambient air testing at active solid waste disposal sites on or before February 1, 1987;

WHEREAS, the Board approved "Testing Guidelines for Active Solid Waste Disposal Sites" at a public meeting held December 18, 1986;

WHEREAS, Health and Safety Code Section 41805.5 defines a solid waste disposal site to include sites which accept or have accepted hazardous waste;

WHEREAS, the Air Resources Board staff, with the participation of representatives of local air pollution control districts, the Department of Health Services and the Water Resources Control Board, have prepared a proposed guidance document titled "Hazardous Waste Disposal Site Testing Guidelines" ("guidelines");

WHEREAS, Health and Safety Code Section 41805.5 requires owners of active solid waste disposal sites to submit a solid waste air quality assessment test report to the local air pollution control districts;

WHEREAS, Health and Safety Code Section 41805.5 requires the Air Resources Board to publish guidelines specifying air contaminants to be tested for and identifying acceptable testing, analytical and reporting methods;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as proposed if feasible alternatives or mitigation measures are available;

WHEREAS, the Board has held a noticed public meeting to consider approval of the proposed guidelines and has received and considered the comments presented by its staff, representatives of the districts, affected government agencies, affected businesses, and other interested persons and agencies on the proposed guidelines; and

WHEREAS, the Board finds that:

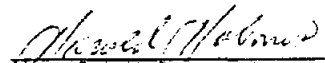
The proposed "Hazardous Waste Disposal Site Testing Guidelines," with the "Testing Guidelines for Active Solid Waste Disposal Sites" adopted December 18, 1986, fulfill the requirements of Health and Safety Code Section 41805.5; and

No significant adverse environmental impacts associated with the proposed guidelines have been identified, and no potentially adverse environmental effects are likely to result from the implementation of the proposed guidelines.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board approves the "Hazardous Waste Disposal Site Testing Guidelines" dated January 23, 1987, as set forth in Attachment A.

BE IT FURTHER RESOLVED that the Executive Officer shall forward the guidelines to air pollution control districts for their use in evaluating solid waste disposal site air quality assessment test reports.

I hereby certify that the above is a true and correct copy of Resolution 87-10, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

WHEREAS, the Board finds that:

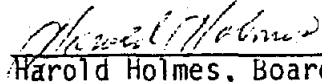
The proposed "Hazardous Waste Disposal Site Testing Guidelines," with the "Testing Guidelines for Active Solid Waste Disposal Sites" adopted December 18, 1986, fulfill the requirements of Health and Safety Code Section 41805.5; and

No significant adverse environmental impacts associated with the proposed guidelines have been identified, and no potentially adverse environmental effects are likely to result from the implementation of the proposed guidelines.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board approves the "Hazardous Waste Disposal Site Testing Guidelines" dated January 23, 1987, as set forth in Attachment A.

BE IT FURTHER RESOLVED that the Executive Officer shall forward the guidelines to air pollution control districts for their use in evaluating solid waste disposal site air quality assessment test reports.

I hereby certify that the above is a true and correct copy of Resolution 87-10, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

State of California
Air Resources Board

HAZARDOUS WASTE DISPOSAL SITE TESTING GUIDELINES

Prepared Pursuant to
California Health and Safety Code Section 41805.5

Prepared by
California Air Resources Board
Stationary Source Division
Toxic Pollutants Branch

and

California Air Pollution Control Officers Association
Landfill Gas Testing Guidelines Working Committee

January 23, 1987

ACKNOWLEDGEMENTS

This document was written with the help of the CAPCOA Guidelines Committee whose time, energy, and patience has been greatly appreciated. We would particularly like to thank:

District Representatives

Tom Brennan
Larry Borrelli
Eric Skelton
Carl Norstedt
Paul Sidhu
Stella Willcox
Fred Lettice

Bay Area AQMD
Monterey Bay Unified APCD
Sacramento County APCD
San Bernardino County APCD
San Diego County APCD
San Diego County APCD
South Coast AQMD

ARB Representatives

Robert Barham
Lynn Baker
Kerry Holliday

California Waste Management Board Representative

Bill Orr

State Water Resources Control Board Representative

Jeff Barnickol

Second Printing
February 1987

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Attachment 2	Specified Air Contaminants
Attachment 3	Report Formats
Attachment 4	Analysis Methods
Attachment 5	Quality Assurance Chain of Custody Form

HAZARDOUS WASTE DISPOSAL SITE TESTING GUIDELINES

Prepared Pursuant to
California Health and Safety Code Section 41805.5

I. INTRODUCTION

A. Background

AB 3374 (Calderon) (Health and Safety Code (HSC) Section 41805.5, included as Attachment 1) requires all active solid waste disposal sites which have accepted solid and/or hazardous waste to conduct measurements to determine the composition of landfill gases, the presence of specified air contaminants in the ambient air, and whether off-site subsurface migration of landfill gas is occurring. To implement this new statute, ARB, in consultation with the air pollution control districts (APCD), was directed to develop guidelines "specifying the air contaminants to be tested for, and identifying acceptable testing, analytical, and reporting methods to be employed in completing the report." These guidelines apply to sites which have accepted hazardous waste, or solid and hazardous wastes (co-disposal). Separate guidelines have been prepared for sites which have accepted only solid waste.

The testing suggested in these guidelines is designed to provide an initial screening of disposal sites to determine which sites in the state may pose a potential public health risk. The APCD will review the test reports, and if the APCD determines the sites may pose a health risk, the sites may have to conduct additional monitoring or take remedial action.

All disposal site owners must submit testing proposals to the APCD for approval before any testing can begin. Climate and land differences in different parts of the state may require variations in the test procedures. Accordingly, testing and procedure variations are allowed in the guidelines.

All active disposal sites are required to conduct testing by July 1, 1987. An active disposal site is one which is currently receiving or has received solid waste since January 1, 1984. HSC 41805.5 defines an inactive site as one which has not received solid waste since January 1, 1984. Inactive sites should have completed and filed a screening questionnaire with the local APCD before November 1, 1986. Inactive sites should contact their APCD for information on the questionnaire. If the test report is not complete by July 1, 1987, the APCD may place the disposal site on a compliance schedule which includes a date by which the report must be filed. This date may not be later than January 1, 1989.

B. Report To The Air Pollution Control Officer

HSC 41805.5 requires all disposal site owners or operators to submit a test report to the local air pollution control officer (APCO). The test report for active landfills is due on July 1, 1987. To comply with HSC 41805.5, the test report must contain:

"1. Chemical characterization test results to determine the composition of gas streams immediately above the solid waste disposal site, or immediately above the solid waste disposal site and within the solid waste disposal site, as appropriate, as determined by the district.

2. Analyses for specified air contaminants in the ambient air adjacent to the solid waste disposal site to determine the effect of the site on air quality.

3. Test results to determine if there is any underground landfill gas migration beyond the solid waste disposal site's perimeter."

Testing is conducted for all compounds listed in Attachment 2. The APCO may also require review of additional compounds upon identification of testing and health effects information. Section II contains the gas stream characterization procedures. For the gas stream characterization test at disposal sites with landfills containing hazardous or solid and hazardous wastes, the integrated surface sample or the landfill gas test and the integrated surface sample will be used to determine what is in the landfill gas. At surface impoundments containing liquid hazardous wastes, landspreading operations, waste piles (uncovered landfills), or drum burial sites, an integrated surface sample will be collected around the perimeter of the impoundment. Section III contains the ambient air testing procedures. For the ambient air test, the site operator will conduct 10 days of ambient air samples at the site perimeter. Section IV contains the gas migration testing procedures. For the gas migration test at co-disposal sites, one migration test well will be installed for each 1000 feet of site perimeter for sampling to determine if there is off-site gas migration. The perimeter probes will be installed between the site and areas where off-site migration would cause the greatest threat to public health and safety. At disposal sites which have received only hazardous waste, a maximum of four wells will be installed around the perimeter of the site.

HSC 41805.5 requires all solid waste assessment test reports to be filed by July 1, 1987. If, however, the report is not complete by that date, the APCO can place the disposal site on a compliance schedule which includes a date by which the report must be filed.

To ensure that an adequate hazardous waste test report is prepared, each disposal site owner must submit a proposal to the APCO. The proposal should include a description of the gas characterization system to be used, location of all monitoring wells both on and off the site, an ambient air monitoring plan including a meteorological data summary, and all the results of past air or landfill gas testing performed at the site, including the results of any testing done to prepare the proposal. Testing cannot begin until the APCO approves the monitoring plan.

C. Report To The Air Resources Board

Government Code Section 66796.54(b) requires the ARB to prepare a report to the legislature on "the extent of hazardous waste in solid waste disposal sites and the potential effects these hazardous wastes may have upon the ambient air quality of the state." In order to prepare this report the ARB will review the data gathered under the guidelines. The form for the report to the ARB is Attachment 3. This form should be completed by the site operator and forwarded to the APCO with the report. Once the APCO determines the hazardous waste assessment test report is adequate, the form should be forwarded to the ARB.

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2. Analyses for specified air contaminants in the ambient air adjacent to the solid waste disposal site to determine the effect of the site on air quality.

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II. GAS STREAM CHARACTERIZATION

HSC 41805.5 requires hazardous waste assessment test reports to include test results to determine the composition of gas streams immediately above the site, or immediately above the site and within the site, as appropriate, as determined by the APCO. Based on information provided on the individual disposal site, the APCO must determine which method is appropriate to characterize the site. The gas stream characterization may consist of one of the following methods:

1. Testing the air immediately above the surface or around the perimeter of the disposal site using the integrated surface sample, or
2. Testing the air immediately above the landfill surface and testing the gas within the landfill using both the integrated surface sample and the landfill gas sample.

The following gas characterization methods are recommended for different disposal operations:

TABLE 1: GAS CHARACTERIZATION METHODS

<u>Disposal operation</u>	<u>Gas characterization method</u>
Landfill	Integrated surface sample, or landfill gas test and integrated surface sample
Surface impoundment	Integrated surface sample
Landspreading	Integrated surface sample
Drum burial	Integrated surface sample
Waste pile (uncovered landfill)	Integrated surface sample

If the APCO approves characterization of the landfill gas by sampling the air immediately above the disposal site, then an integrated surface sample is taken. For landfilled and drum burial areas, the integrated surface sample involves sampling the air three inches above the landfill surface while a technician walks a prescribed course with the sampling equipment over one 50,000 square-foot grid of the landfill surface. The process is repeated for five 50,000 square-foot grid of the site and the samples are analyzed for the Attachment 2 compounds. For surface impoundments, waste piles, and landspreading operations, the integrated surface sample involves sampling the air around the perimeter of each impoundment while a technician walks around the impoundment. If the site accepted solid and hazardous waste, methane analysis is also required to gather information on overall site emissions.

Landfill gas testing involves taking samples of the landfill gas out of the interior of the landfill and testing them for the Attachment 2 compounds. The samples are also analyzed for oxygen and nitrogen for information on sample integrity. Carbon dioxide and methane concentrations will give information on gas production.

If the APCO approves characterization of the landfill gas by sampling the air immediately above the landfill surface and within the landfill, the operator should conduct the landfill gas testing as set out in these guidelines, and the integrated surface sampling for one 50,000 square-foot grid of the landfill.

Landfill gas testing requires the compounds listed in Attachment 2 to be determined to the "disposal site" detection limits. Integrated surface sampling requires the compounds listed in Attachment 2 to be determined to the "air" detection limits.

A. Landfill Gas Testing

If the disposal site has an operating interior gas collection system, samples should be taken from the system; additional wells need not be installed. Each installed well should be to a depth of at least 6 feet below the bottom of the intermediate or final cover. The well should not penetrate any leachate liner. During installation the contractor should take appropriate steps to mitigate the public nuisance of gas escape. All wells should be capped when not being sampled.

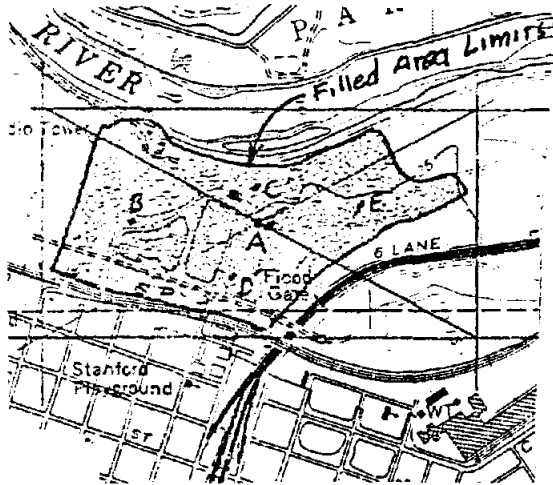


Figure 1: Well Location Example

To locate the wells, draw a box around the landfilled area on a scale map with the box sides 100 feet outside the filled area edge. The sides should run north-south, east-west. Connect the opposite corners with diagonals. Locate 5 points: Point A at the diagonal intersection, point B at the center of the largest sector formed by the diagonals and the filled area, point C at the center of the next larger sector, point D at the center of the next larger sector, and point E at the center of the smallest sector. Figure 1 is an example. Five samples should be taken, one sample from each well and analyzed for the Attachment 2 compounds.

To complete the HSC 41805.5 requirements for characterizing landfill gas, the owner should perform an investigation of methane emissions from one 50,000 square-foot grid of the disposal site along with the landfill gas test. This sample may be collected using an integrated surface sample as described in these guidelines or by taking methane measurements with a portable flame ionization detector, with a lower detection limit of 2 ppm. The grid and sampling method selected should be approved by the APCO.

1. Protocol

The technician should make certain the seal around the top of the well does not allow air infiltration. The well should not be sampled until 24 hours after the installation is complete. To sample the well, the technician attaches the pump and withdraws at least 2 well volumes from the well. The technician then attaches the bag and draws a ten liter sample at a one liter per minute rate. The bag should be in a light sealed container and should be analyzed within 72 hours.

If the APCO approves characterization of the landfill gas by sampling the air immediately above the landfill surface and within the landfill, the operator should conduct the landfill gas testing as set out in these guidelines, and the integrated surface sampling for one 50,000 square-foot grid of the landfill.

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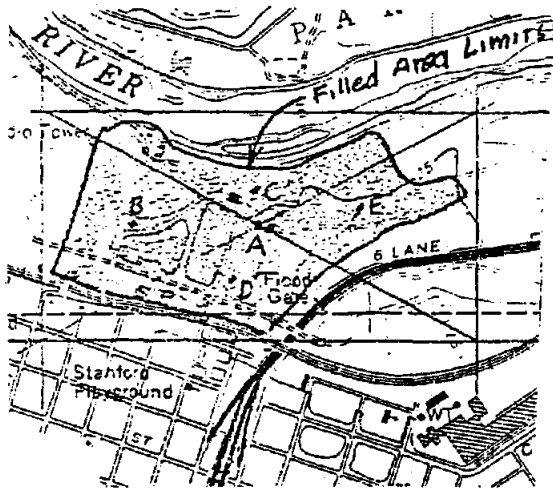


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To locate the wells, draw a box around the landfilled area on a scale map with the box sides 100 feet outside the filled area edge. The sides should run north-south, east-west. Connect the opposite corners with diagonals. Locate 5 points: Point A at the diagonal intersection, point B at the center of the largest sector formed by the diagonals and the filled area, point C at the center of the next larger sector, point D at the center of the next larger sector, and point E at the center of the smallest sector. Figure 1 is an example. Five samples should be taken, one sample from each well and analyzed for the Attachment 2 compounds.

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1. Protocol

The technician should make certain the seal around the top of the well does not allow air infiltration. The well should not be sampled until 24 hours after the installation is complete. To sample the well, the technician attaches the pump and withdraws at least 2 well volumes from the well. The technician then attaches the bag and draws a ten liter sample at a one liter per minute rate. The bag should be in a light sealed container and should be analyzed within 72 hours.

If the owner chooses to leave the well intact for future sampling, the pipe should be capped or a valve installed to prevent gas leakage. If the owner removes the well, the hole should be filled and resealed to prevent gas escape.

2. Data

For each sample, the owner should record:

- a. Date, time, and sample location.
- b. Methane, CO₂, oxygen, and nitrogen concentrations.
- c. Concentrations of compounds listed in Attachment 2. Analytical methods are included in Attachment 4.
- d. The operating schedule, status, and gas quantity extracted for any landfill gas collection system for the previous 3 days for each day sampled.

B. Integrated Surface Sampling

The integrated surface sample is a method of characterizing disposal site emissions. Integrated surface sampling is designed to sample the emissions immediately after they have passed through the final landfill cover or after they have evaporated from a surface impoundment, waste pile, or landspreading operation. Because the sampling system will dilute the emitted landfill gas, use of more sensitive analytical methods are necessary to adequately characterize the sample.

For landfilled and drum burial areas, the owner will collect and analyze a minimum of five samples, one sample from each 50,000 square foot grid centered on points as determined in Figure 1 on page 4. Figure 2 is a typical walking pattern for each grid. For surface impoundments, waste piles, or landspreading operations, one sample will be collected from the air around the perimeter of each such disposal area on the site.

Sloped areas of the disposal site should be investigated along with the level areas. If investigation of the steep areas is a safety concern, the owner does not have to test these areas. The areas not to be tested must be approved prior to the testing by the APCO.

1. Number of Samples

One sample will be collected from each of the five grids, and one sample from near the edge of any surface impoundment, waste pile, or landspreading operation on the site.

2. Sampling Conditions

- a. Average wind speed suitable for this sampling procedure is less than 5 miles per hour. Surface sampling should be terminated when the average wind speed exceeds 5 miles per hour or the instantaneous wind speed exceeds 10 miles per hour. Average wind speed is determined on a 10 minute average.
- b. Surface monitoring is to be conducted when the disposal site is dry and no rain has

fallen. The disposal site is considered dry when there has been no rain for the 72 hours prior to sampling.

3. Equipment Description

An integrated surface sampler is a portable self-contained unit with its own internal power source. The integrated sampler consists of a stainless steel collection probe approximately 3.5 inches in diameter (funnel: 316 stainless steel), a flow meter, a pump, and a 10-liter Tedlar[®] bag enclosed in a light sealed cardboard box.

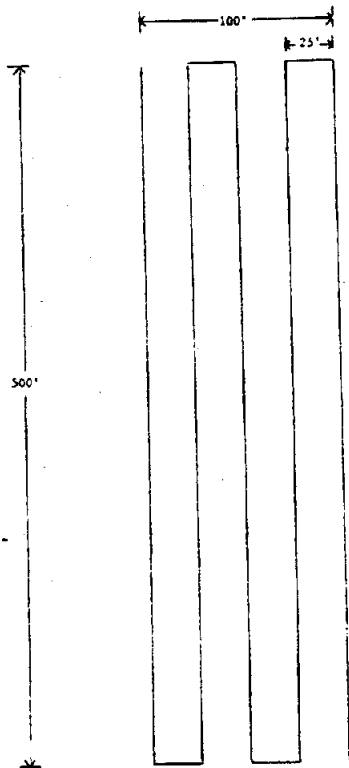


Figure 2: Walking Pattern

Source: South Coast AQMD

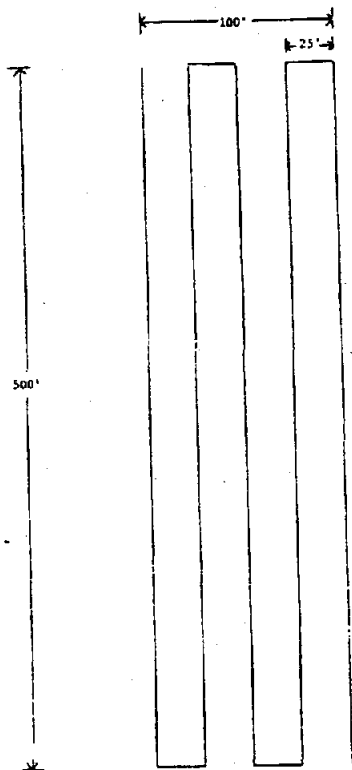
- a. Power: Two 9 volt batteries.
- b. Pump: One 12V DC pump. The diaphragm is made of nonlubricated Viton[®] rubber. The maximum pump unloaded flow rate is 4.5 liters per minute.
- c. One 10-liter Tedlar[®] bag with a valve. The Tedlar[®] bag is contained in a light sealed cardboard box to prevent photochemical reactions from occurring during sampling and transportation. The valve is a push-pull type constructed of aluminum and stainless steel, with a Viton[®] o-ring seal.
- d. Rotameter made of borosilicate glass with a flow range of 0 to 1 liter per minute. The scale is in milliliters with major graduations (labeled) every 5 ml and minor graduations every 1 ml.

- e. Air Flow Control Orifice: Needle valve in the flow meter.
- f. Funnel: 316 stainless steel.
- g. Fittings, tubing and connectors: 316 stainless steel or Teflon[®].
- h. An anemometer with a continuous recorder: 3 cup assembly, range 0 - 50 miles per hour, with a threshold limit of 0.75 miles per hour or less.

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a. Power: Two 9 volt batteries.

b. Pump: One 12V DC pump. The diaphragm is made of nonlubricated Viton[®] rubber. The maximum pump unloaded flow rate is 4.5 liters per minute.

c. One 10-liter Tedlar[®] bag with a valve. The Tedlar[®] bag is contained in a light sealed cardboard box to prevent photochemical reactions from occurring during sampling and transportation. The valve is a push-pull type constructed of aluminum and stainless steel, with a Viton[®] o-ring seal.

d. Rotameter made of borosilicate glass with a flow range of 0 to 1 liter per minute. The scale is in milliliters with major graduations (labeled) every 5 ml and minor graduations every 1 ml.

Figure 2: Walking Pattern

Source: South Coast AQMD

e. Air Flow Control Orifice: Needle valve in the flow meter.

f. Funnel: 316 stainless steel.

g. Fittings, tubing and connectors: 316 stainless steel or Teflon[®].

h. An anemometer with a continuous recorder: 3 cup assembly, range 0 - 50 miles per hour, with a threshold limit of 0.75 miles per hour or less.

4. Sampling Procedure

A portable bag sampler as described in the previous section will be used to collect an integrated surface sample from each grid, and around the perimeter of each surface impoundment, waste pile, or landspreading operation. During sampling at landfills or drum burial areas, the probe is to be placed approximately 2 to 3 inches above the disposal site surface. A separate gas sample of approximately 8 to 10 liters will be collected from each grid or disposal area. For 50,000 square foot grids, the sampler will be set at a flow rate of approximately 333 cubic centimeters per minute and the technician will walk through a course of approximately 2,600 linear feet as shown in Figure 2 over a continuous 25-minute period. For other grid sizes or disposal areas, collection rates and walk patterns should be fixed to collect 8 to 10 liters, if prior approval is obtained from the APCO.

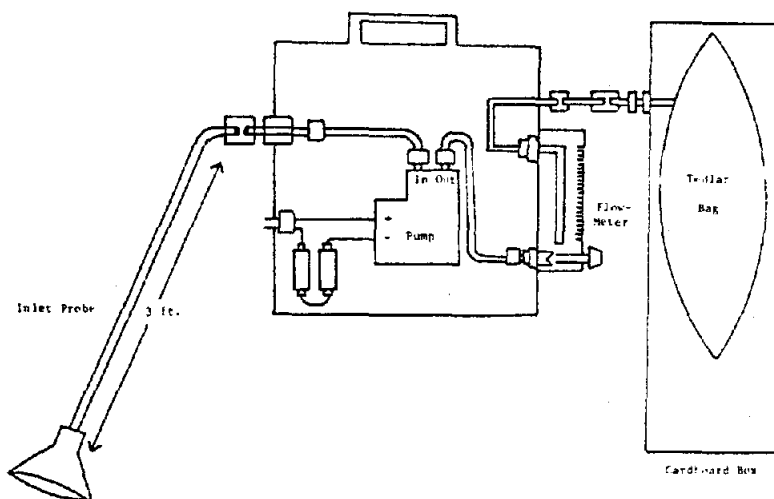


Figure 3: Integrated Surface Sampler

Source: South Coast AQMD

An anemometer and wind vane with continuous recorder will be installed at a site which is representative of the wind speeds and directions of the areas being sampled. The wind velocity should be recorded throughout the sampling period. The wind vane should be properly oriented.

5. Analytical Procedures

All bag samples collected should be analyzed within 72 hours of collection for total organic compounds and Attachment 2 compounds. The lower detection limits for these tests are listed in the "air" column of Attachment 2.

III. AMBIENT AIR MONITORING

HSC Section 41805.5 requires that air adjacent to disposal sites be tested and analyzed for specified air contaminants. To comply with HSC 41805.5, disposal site owners should conduct ambient air monitoring at the perimeter of the disposal site. The test should adequately characterize the contaminants in the air. The air column listed in Attachment

2 shows the lower detection limits to be achieved in parts per billion. Each disposal site should perform the ambient air sampling on ten separate, not necessarily consecutive, days. Ten days of ambient sampling provides an initial screening of hazardous waste disposal sites and allows for some daily variations in site operations, weather conditions, and emissions.

The disposal site operator is given the option of using one of three suggested procedures for testing the ambient air. These procedures were developed to cover differences in topography and climate which may occur at different sites. The option chosen will depend on the results of a meteorological survey conducted prior to ambient monitoring. Each option has two parts. One addresses sites with different day and night wind patterns and one addresses sites with the same day and night wind patterns.

A. OPTION 1

1. General Procedures

HSC Section 41805.5 requires that air adjacent to disposal sites be tested and analyzed for specified air contaminants. If the disposal site has a gas collection system which does not operate continuously, at least one of the sampling days should be a day before the gas collection system is turned on after a typical inoperative period. This option requires twenty-four hour samples to be taken on 10 separate, not necessarily consecutive, days.

2. Meteorological Survey

A meteorological survey should be conducted prior to ambient air sampling in order to determine the local wind flow patterns which will subsequently be used to help identify the number and location of samplers required for an effective ambient air monitoring program. The operator should submit the survey to the APCO prior to ambient sampling, as part of the monitoring plan. The survey should summarize how wind flow patterns at the site will be characterized based on: previously collected on-site meteorological data, data collected nearby (e.g., local airport data), proximity to water or terrain which may influence diurnal variations (e.g., daytime upslope winds, nighttime downslope, or sea breeze conditions), or a plan for on-site meteorological data collection prior to ambient monitoring. In completing an on-site meteorological survey prior to monitoring, wind sensors should be oriented with respect to north, located nine to twelve feet above the ground and a minimum of sixty feet from obstacles such as trees, shrubbery, and buildings.

3. Ambient Air Sampling

a. General Sampling Criteria

At the completion of the meteorological survey, and on approval of the APCO, ambient air sampling equipment will be installed at the appropriate locations which will be determined by:

1. Site topography,
2. Meteorological survey, and
3. Local land use patterns.

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2. Meteorological survey, and
3. Local land use patterns.

The sampling equipment should be located at or near the perimeter of the waste disposal site, in the clear and away from surrounding obstructions. The inlet probes for the ambient samplers should be located between six and nine feet off the ground (reaching height) and a minimum of sixty feet from obstacles such as trees, shrubbery and buildings. Air flow around the inlet probe should be unrestricted in an arc of at least 270 degrees with the predominant wind direction for greatest expected pollutant concentration potential included in the 270 degree arc. The sampler locations should be carefully selected to ensure the predicted prevailing wind patterns for the sampling date will come across the main body of the disposal site to the downwind station. Wind speed and direction measurements will continue to be collected throughout the ambient air sampling period to verify that the meteorological criteria are met.

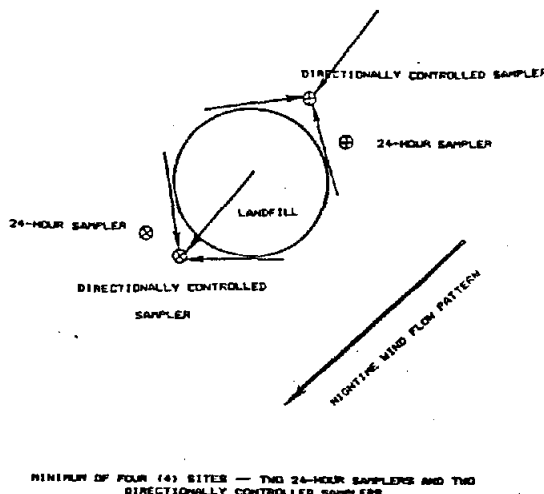


Figure 4: Option 1
Source: South Coast AQMD

Ambient air samples will be collected over a 24-hour period beginning and ending at 10:00 A.M. using the self-contained portable sampling units described in Equipment Description. In general, 24-hour and directionally controlled sampling will be required to ensure that maximum contaminant concentrations are identified for each sampling period. However, directionally controlled sampling may not be required at sites which have a constant wind direction for 24 hours. All samples will be removed from the samplers immediately after the 24-hour sampling period and analyzed for the required compounds. It is recommended that the sample be analyzed within 72 hours of collection.

b. Specific Sampling Criteria

i. At sites that experience different day and night wind flow patterns, a minimum of two 24-hour samplers and two directionally controlled samplers will be required. Twenty-four hour samplers will be placed at the upwind and downwind site perimeters based on the prevailing wind direction. The directionally controlled sampler(s) located downwind of the disposal site should be placed at sites which will sample under the stable (drainage) wind conditions identified in the meteorological survey. The directionally controlled sampler located upwind of the disposal site should be placed near the upwind 24-hour sampler. The 24-hour samplers will operate continuously for the specified 24 hours and the directionally controlled samplers will only operate when the wind direction is within a wind sector allowing air to pass across the disposal site to the downwind sampler. This will allow the downwind directionally controlled sampler(s) to only collect air that has *passed* over the disposal site and the upwind directionally controlled sampler to only collect air that has *not passed* over the disposal site.

ii. At sites that experience a constant wind direction for 24 hours, a minimum of two 24-hour samplers will be required. A 24-hour sampler will be placed both upwind and downwind of the site based on the prevailing wind direction so that the upwind sampler only collects air that has *not passed* over the disposal site and the downwind sampler only collects air that has *passed* over the disposal site. Additional 24-hour samplers should be placed at locations which will sample under the stable (drainage) wind conditions identified in the meteorological survey. Since the wind direction does not change, these 24-hour samplers will act as directionally controlled samplers as well as 24-hour samplers. Comparison of the results from these samplers will provide information on ambient air quality standards and the effects the disposal site has on the ambient air quality.

4. Sampling Conditions

Ambient air sampling should be conducted on days when stable and unstable meteorological conditions are characterized by the following meteorological conditions:

- a. Stable nights with average wind speeds of five miles per hour or less.
- b. Daytime conditions with average wind speeds of ten miles per hour or less.

No sampling will be conducted under the following adverse meteorological conditions:

- a. Precipitation
- b. Twenty-four hour average wind speeds greater than ten miles per hour.

5. Equipment Description

a. Bag Sampler

1. Pump with a diaphragm made of non-lubricated Viton[®] rubber. The maximum pump unloaded flow rate is 4.5 liters per minute.
2. One 10-liter Tedlar[®] bag with a push-pull valve constructed of aluminum and stainless steel with a Viton[®] o-ring seal.
3. Rotameter made of borosilicate glass with a flow range of three to fifty cubic centimeters per minute. The scale is in millimeters with major graduations (labeled) every 5 mm and minor graduations every 1 mm.
4. Air flow control orifice made with 316 stainless steel capillary tubing.
5. Bypass valve.
6. Fittings, tubing and connectors made with 316 stainless steel or teflon.
7. Clock timer with an accuracy that should be better than 1%.

ii. At sites that experience a constant wind direction for 24 hours, a minimum of two 24-hour samplers will be required. A 24-hour sampler will be placed both upwind and downwind of the site based on the prevailing wind direction so that the upwind sampler only collects air that has *not passed* over the disposal site and the downwind sampler only collects air that has *passed* over the disposal site. Additional 24-hour samplers should be placed at locations which will sample under the stable (drainage) wind conditions identified in the meteorological survey. Since the wind direction does not change, these 24-hour samplers will act as directionally controlled samplers as well as 24-hour samplers. Comparison of the results from these samplers will provide information on ambient air quality standards and the effects the disposal site has on the ambient air quality.

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5. Equipment Description

a. Bag Sampler

1. Pump with a diaphragm made of non-lubricated Viton[®] rubber. The maximum pump unloaded flow rate is 4.5 liters per minute.
2. One 10-liter Tedlar[®] bag with a push-pull valve constructed of aluminum and stainless steel with a Viton[®] o-ring seal.
3. Rotameter made of borosilicate glass with a flow range of three to fifty cubic centimeters per minute. The scale is in millimeters with major graduations (labeled) every 5 mm and minor graduations every 1 mm.
4. Air flow control orifice made with 316 stainless steel capillary tubing.
5. Bypass valve.
6. Fittings, tubing and connectors made with 316 stainless steel or teflon.
7. Clock timer with an accuracy that should be better than 1%.

b. Wind directionally controlled system

1. Wind direction sensor with a vane which has a range of 0 - 540 degrees and a threshold of 1.00 mile per hour or less.
2. Controller and indicator console with an indicator range of 0 - 360 degrees and an accuracy of $\pm 2\%$ of full scale.

c. Wind speed and direction monitoring with continuous recorder.

1. Anemometer three cup assembly with a range of 0-50 miles per hour and a threshold of 0.75 miles per hour or less.
2. Wind vane with a range of 0 - 540 degrees and a threshold of 1.00 miles per hour or less.

6. Wind Data Reporting

Wind data (speed and direction) will be reported as an hourly average. For example, the data collected between 1:00 P.M. and 2:00 P.M. will be averaged and reported as the 1:00 P.M. hourly average. Wind speeds will be reported in miles per hour. Wind directions will be reported using the sixteen point scale (sixteen directional points corresponding to the mariner's compass rose on which each direction is equivalent to a 22 1/2 degree sector of a 360 degree circle). For example, wind directions would be N, NNE, NE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, and NNW.

B. OPTION 2

1. General Procedures

HSC Section 41805.5 requires that air adjacent to disposal sites be tested and analyzed for specified air contaminants. These guidelines require that 24-hour and less than 24-hour ambient air sampling be conducted on 10 different, not necessarily consecutive, days.

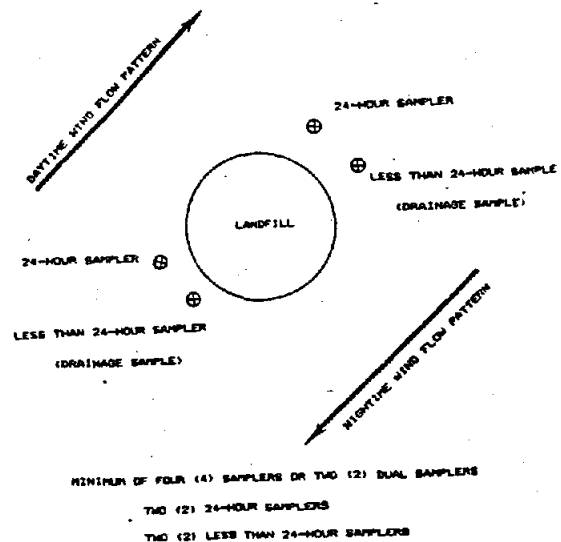


Figure 5: Option 2
Source: South Coast AQMD

2. Meteorological Survey

See Option 1.

3. Ambient Air Sampling

See Option 1, Subsection 3a, General Sampling Criteria.

a. At sites that experience different but predictable day and night wind flow patterns, a minimum of two 24-hour samplers and two less than 24-hour samplers will be required. One 24-hour sampler will be placed both upwind and downwind of the site based on the prevailing wind direction. The less than 24-hour sampler(s) located downwind of the disposal site should be placed at sites to sample under the stable (drainage) wind conditions identified in the meteorological survey. The less than 24-hour sampler located upwind of the disposal site should be placed near the upwind 24-hour sampler. The start and stop times for the less than 24-hour samplers will correspond to the stable (drainage) conditions identified by analyzing the hourly wind roses. The 24-hour samplers will operate continuously for the specified 24 hours and the less than 24-hour samplers will only operate when the wind direction is coming across the disposal site to the downwind sampler. This will allow the downwind less than 24-hour sampler(s) to only collect air that has *passed* over the disposal site and the upwind less than 24-hour sampler to only collect air that has *not passed* over the disposal site.

b. At sites that experience a constant wind direction for 24 hours, a minimum of two 24-hour samplers will be required. A 24-hour sampler will be placed both upwind and downwind of the site based on the prevailing wind direction so that the upwind sampler only collects air that has *not passed* over the disposal site and the downwind sampler only collects air that has *passed* over the disposal site. Additional 24 hour samplers should be placed at locations which will sample under the stable (drainage) wind conditions identified in the meteorological survey. Since the wind direction does not change, these 24-hour samplers will act as directionally controlled samplers as well as 24-hour samplers. Comparison of the results from these samplers will provide information on ambient air quality standards and the effects the disposal site has on the ambient air quality.

4. Sampling Conditions

See Option 1.

5. Equipment Description

See Option 1.

6. Wind Data Reporting

See Option 1.

C. OPTION 3

1. General Procedures

HSC Section 41805.5 requires that air adjacent to disposal sites be tested and analyzed

2. Meteorological Survey

See Option 1.

3. Ambient Air Sampling

See Option 1, Subsection 3a, General Sampling Criteria.

a. At sites that experience different but predictable day and night wind flow patterns, a minimum of two 24-hour samplers and two less than 24-hour samplers will be required. One 24-hour sampler will be placed both upwind and downwind of the site based on the prevailing wind direction. The less than 24-hour sampler(s) located downwind of the disposal site should be placed at sites to sample under the stable (drainage) wind conditions identified in the meteorological survey. The less than 24-hour sampler located upwind of the disposal site should be placed near the upwind 24-hour sampler. The start and stop times for the less than 24-hour samplers will correspond to the stable (drainage) conditions identified by analyzing the hourly wind roses. The 24-hour samplers will operate continuously for the specified 24 hours and the less than 24-hour samplers will only operate when the wind direction is coming across the disposal site to the downwind sampler. This will allow the downwind less than 24-hour sampler(s) to only collect air that has *passed* over the disposal site and the upwind less than 24-hour sampler to only collect air that has *not passed* over the disposal site.

b. At sites that experience a constant wind direction for 24 hours, a minimum of two 24-hour samplers will be required. A 24-hour sampler will be placed both upwind and downwind of the site based on the prevailing wind direction so that the upwind sampler only collects air that has *not passed* over the disposal site and the downwind sampler only collects air that has *passed* over the disposal site. Additional 24 hour samplers should be placed at locations which will sample under the stable (drainage) wind conditions identified in the meteorological survey. Since the wind direction does not change, these 24-hour samplers will act as directionally controlled samplers as well as 24-hour samplers. Comparison of the results from these samplers will provide information on ambient air quality standards and the effects the disposal site has on the ambient air quality.

4. Sampling Conditions

See Option 1.

5. Equipment Description

See Option 1.

6. Wind Data Reporting

See Option 1.

C. OPTION 3

1. General Procedures

HSC Section 41805.5 requires that air adjacent to disposal sites be tested and analyzed

for specified air contaminants. These guidelines require that 24-hour ambient air sampling be conducted on 10 different, not necessarily consecutive, days.

2. Meteorological Survey

See Option 1.

3. Ambient Air Sampling

See Option 1, Subsection 3a, General Sampling Criteria.

a. At sites that experience different day and night wind flow patterns, a minimum of three 24-hour samplers will be required. One 24-hour sampler will be placed on both upwind and downwind of the site based on the prevailing wind direction. Additional 24-hour samplers will be located downwind of the disposal site at sites which will sample under the stable (drainage) wind conditions identified in the meteorological survey. In addition, one 24-hour sampler will be placed in the vicinity of the disposal site, approximately one mile away, so it will not be affected by the disposal site emissions. This 24-hour sampler should also be approximately one mile from other possible major emission sources so that the sample it collects will represent the background concentrations for the area. This background sampler should be located in the clear and away

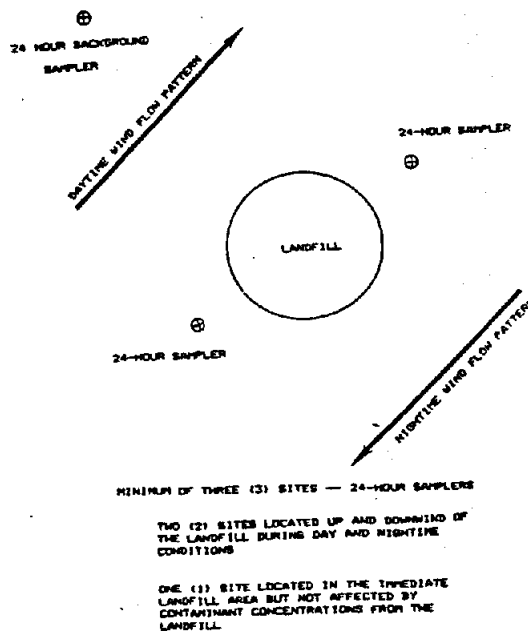


Figure 6: Option 3

Source: South Coast AQMD

from surrounding obstructions. Its inlet probe must be located between six and nine feet off the ground (breathing height) and a minimum of 60 feet from obstacles such as trees, shrubbery, and buildings. Air flow around the inlet probe must be unrestricted. All of the 24-hour samplers will operate continuously for the specified 24 hours. Comparison of the results from the samplers will provide information on the ambient air quality standards.

b. At sites that experience a constant wind direction for 24 hours, a minimum of two 24-hour samplers will be required. A 24-hour sampler will be placed both upwind and downwind of the site based on the prevailing wind direction so that the upwind sampler only collects air that has *not passed* over the disposal site and the downwind sampler only collects air that has *passed* over the disposal site. Additional 24-hour samplers should be placed at locations which will sample under the stable (drainage) wind conditions identified in the meteorological survey. Since the wind direction does not change, these 24-hour samplers will act as less than 24-hour samplers as well as 24-hour samplers. In

addition, one 24-hour sampler will be placed in the vicinity of the disposal site, approximately one mile away, so it will not be effected by the disposal site emissions. This 24-hour sampler should also be approximately one mile away from possible major emission sources so that the sample it collects will represent the background concentrations for the area. This background sampler should be located in the clear and away from surrounding obstructions. Its inlet probe should be located between six and nine feet off the ground (breathing height) and a minimum of sixty feet from obstacles such as trees, shrubbery and buildings. Air flow around the inlet probe should be unrestricted. All of the 24-hour samplers will operate continuously for the specified 24 hours.

4. Sampling Conditions

See Option 1.

5. Equipment Description

See Option 1.

6. Wind Data Reporting

See Option 1.

D. GENERIC ANALYTICAL METHODS

HSC Section 41805.5 directs the ARB to publish testing guidelines "specifying air contaminants to be tested for and identifying acceptable testing, analytical and reporting methods. The following generic analytical methods contain a brief description of the standard operating procedures (SOP) used by the ARB to sample and analyze specific compounds. Specific SOPs are contained in Attachment 4.

1. Method for Vinyl Chloride

Ambient samples are collected over a 24-hour period in a 30-liter Tedlar[®] bag using a low-volume sampler.

Samples are analyzed using chromatography with flame ionization or photo ionization detection and preconcentration techniques. The resultant concentration peak is identified by retention time and quantified by reference to calibration standards.

2. Method for Carbon Tetrachloride, Chloroform, Ethylene Dibromide, Ethylene Dichloride, Methyl Chloroform, Methylene Chloride, Perchloroethylene, and Trichloroethylene

Ambient samples are collected over a 24-hour period in a 30-liter Tedlar[®] bag using a low-volume sampler.

Samples are analyzed using gas chromatography with electron capture detection and preconcentration techniques. Resultant concentration peaks are identified by retention times and quantified by references to calibration standards.

addition, one 24-hour sampler will be placed in the vicinity of the disposal site, approximately one mile away, so it will not be effected by the disposal site emissions. This 24-hour sampler should also be approximately one mile away from possible major emission sources so that the sample it collects will represent the background concentrations for the area. This background sampler should be located in the clear and away from surrounding obstructions. Its inlet probe should be located between six and nine feet off the ground (breathing height) and a minimum of sixty feet from obstacles such as trees, shrubbery and buildings. Air flow around the inlet probe should be unrestricted. All of the 24-hour samplers will operate continuously for the specified 24 hours.

4. Sampling Conditions

See Option 1.

5. Equipment Description

See Option 1.

6. Wind Data Reporting

See Option 1.

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Samples are analyzed using gas chromatography with electron capture detection and preconcentration techniques. Resultant concentration peaks are identified by retention times and quantified by references to calibration standards.

3. Method for Benzene

Ambient samples are collected over a 24-hour period in a 30-liter Tedlar[®] bag using a low volume sampler.

Samples are analyzed using gas chromatography with photo ionization detection and preconcentration techniques. The resultant concentration peak is identified by retention time and quantified by reference to calibration standards.

IV. GAS MIGRATION

A. General

HSC Section 41805.5 requires disposal site owners to test for off-site underground gas migration. The testing should be done at the disposal site edge in wells with spacing determined by local geology and land use near the disposal site. Wells should be tested for the Attachment 2 compounds to the "disposal site" detection limits. At co-disposal sites, wells should also be tested for methane. Any existing perimeter monitoring system can be used if it can be shown to provide the necessary data.

For co-disposal sites, one perimeter sampling probe should be installed at the waste disposal site perimeter for each 1000 feet of site perimeter. The site perimeter is the outer edge of the area which is permitted to receive waste. All the wells should be placed at the site perimeter between the filled area and the areas off-site where gas migration would be a potential threat to public health or safety. For sites which accepted only hazardous waste, a maximum of four wells should be located around the perimeter of the site.

Samples should be taken from six feet below the surface. When the sampling wells are no longer in use, the wells should be closed using Department of Water Resources published criteria.

B. Protocol

1. Equipment Description

- a. Pump with diaphragm made from non-lubricated Viton[®] rubber.
- b. Battery to operate pump
- c. Tedlar[®] bags
- d. Various fittings
- e. Flame ionization detector, or similar detector, with a lower detection limit of 2 ppm methane.

2. Sampling Procedure

If the disposal site has a gas collection system and the system does not operate continuously, then the probes should be sampled with the system operating and immediately before the system is restarted after an off period.

- a. Attach the pump to the well.
- b. Attach the Tedlar[®] bag and take a 10 liter sample.
- c. Check the sample for the Attachment 2 compounds to the "disposal site" detection limits, and methane at co-disposal sites.

3. Data Reporting

For each sample, the owner should record:

- a. Date, time, and sample location
- b. The concentrations of the Attachment 2 compounds, and methane for co-disposal sites.
- c. Whether any landfill gas collection system was operating.

V. QUALITY ASSURANCE FOR SAMPLING

A quality assurance plan for disposal site testing should be prepared and submitted to the APCO as part of the monitoring plan. The following quality assurance tasks are listed as an example of the information which should be included in the plan.

A. Quality Assurance Objectives

Quality assurance procedures for disposal site testing are designed to perform two primary functions. The first is to establish the necessary quality control activities relating to sample collection, sample analysis, siting of ambient monitors, and data validation. Secondly, the plan provides for assessment of data quality in terms of precision, accuracy, and completeness.

B. Sampling Methods

Specific sampling methods will be prepared in a monitoring plan for review by the APCO. The methods should include equipment specifications, acceptance testing, sample handling and chain of custody procedures such as length of time before analysis, temperature control on samples, and shipping procedures to prevent sample loss. The monitoring plan will outline measures to protect the sampling apparatus and media from interference or damage due to rain. Use of chain of custody forms is recommended. A sample chain of custody record is included as Attachment 5. Field data sheets will be used to record sampling date and location, initials of individuals conducting sampling, analysis and data reduction, sample number, initial and final time and flow, malfunctions, leak checks, and weather conditions (e.g., rain) which could influence sample results. The initial and final flow will be averaged for the 24-hour sampling period if a flow controller is not used. Tedlar bags should be recertified before each use. This involves purging the bags until no contamination is detected and checking for leaks.

A site description form should be included for each monitoring site listing sampling height, distances to obstructions, and showing the monitoring location with respect to the waste site on a map with scale.

- a. Attach the pump to the well.
- b. Attach the Tedlar[®] bag and take a 10 liter sample.
- c. Check the sample for the Attachment 2 compounds to the "disposal site" detection limits, and methane at co-disposal sites.

3. Data Reporting

For each sample, the owner should record:

- a. Date, time, and sample location
- b. The concentrations of the Attachment 2 compounds, and methane for co-disposal sites.
- c. Whether any landfill gas collection system was operating.

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A site description form should be included for each monitoring site listing sampling height, distances to obstructions, and showing the monitoring location with respect to the waste site on a map with scale.

Ambient sampling precision will be calculated from at least 2 samplers collocated at a site of expected maximum concentrations. The samplers should be located between 6 and 12 feet apart. Collocated samples will be collected daily for the 10 days of ambient sampling. One sampler will be designated as the primary sampler and the others will be designated as duplicate.

C. Analysis Methods

When possible, ARB approved methods for sample preparation and analysis should be used. If modifications are necessary, the changes should be fully documented in the monitoring plan and validation testing conducted. Validation testing should provide an assessment of accuracy, precision, interferences, applicable concentration ranges, recoveries, and limits of detection of the alternative method.

Each method developed for sample analysis should be documented in a Standard Operating Procedure and be available for review by the APCO before monitoring begins. The method documentation should include the quality control activities necessary to routinely monitor data quality such as the use of control samples, field blanks, and duplicate samples. The method should also include the frequency of analysis for quality control samples. Analysis of control samples is recommended before each day of lab analysis and after every tenth sample. Control samples should be analyzed to be within control limits previously established by the laboratory performing the analysis. If results are outside the control limits, the method should be reviewed, recalibrated, and the control sample reanalyzed. Field blanks should be included with each batch of samples. The identity of blank and spiked samples should be unknown to the analyst.

D. Calibration Procedures

The monitoring plan will specify calibration procedures including calibration intervals for recalibration, calibration standards, environmental conditions for calibrations, and a calibration record keeping system. When possible, National Bureau of Standards traceable gas standards should be used for calibration of the analytical instruments in accordance with standard analytical procedures which include multiple calibration points that bracket the expected concentrations.

If elapsed time meters are used, rather than noting beginning and ending times, the meters should be checked and calibrated to within ± 5 minutes for a 24-hour period. Samplers operated with an automatic on/off timer should be calibrated so that the sampling period is 24 hours ± 15 minutes.

Flow meters or flow controllers with critical orifices should be calibrated against a referenced flow meter at the initiation of a monitoring period.

Sampling flows should be checked in the field and noted before and after each sampling period. Before flows are checked, the sampling system should be leak checked. The initial flow should be within $\pm 10\%$ if a calibrated pressure transducer is used to check flows or within $\pm 15\%$ if a calibrated rotameter is used. Flow meters should be recalibrated if flows are found to be outside of these control limits.

E. Preventative Maintenance

To prevent loss of data, spare pumps and sampling materials should be kept available in the field by the operator. A schedule should be prepared for checking sampling pumps, meteorological instruments, extension cords, crimps in sampling tubing, and leaks.

F. Data Validation - Precision, Accuracy, and Completeness

Average precision and accuracy, and respective standard deviations should be calculated for the entire data set. The following equation should be used to calculate data precision.

$$P = \frac{Y - X}{X} \times 100$$

where: P = calculated data precision
Y = concentration from duplicate sampler of collocated pair;
X = concentration from primary sampler of collocated pair.

Accuracy should be determined from the performance audit of flows or spiked samples and should be calculated using the following equation:

$$A = \frac{Y - X}{X} \times 100$$

where: A = calculated data accuracy
Y = measured concentration of spiked sample or measured flow;
X = known concentration of spiked sample or known flow.

Data completeness should be calculated as a percentage of valid data compared to the total possible amount of data if no invalidations had occurred. Data will be invalidated if the power is out at a site and the length of a sample cannot be verified, or if the sampling medium breaks during sampling or shipment for analysis. Data will be corrected to reflect discrepancies in the sampling flow based on the results of a flow audit.

G. Performance Audits

For sampling with sorbent tubes, a referenced flow measuring device with a standard limiting orifice should be used to verify the indicated flows on the samplers. Flow

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Y = concentration from duplicate sampler of collocated pair;
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$$A = \frac{Y - X}{X} \times 100$$

where: A = calculated data accuracy
Y = measured concentration of spiked sample or measured flow;
X = known concentration of spiked sample or known flow.

Data completeness should be calculated as a percentage of valid data compared to the total possible amount of data if no invalidations had occurred. Data will be invalidated if the power is out at a site and the length of a sample cannot be verified, or if the sampling medium breaks during sampling or shipment for analysis. Data will be corrected to reflect discrepancies in the sampling flow based on the results of a flow audit.

G. Performance Audits

For sampling with sorbent tubes, a referenced flow measuring device with a standard limiting orifice should be used to verify the indicated flows on the samplers. Flow

audits should be conducted at least once during a monitoring period. Analytical audits should be conducted by spiking samples with referenced standards or by having another lab analyze split samples for comparison of results.

H. Quality Assurance Reports

Quality assurance activities and data will be summarized by the staff conducting the sampling and included as an attachment to the final data summary.

VII. TEST REPORT EVALUATION

HSC Section 41805.5(g) requires APCOs to evaluate the test reports. The test report data required by July 1, 1987 provides preliminary information on ambient air concentrations and landfill gas composition. If, after consulting with the Department of Health Services and the California Waste Management Board, an APCO determines that levels of tested air contaminants pose a health risk, the statute requires the district to take remedial action. Remedial action may include further ambient air monitoring, landfill gas testing, or installation of a landfill gas collection system.

If a district determines that a site poses a health risk, extended ambient air monitoring is recommended as part of the mitigation process. Additional air monitoring is also recommended at sites where the potential for public exposure or need for remedial action is uncertain. HSC Section 41805.5 (f) provides that districts may re-evaluate the status of a site and require additional testing as necessary.

CHAPTER _____

An act to repeal and add Section 66796.54 of the Government Code, and to repeal and add Section 41805.5 of the Health and Safety Code, relating to solid waste, and declaring the urgency thereof, to take effect immediately.

LEGISLATIVE COUNSEL'S DIGEST

AB 3374, Calderon. Solid waste; disposal sites; air monitoring; water pollution reports.

(1) Existing law requires the State Water Resources Control Board to submit annual reports on or before July 1, 1988, July 1, 1989, and July 1, 1990, on the extent and effect on water quality of hazardous wastes in solid waste disposal sites, with recommendations on needed actions to protect water quality.

This bill would change the dates that the reports are due from the board to January 1, 1989, January 1, 1990, and January 1, 1991, respectively.

(2) Existing law requires solid waste disposal sites to submit a solid waste assessment report to the board of the air pollution control district or the air quality management district by January 1, 1987. The district board is required to examine the report and notify the State Department of Health Services and the California Waste Management Board if the district board determines that hazardous waste is migrating into the air. The State Air Resources Board is required to submit a report to the Legislature on or before July 1 of 1988, 1989, and 1990, concerning hazardous waste in solid waste sites.

This bill would repeal those provisions and would instead require the owner of a solid waste disposal site, as defined, to submit a solid waste air quality assessment test report, as specified, to the district on or before July 1, 1987. The bill would also require the owner of an inactive solid waste disposal site, except as specified, to submit a screening questionnaire to the district on or before November 1, 1986, and to submit specified information required by the district based upon an evaluation of the

questionnaire by the district. The bill would require the state board to develop guidelines for the test report and evaluation of the screening questionnaire by February 1, 1987, and to develop the screening questionnaire by October 1, 1986.

The bill would authorize a district to exempt a site from these provisions and to reevaluate the status of a solid waste disposal site and require the submission or revision of a test report.

A district would be required to evaluate all test reports for compliance with the state board's guidelines. The bill would require the district to take appropriate remedial action if the district determines, after evaluating the test report and consultation with the department and the California Waste Management Board, that the levels of specified air contaminants, as defined, pose a health risk or a threat to the environment.

The bill would delete the requirement that the state board submit a report to the Legislature by July 1, 1990.

(3) The bill would incorporate additional changes to Section 66796.54 of the Government Code proposed by AB 3088, if this bill and AB 3088 are both enacted and this bill is enacted last.

(4) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement, including the creation of a State Mandates Claims Fund to pay the costs of mandates which do not exceed \$50,000 statewide and other procedures for claims whose statewide costs exceed \$500,000.

This bill would impose a state-mandated local program by requiring cities, counties, and districts which own a solid waste disposal site or an inactive site to submit a specified test report and by requiring air quality management districts and air pollution control districts to evaluate these reports and take specified actions.

The bill would provide that reimbursement shall be made pursuant to those statutory procedures and, if the statewide cost does not exceed \$500,000, shall be payable from the State Mandates Claims Fund, except that, for

certain costs, the bill would provide that no reimbursement is required for a specified reason.

(5) The bill would declare that it is to take effect immediately as an urgency statute.

The people of the State of California do enact as follows:

SECTION 1. Section 66796.54 of the Government Code is repealed.

SEC. 2. Section 66796.54 is added to the Government Code, to read:

66796.54. (a) On or before January 1, 1989, January 1, 1990, and January 1, 1991, the State Water Resources Control Board shall submit a report to the Legislature summarizing the extent of hazardous waste in solid waste disposal sites and the potential effects these hazardous wastes may have upon the quality of waters of the state, and recommending actions needed to protect the quality of water. Each report shall summarize the data from those solid waste water quality assessment test reports which have been submitted on or before January 1 of the preceding year to California regional water quality control boards pursuant to Section 13273 of the Water Code, and shall evaluate the accuracy of the solid waste water quality assessment tests conducted.

(b) On or before July 1, 1988, and July 1, 1989, the State Air Resources Board shall submit a report to the Legislature summarizing the extent of hazardous waste in solid waste disposal sites and the potential effects these hazardous wastes may have upon the ambient air quality of the state, and recommending actions needed to protect the quality of air. The reports submitted on July 1, 1988, and July 1, 1989, shall summarize the data from the solid waste air quality assessment test reports submitted to air quality maintenance districts and air pollution control districts on or before July 1, 1987, and January 1, 1988, respectively, pursuant to Section 41805.5 of the Health and Safety Code, and shall evaluate the accuracy of the solid waste assessment tests conducted.

SEC. 3. Section 66796.54 is added to the Government Code, to read:

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(b) On or before July 1, 1988, and July 1, 1989, the State Air Resources Board shall submit a report to the Legislature summarizing the extent of hazardous waste in solid waste disposal sites and the potential effects these hazardous wastes may have upon the ambient air quality of the state, and recommending actions needed to protect the quality of air. The reports submitted on July 1, 1988, and July 1, 1989, shall summarize the data from the solid waste air quality assessment test reports submitted to air quality maintenance districts and air pollution control districts on or before July 1, 1987, and January 1, 1988, respectively, pursuant to Section 41805.5 of the Health and Safety Code, and shall evaluate the accuracy of the solid waste assessment tests conducted.

SEC. 4. Section 41805.5 of the Health and Safety Code is repealed.

SEC. 5. Section 41805.5 is added to the Health and Safety Code, to read:

41805.5. (a) Except as provided in subdivisions (b) and (c), the owner of a solid waste disposal site shall submit to the district on or before July 1, 1987, a solid waste air quality assessment test report that contains all of the following:

(1) Test results to determine if there is any underground landfill gas migration beyond the solid waste disposal site's perimeter.

(2) Analyses for specified air contaminants in the

certain costs, the bill would provide that no reimbursement is required for a specified reason.

(5) The bill would declare that it is to take effect immediately as an urgency statute.

The people of the State of California do enact as follows:

SECTION 1. Section 66796.54 of the Government Code is repealed.

SEC. 2. Section 66796.54 is added to the Government Code, to read:

66796.54. (a) On or before January 1, 1989, January 1, 1990, and January 1, 1991, the State Water Resources Control Board shall submit a report to the Legislature summarizing the extent of hazardous waste in solid waste disposal sites and the potential effects these hazardous wastes may have upon the quality of waters of the state, and recommending actions needed to protect the quality of water. Each report shall summarize the data from those solid waste water quality assessment test reports which have been submitted on or before January 1 of the preceding year to California regional water quality control boards pursuant to Section 13273 of the Water Code, and shall evaluate the accuracy of the solid waste water quality assessment tests conducted.

(b) On or before July 1, 1988, and July 1, 1989, the State Air Resources Board shall submit a report to the Legislature summarizing the extent of hazardous waste in solid waste disposal sites and the potential effects these hazardous wastes may have upon the ambient air quality of the state, and recommending actions needed to protect the quality of air. The reports submitted on July 1, 1988, and July 1, 1989, shall summarize the data from the solid waste air quality assessment test reports submitted to air quality maintenance districts and air pollution control districts on or before July 1, 1987, and January 1, 1988, respectively, pursuant to Section 41805.5 of the Health and Safety Code, and shall evaluate the accuracy of the solid waste assessment tests conducted.

SEC. 3. Section 66796.54 is added to the Government Code, to read:

66796.54. (a) On or before January 1, 1989, January 1, 1990, and January 1, 1991, the State Water Resources Control Board shall submit a report to the Legislature summarizing the extent of hazardous waste in solid waste disposal sites and the potential effects these hazardous wastes may have upon the quality of waters of the state, and recommending actions needed to protect the quality of water. Each report shall summarize the data from those solid waste water quality assessment test reports which have been submitted during the preceding year to California regional water quality control boards pursuant to Section 13273 of the Water Code, and shall evaluate the accuracy of the solid waste water quality assessment tests conducted.

(b) On or before July 1, 1988, and July 1, 1989, the State Air Resources Board shall submit a report to the Legislature summarizing the extent of hazardous waste in solid waste disposal sites and the potential effects these hazardous wastes may have upon the ambient air quality of the state, and recommending actions needed to protect the quality of air. The reports submitted on July 1, 1988, and July 1, 1989, shall summarize the data from the solid waste air quality assessment test reports submitted to air quality maintenance districts and air pollution control districts on or before July 1, 1987, and January 1, 1988, respectively, pursuant to Section 41805.5 of the Health and Safety Code, and shall evaluate the accuracy of the solid waste assessment tests conducted.

SEC. 4. Section 41805.5 of the Health and Safety Code is repealed.

SEC. 5. Section 41805.5 is added to the Health and Safety Code, to read:

41805.5. (a) Except as provided in subdivisions (b) and (c), the owner of a solid waste disposal site shall submit to the district on or before July 1, 1987, a solid waste air quality assessment test report that contains all of the following:

(1) Test results to determine if there is any underground landfill gas migration beyond the solid waste disposal site's perimeter.

(2) Analyses for specified air contaminants in the

ambient air adjacent to the solid waste disposal site to determine the effect of the site on air quality.

(3) Chemical characterization test results to determine the composition of gas streams immediately above the solid waste disposal site, or immediately above the solid waste disposal site and within the solid waste disposal site, as appropriate, as determined by the district.

(4) Any other information which the district board may require, by emergency regulation.

The solid waste air quality assessment test report shall be prepared in accordance with the guidelines developed by the state board pursuant to subdivision (d).

(b) The owner of an inactive solid waste disposal site shall complete and submit the screening questionnaire, developed pursuant to subdivision (e), to the district on or before November 1, 1986, unless the owner is required to submit a report containing the same information specified in subdivision (a) pursuant to a federal, state, or district order, or unless exempted pursuant to subdivision (c). The district shall evaluate the submitted screening questionnaires in accordance with the guidelines developed pursuant to subdivision (e) and shall determine whether the owner of the site be required to submit all, or a portion of, the information required to be reported in a solid waste air quality assessment test report. The district shall notify the owner in writing on or before January 1, 1987, of the information identified in subdivision (a) to be submitted for the site. After receiving this notification, the owner of the inactive solid waste disposal site shall submit a solid waste air quality assessment test report containing the required information on or before January 1, 1988, to the district.

(c) A district may exempt from subdivisions (a) and (b) a solid waste disposal site or inactive solid waste disposal site which has accepted or now contains only inert and nondecomposable solids. To receive an exemption, the owner of the site shall submit, on or before November 1, 1986, a copy of all permits, all waste discharge requirements pertinent to the site, and any other data necessary for the district to determine

whether an exemption should be granted to the site.

(d) On or before February 1, 1987, the state board, in coordination with the districts, shall develop and publish test guidelines for the solid waste air quality assessment report specifying the air contaminants to be tested for and identifying acceptable testing, analytical, and reporting methods to be employed in completing the report.

(e) On or before October 1, 1986, the state board, in coordination with the districts, shall develop and publish a screening questionnaire for inactive solid waste disposal sites and guidelines for evaluating the questionnaire by the districts pursuant to subdivision (b). The screening questionnaire and guidelines shall require an inactive solid waste disposal site to be evaluated based on the nature and age of materials in the site, the quantity of materials in the site, the size of the site, and other appropriate factors. The guidelines for evaluating the screening questionnaire shall require a district to weigh heavily the proximity of the site to residences, schools, and other sensitive areas, and to pay particular attention to potential adverse impacts on facilities such as hospitals and schools, and on residential areas, within one mile of the site's perimeter.

(f) A district may reevaluate the status of a solid waste disposal site, including sites exempted pursuant to subdivision (c), and require the owner to submit or revise a solid waste air quality assessment test report after January 1, 1987. The district shall give written notification to the owner of the solid waste disposal site that a solid waste air quality assessment test report is to be submitted, or that the existing report is to be revised, and the date by which the report is to be submitted.

(g) A district shall evaluate any solid waste air quality assessment test reports submitted pursuant to subdivisions (a), (b), and (f), and determine if the report's testing, analytical and reporting methods comply with the guidelines developed pursuant to subdivision (d). If the district determines that the solid waste air quality assessment test report complies with the guidelines, it shall evaluate the data. If the district

determines, after evaluation of the report and consultation with the state department and the California Waste Management Board, that levels of one or more specified air contaminants pose a health risk to human beings or a threat to the environment, the district shall take appropriate remedial action.

(h) If a district determines that a solid waste air quality assessment test report does not comply with the guidelines developed pursuant to subdivision (d), the district shall provide the owner of the site with a written notice specifying the inadequacies of the report and shall require the owner to correct the deficiencies and resubmit the report by a date determined by the district.

(i) For the purpose of this section, the following definitions apply:

(1) "Inactive solid waste disposal site" means a solid waste disposal site which has not received any solid waste for disposal after January 1, 1984.

(2) "Landfill gas" means any untreated, raw gas derived through a natural process from the decomposition of organic waste deposited in a solid waste disposal site or from the evolution of volatile species in the waste.

(3) "Perimeter" means the outer boundary of the entire solid waste disposal site property.

(4) "Solid waste disposal site" means a place, location, tract of land, area, or premises in use, or which has been used, for the landfill disposal of solid waste, as defined in Section 66719 of the Government Code, or hazardous waste, as defined in Section 66714.8 of the Government Code, or both.

(5) "Specified air contaminants" means substances determined to be air contaminants by the state board in coordination with the districts. The state board and the districts shall consider determining the following compounds to be air contaminants for purposes of this paragraph: benzene, chloroethene, 1,2-dibromoethane, 1,2-dichloroethane, benzyl chloride, chlorobenzene, dichlorobenzene, 1,1-dichloroethene, dichloromethane, formaldehyde, hydrogen sulfide, tetrachloroethylene, tetrachloromethane, toluene, 1,1,1-trichloroethane,

trichloroethylene, trichloromethane, xylene, and any other substance deemed appropriate by the state board or a district.

SEC. 6. Section 3 of this bill incorporates changes to Section 66796.54 of the Government Code proposed by both this bill and AB 3088. It shall only become operative if (1) both bills are enacted and become effective on or before January 1, 1987, but this bill becomes operative first, (2) this bill repeals and adds Section 66796.54 of the Government Code and AB 3088 amends Section 66796.54 of the Government Code, and (3) this bill is enacted after AB 3088, in which case Section 66796.54 of the Government Code, as added by Section 2 of this bill, shall remain operative only until the operative date of AB 3088, at which time Section 3 of this bill shall become operative.

SEC. 7. Reimbursement to local agencies and school districts for costs mandated by the state pursuant to this act shall be made pursuant to Part 7 (commencing with Section 17500) of Division 4 of Title 2 of the Government Code and, if the statewide cost of the claim for reimbursement does not exceed five hundred thousand dollars (\$500,000), shall be made from the State Mandates Claims Fund, except that no reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution for the cost of the program or level of service mandated by this act that the local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay that cost.

SEC. 8. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting the necessity are:

In order to fully and fairly implement the provisions of Chapter 1532 of the Statutes of 1984 relating to disposal of hazardous waste, and to implement the reporting requirements of this act, as quickly as possible, it is necessary that this act take effect immediately.

determines, after evaluation of the report and consultation with the state department and the California Waste Management Board, that levels of one or more specified air contaminants pose a health risk to human beings or a threat to the environment, the district shall take appropriate remedial action.

(h) If a district determines that a solid waste air quality assessment test report does not comply with the guidelines developed pursuant to subdivision (d), the district shall provide the owner of the site with a written notice specifying the inadequacies of the report and shall require the owner to correct the deficiencies and resubmit the report by a date determined by the district.

(i) For the purpose of this section, the following definitions apply:

(1) "Inactive solid waste disposal site" means a solid waste disposal site which has not received any solid waste for disposal after January 1, 1984.

(2) "Landfill gas" means any untreated, raw gas derived through a natural process from the decomposition of organic waste deposited in a solid waste disposal site or from the evolution of volatile species in the waste.

(3) "Perimeter" means the outer boundary of the entire solid waste disposal site property.

(4) "Solid waste disposal site" means a place, location, tract of land, area, or premises in use, or which has been used, for the landfill disposal of solid waste, as defined in Section 66719 of the Government Code, or hazardous waste, as defined in Section 66714.8 of the Government Code, or both.

(5) "Specified air contaminants" means substances determined to be air contaminants by the state board in coordination with the districts. The state board and the districts shall consider determining the following compounds to be air contaminants for purposes of this paragraph: benzene, chloroethene, 1,2-dibromoethane, 1,2-dichloroethane, benzyl chloride, chlorobenzene, dichlorobenzene, 1,1-dichloroethene, dichloromethane, formaldehyde, hydrogen sulfide, tetrachloroethylene, tetrachloromethane, toluene, 1,1,1-trichloroethane,

trichloroethylene, trichloromethane, xylene, and any other substance deemed appropriate by the state board or a district.

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SEC. 8. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting the necessity are:

In order to fully and fairly implement the provisions of Chapter 1532 of the Statutes of 1984 relating to disposal of hazardous waste, and to implement the reporting requirements of this act, as quickly as possible, it is necessary that this act take effect immediately.

ATTACHMENT 2

SPECIFIED AIR CONTAMINANTS

COMPOUND		Detection Limits, ppb	
		Air	Disposal site
Chloroethene (Vinyl Chloride)	$\text{CH}_2\text{:CHCl}$	2	500
Benzene	C_6H_6	2	500
1,2-Dibromoethane (Ethylene Dibromide)	$\text{BrCH}_2\text{CH}_2\text{Br}$	0.5	1
1,2-Dichloroethane (Ethylene Dichloride)	$\text{ClCH}_2\text{CH}_2\text{Cl}$	0.2	20
Dichloromethane (Methylene Chloride)	CH_2Cl_2	1	60
Tetrachloroethene (Perchloroethylene)	$\text{Cl}_2\text{C:CCl}_2$	0.2	10
Tetrachloromethane (Carbon Tetrachloride)	CCl_4	0.2	5
1,1,1-Trichloroethane (Methyl Chloroform)	CH_3CCl_3	0.5	10
Trichloroethylene	HCIC:CCl_2	0.6	10
Trichloromethane (Chloroform)	CHCl_3	0.8	2

LANDFILL REPORT

Landfill Name:

Location (Latitude and Longitude or UTM coordinates):

POPULATION	Within 1 mile	1 to 2 miles	2 to 3 miles

COMPOUND	Laboratory Detection Limits, ppb	AMBIENT AIR SAMPLING				Date _____	BACKGROUND Background
		UPWIND		DOWNWIND			
		Site 1	Site 2	Site 1	Site 2		
Vinyl Chloride							
Benzene							
Ethylene Dibromide							
Ethylene Dichloride							
Methylene Chloride							
Perchloroethylene							
Carbon Tetrachloride							
Methyl Chloroform							
Trichloroethylene							
Chloroform							
Methane							

ATTACHMENT 4

The choice of analytical method is left up to the individual laboratory performing the analysis. The methods provided in Attachment 4 are provided as examples of methods which can be used to sample and analyze for the specified air contaminants identified in Attachment 2. The methods are used by ARB laboratories to quantify the compounds listed *at or below the detection limits specified in Attachment 2*. Table 4-1 summarizes the method detection limits achievable by these methods and the detection limits to be reported for these guidelines:

TABLE 4-1: METHOD DETECTION LIMITS

COMPOUND	Guideline	Method Detection Limits, ppb	
		Haagen-Smit Laboratory	Aerometric Data Division
Chloroethene (Vinyl Chloride)	2	-	1
Benzene	2	0.5	0.5
1,2-Dibromoethane (Ethylene Dibromide)	0.5	0.01	0.005
1,2-Dichloroethane (Ethylene Dichloride)	0.2	0.2	0.1
Dichloromethane (Methylene Chloride)	1	1	0.6
Tetrachloroethene (Perchloroethylene)	0.2	0.004	0.01
Tetrachloromethane (Carbon Tetrachloride)	0.2	0.02	-
1,1,1-Trichloroethane (Methyl Chloroform)	0.5	0.004	0.004
Trichloroethylene	0.6	0.005	0.02
Trichloromethane (Chloroform)	0.8	0.004	0.02

Procedure for the Sampling and Analysis
of Atmospheric C₁ to C₂ Halogenated Hydrocarbons
Method 103

1 Introduction

- 1.1 This procedure describes a method of sampling and analyzing atmospheric concentrations of C₁ to C₂ halogenated hydrocarbons in the range of 0.004 to 1.0 parts per billion (ppb).
- 1.2 Lower concentrations may be analyzed by increasing the sample volume and using a cryogenic trap to concentrate the sample.
- 1.3 Higher concentrations may be analyzed by direct injection of a diluted sample into a sample loop of a gas chromatograph.
- 1.4 Compounds which can be analyzed by this method are:
- 1.4.1 Dichloromethane, CH₂Cl₂, (methylene chloride)
- 1.4.2 Trichloromethane, CHCl₃, (chloroform)
- 1.4.3 1,2-Dichloroethane, ClCH₂CH₂Cl, (ethylene dichloride, EDC)
- 1.4.4 1,1,1-Trichloroethane, Cl₃CCH₃, (methyl chloroform)
- 1.4.5 Tetrachloromethane, CCl₄, (carbon tetrachloride)
- 1.4.6 Trichloroethene, Cl₂C=CHCl, (trichloroethylene, TCE)
- 1.4.7 1,2-Dibromoethane, BrCH₂CH₂Br, (ethylene dibromide, EDB)
- 1.4.8 Tetrachloroethene, Cl₂C=CCl₂, (perchloroethylene, PERC)

2 Method

- 2.1 Air is sampled into a Tedlar bag at a calibrated and controlled flow during selected time intervals as described in Appendix A, "Procedure for Atmospheric Tedlar Bag Sampling".
- 2.2 A measured volume of the air sample is transferred by a syringe into the chromatograph.
- 2.3 The components are separated by a specified column and analyzed by an electron capture detector.
- 2.4 An electronic integrator quantitates the halogenated hydrocarbons by integrating the peak areas and calculating concentrations from a factor determined during calibration with a halogenated hydrocarbons

Procedure for the Sampling and Analysis
of Atmospheric C₁ to C₂ Halogenated Hydrocarbons
Method 103

1 Introduction

- 1.1 This procedure describes a method of sampling and analyzing atmospheric concentrations of C₁ to C₂ halogenated hydrocarbons in the range of 0.004 to 1.0 parts per billion (ppb).
- 1.2 Lower concentrations may be analyzed by increasing the sample volume and using a cryogenic trap to concentrate the sample.
- 1.3 Higher concentrations may be analyzed by direct injection of a diluted sample into a sample loop of a gas chromatograph.
- 1.4 Compounds which can be analyzed by this method are:
- 1.4.1 Dichloromethane, CH₂Cl₂, (methylene chloride)
- 1.4.2 Trichloromethane, CHCl₃, (chloroform)
- 1.4.3 1,2-Dichloroethane, ClCH₂CH₂Cl, (ethylene dichloride, EDC)
- 1.4.4 1,1,1-Trichloroethane, Cl₃CCH₃, (methyl chloroform)
- 1.4.5 Tetrachloromethane, CCl₄, (carbon tetrachloride)
- 1.4.6 Trichloroethene, Cl₂C=CHCl, (trichloroethylene, TCE)
- 1.4.7 1,2-Dibromoethane, BrCH₂CH₂Br, (ethylene dibromide, EDB)
- 1.4.8 Tetrachloroethene, Cl₂C=CCl₂, (perchloroethylene, PERC)

2 Method

- 2.1 Air is sampled into a Tedlar bag at a calibrated and controlled flow during selected time intervals as described in Appendix A, "Procedure for Atmospheric Tedlar Bag Sampling".
- 2.2 A measured volume of the air sample is transferred by a syringe into the chromatograph.
- 2.3 The components are separated by a specified column and analyzed by an electron capture detector.
- 2.4 An electronic integrator quantitates the halogenated hydrocarbons by integrating the peak areas and calculating concentrations from a factor determined during calibration with a halogenated hydrocarbons

standard mixture.

3 Apparatus

- 3.1 A sampler with bags is required for each site. The sampler and bags are prepared and operated as described in the "Procedure for Atmospheric Tedlar Bag Sampling".
- 3.2 A gas chromatograph (GC) equipped with a gas injection valve and freeze-out trap inlet system is required. An electron capture detector is used.
- 3.3 One GC column is required: A glass column (6 ft x 1/4 in O.D.) packed with 0.2 percent Carbowax 1500 on Supelco 80/100 mesh Carbopac C.
- 3.4 Other GC supportive apparatus used are a strip chart recorder, a remote controller, and an electronic integrator.
- 3.5 Ground glass syringes (50, 100, and 250 mL capacity) or other suitable devices to accurately transfer air samples from Tedlar bags to the sample inlet of the GC are used.
- 3.6 A large air-tight chamber is used to prepare standard gas mixtures.
- 3.7 The cryogenic traps holding the liquid nitrogen are Dewar containers.

4 Reagents

- 4.1 All gases used in the GC analysis shall be of the highest commercial quality available.
- 4.2 Helium shall have a purity of 99.995%.
- 4.3 Halogenated hydrocarbons reference liquid standards, 99% purity as listed in 1.4 are used to prepare a 10 ppb working standard mixture which is used as a span gas.
- 4.4 A mixture of 10 percent methane in argon is used as make-up gas in the GC.
- 4.5 Commercial liquid nitrogen (b.p. = -196°C) is used to cool the freeze-out trap.

5 Procedure

- 5.1 Bags and samplers are fabricated, tested, and operated as described in Appendix B, "Procedure for the Fabrication and Testing of Sample Bags".

- 5.2 The air sample is analyzed for C₁ to C₂ halogenated hydrocarbons by using either the loop method or the freeze-out trap method. The freeze-out trap method is used for ppb to ppt (parts per trillion) concentrations.
- 5.2.1 The procedure for the loop method follows:
- 5.2.2 The air sample is transferred from the gas sample bag and injected into the sample loop of the GC using a clean 100 mL syringe fitted with a Luer-lok to quick-connect adapter.
- 5.2.3 The gas sampling valve (rotary type) is equipped with a 1 mL loop.
- 5.2.4 The gas sampling valve is rotated and the sample enters the GC analyzer and is separated into component compounds.
- 5.2.5 A Carbowax 1500/Carbopak C column is used to separate the halogenated hydrocarbons. Typical operating conditions for the gas chromatograph are:
- 25 mL/min helium carrier gas flow
 - 40 mL/min 10% methane in argon make-up flow gas
 - 80°C 10-port valve compartment temperature
 - 150°C injection port temperature
 - 350°C detector temperature
 - 6° to 160°C at 8°C/min programming column temperature
 - Backflush: 23 min.
- 5.2.6 Each separated component passes through the electron capture detector and yields a response proportional to its response factor and concentration.
- 5.2.7 Concentrations of halogenated hydrocarbons may be calculated using an electronic integrator.
- 5.3.1 The procedure for the freeze-out method follows:
- 5.3.2 Immerse the sample trap in liquid nitrogen (LN₂) and allow the temperature to stabilize while maintaining a flow of helium through the system.
- 5.3.3 After discarding about 50 mL of the sample, withdraw exactly 100 mL from the sample bag with a 100 mL syringe and transfer the sample into the trap.
- 5.3.4 Backfill the syringe with another 40 mL of helium and flush the 40 mL through the trap; then flush the carrier helium through the trap for three minutes.
- 5.3.5 Isolate the cryogenic trap by using the isolation valve which allows the carrier gas to by-pass the trap.

- 5.2 The air sample is analyzed for C₁ to C₂ halogenated hydrocarbons by using either the loop method or the freeze-out trap method. The freeze-out trap method is used for ppb to ppt (parts per trillion) concentrations.
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 - 350°C detector temperature
 - 6° to 160°C at 8°C/min programming column temperature
 - Backflush: 23 min.
- 5.2.6 Each separated component passes through the electron capture detector and yields a response proportional to its response factor and concentration.
- 5.2.7 Concentrations of halogenated hydrocarbons may be calculated using an electronic integrator.
- 5.3.1 The procedure for the freeze-out method follows:
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- 5.3.3 After discarding about 50 mL of the sample, withdraw exactly 100 mL from the sample bag with a 100 mL syringe and transfer the sample into the trap.
- 5.3.4 Backfill the syringe with another 40 mL of helium and flush the 40 mL through the trap; then flush the carrier helium through the trap for three minutes.
- 5.3.5 Isolate the cryogenic trap by using the isolation valve which allows the carrier gas to by-pass the trap.

- 5.3.6 Replace the LN₂ Dewar flask with a Dewar containing hot water at about 290 deg C.
- 5.3.7 Allow the trap to warm up.
- 5.3.8 Inject the sample into the carrier gas stream by turning the GC sampling valve. The gas sample enters the GC analyzer and is separated into component compounds.
- 5.3.9 The instrument operating conditions are the same as those described in Section 5.2.5 above.
- 5.3.10 Each separated component passes through the electron capture detector and yields a response proportional to its response factor and concentration.

6 Calculations

- 6.1 The concentrations of halogenated hydrocarbons, in ppb, are calculated by an electronic integrator using the external standard method.
 - 6.1.1 Concentration = Area x Response Factor x Dilution Factor
- 6.2 The Response Factor (RF) is calculated during calibration by the equation:

$$RF = \frac{\text{Concentration}}{\text{Area}}$$

- 6.2.1 Dilution Factor = $\frac{\text{Total volume of diluted sample}}{\text{Initial sample volume before dilution}}$
- 6.2.2 Replicate calibrations are averaged and the arithmetic mean is stored as the RF for subsequent analyses.
- 6.3 Concentrations may be converted from ppb to mg/m³ by means of the following formula:

$$\text{mg/m}^3 = \frac{P \times (\text{M.W.}) \times (\text{ppb}) \times (10^6)}{(82.05) \times (T)}$$

Where:

P = Pressure in atmospheres
 M.W. = Molecular weight of corresponding halogenated hydrocarbon
 82.05 = Gas constant in cm³ x atm. / °K-mole
 T = Absolute temperature (°K).

- 6.4 The concentration unit mg/m³ is equivalent to ng/cm³

- 7 Quality Control
- 7.1 Quality control procedures are followed in two areas: sampling and analysis.
- 7.2 The quality control procedures used in sampling are:
- 7.2.1 The Tedlar bag samplers are checked every 6 months for leakage and contamination. The interval is shortened if any malfunction is suspected. A written record is maintained of the history of each sampler. (See Appendix A).
- 7.2.2 The Tedlar bags are checked for leakage and contamination before being used for sampling. A log book is maintained with a complete history of bag usage. (See Appendix B).
- 7.3 The quality control procedures used in analyzing the sample are:
- 7.3.1 The accuracy of the method has not been determined.
- 7.3.1.1 Every six to nine months a calibration standard is prepared in a glass-lined Pfaudler Chamber maintained by the Environmental Laboratory Section of the Haagen-Smit Laboratory.
- 7.3.1.2 The chamber is repeatedly evacuated and flushed with zero air until it is shown by gas chromatographic analysis to be free of any significant contamination.
- 7.3.1.3 To prepare the standard, the chamber is re-evacuated and filled with zero air to a pressure of 5 psia.
- 7.3.1.4 A measured volume of a volumetrically prepared solution of halogenated hydrocarbons in methanol is injected via a heated injector into a stream of zero air as it is flowing into the chamber. The volume of the solution injected into the chamber is chosen so as to give the desired gas phase concentration of halogenated hydrocarbons when the chamber is pressurized to 16 psia with zero air.
- 7.3.2 Calibration standards are prepared periodically. The accuracy of the standard is verified and the procedure validated by comparing the concentration of tetrachloroethene in the chamber to that of an NBS standard.
- 7.3.2.1 A newly prepared chamber working standard is rejected unless the tetrachloroethene concentration based on calculation agrees within +/- 5% of the value determined by analysis, using the NBS standard for calibration.

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 - 7.3.1.2 The chamber is repeatedly evacuated and flushed with zero air until it is shown by gas chromatographic analysis to be free of any significant contamination.
 - 7.3.1.3 To prepare the standard, the chamber is re-evacuated and filled with zero air to a pressure of 5 psia.
 - 7.3.1.4 A measured volume of a volumetrically prepared solution of halogenated hydrocarbons in methanol is injected via a heated injector into a stream of zero air as it is flowing into the chamber. The volume of the solution injected into the chamber is chosen so as to give the desired gas phase concentration of halogenated hydrocarbons when the chamber is pressurized to 16 psia with zero air.
 - 7.3.2 Calibration standards are prepared periodically. The accuracy of the standard is verified and the procedure validated by comparing the concentration of tetrachloroethene in the chamber to that of an NBS standard.
 - 7.3.2.1 A newly prepared chamber working standard is rejected unless the tetrachloroethene concentration based on calculation agrees within +/- 5% of the value determined by analysis, using the NBS standard for calibration.

- 7.3.2.2 A newly prepared chamber working standard is rejected unless the relative response factors for all eight halogenated hydrocarbons of interest fall within $\pm 10\%$ of the historically established mean values.
- 7.3.3 A working chamber standard is checked at least every three months for conformity to criteria 7.3.2.1 and 7.3.2.2.
 - 7.3.3.1 A new standard is prepared as frequently as required as determined by the above mentioned criteria.
 - 7.3.3.2 Any reports generated after the standard ceases to be demonstratively within the established tolerances shall contain a cautionary explanation.
- 7.4 The gas chromatograph is calibrated periodically.
 - 7.4.1 Calibration factors are determined on the basis of the mean values of the previous calibration runs which meet the criteria of 7.4.3.
 - 7.4.2 Each day a calibration check is performed using the Pfaudler chamber standard to span the instrument.
 - 7.4.3 If the response for each compound of interest is within 10% of the established calibration value, the established calibration factors are retained.
 - 7.4.4 The calibration check is repeated if the response of the instrument has changed by more than 10% from the established values.
 - 7.4.5 If the response is still out of tolerance, a quality assurance report is submitted, remedial action is initiated, and new calibration factors calculated.
 - 7.4.6 Blank samples shall be analyzed daily after the calibration is completed and, whenever necessary, between samples.
- 7.5 The linearity of the instrument is checked periodically.
 - 7.5.1 A gas chromatographic multipoint linearity check is performed annually with standards of at least four different concentrations and four replicate runs for each concentration. The concentrations should include the anticipated range of sample concentrations above the limit of detection.
 - 7.5.2 The mean-square error due to lack of fit about the regression line is compared to the total mean-square error of the independent replicates about their individual means. The calibration is accepted if the F-ratio is less than the 95% rejection limit.

- 7.5.3 A repeated multipoint calibration should not differ from the previous calibration by more than 10%.
- 7.5.4 Any region of concentration that deviates more than 5% from the least-square line is considered nonlinear.
- 7.5.5 Data is reported only for compounds whose concentrations lie in the linear range.
- 7.6 Limits of detection are established.
 - 7.6.1 The limit of detection (LOD) is based on three standard deviations (SD) of runs near the LOD (within 10 SD of the LOD, Winefordner and Long, 1983).
 - 7.6.2 The LOD should be determined at least on an annual basis.
 - 7.6.3 If the instrument response changes by more than 15%, the instrument must be checked and the LOD redetermined.
 - 7.6.4 The presence in a sample of a very large adjacent peak will often raise the LOD in the sample.
- 7.7 Analytical instruments have quality control procedures.
 - 7.7.1 Column conditions are checked periodically and as needed.
 - 7.7.1.1 All GC accessible parameters is logged when a column is first installed. These parameters are checked daily and recorded on integrator reports.
 - 7.7.1.2 The efficiency and resolution of the column are checked every month. If the tests show more than a 10% change, the column is replaced.
 - 7.7.1.3 If the headpressure required to maintain a specified flow through the column increases by more than 100%, the column is replaced.
 - 7.7.1.4 If the drift of retention times of peaks results in peak misidentification, all instrument parameters are checked.
 - 7.7.2 Replicate analyses are a quality control procedure.
 - 7.7.2.1 A duplicate analysis is performed on at least one sample per day.
 - 7.7.2.2 If the duplicate analysis (replicate) differs by more than 20%, and if the concentration of the sample is higher than 3X LOD, then an additional analysis is performed.

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- 7.7.2.3 If the range of the replicate analyses is greater than the mean and if the concentration of the sample is greater than 3X LOD, the analyses are not acceptable.
- 7.7.2.4 If the range is within 20%, the mean and the standard deviation are reported.
- 7.7.2.5 If there is any reason to suspect the presence of an interferent (peak broadening, shift of retention time, shoulder formation, etc.), peak identification is verified using another analyzer (GC/MS), detector, or column.
- 7.7.2.6 When spiked samples are analyzed, the peak height and peak area ratios of the spiked and unspiked samples must be consistent.
- 7.7.3 Compound confirmation is a quality control procedure.
 - 7.7.3.1 Ten percent of the analyses are confirmed by a different analytical system (different column or different detector, e.g. GC/MS).
 - 7.7.3.2 If the confirmatory and the routine analyses differ by more than 20%, none of the analyses are acceptable.
- 7.8 Analytical reports undergo quality control procedures.
 - 7.8.1 Data storage: raw data transmitted from the integrator are stored unmodified in electronic storage. Data are archived according to date, site, analyses, and project for easy retrieval. These data are kept for 3 years in the laboratory electronic storage.
 - 7.8.2 All data above the minimum detection limits are reported to the requesting agency in hard copy or electronic format.
 - 7.8.3 All reports are reviewed by at least two qualified staff before they are released.

8 Critique and Comments

- 8.1 Lower limits of detection have been established using the prescribed instrument conditions and using a 100 mL sample with the freeze-out trap technique.
 - 8.1.1 Table 8.1.1 lists the lower limits of detection for the the compounds analyzed by this method.
- 8.2 Interferences are not usually a serious problem for light halogenated hydrocarbon analysis when the electron capture detector is used.

- 8.2.1 The electron capture detector is selective for the measurement of halogenated hydrocarbons. It is virtually insensitive to other hydrocarbons thus eliminating interferences from non-halogenated hydrocarbons.
- 8.2.2 Any halogenated hydrocarbons present in the sample having retention times very similar to the compounds of interest under the operating conditions described in this method will interfere. Therefore, proof of chemical identity requires confirmation.
- 8.2.3 Water vapor at normal ambient humidity in the sample does not interfere with the separation and quantification of halogenated hydrocarbons.
- 8.2.4 High concentrations of nitrogen oxides (500 ppm) and sulfur oxides (50 ppm) interfere in the determination of methylene chloride in the samples of stack emission sources.
- 8.3 The procedure described herein has both advantages and disadvantages:
- 8.3.1 This method provides a simple way of air sampling. The concentrations of halogenated hydrocarbons in the range of interest are stable for more than 24 hours in the bag, providing sufficient time for the analysis.
- 8.3.2 The sample is easily and repeatedly introduced into the instrument by means of a gas sampling valve.
- 8.3.3 A representative composite sample is readily obtained for any selected time interval because the air sampling flow rate is constant.
- 8.3.4 Both the upper and the lower limits of detection can be extended by concentrating a larger volume of the sample with a freeze-out trap or by diluting the sample in a Tedlar bag with nitrogen or by loop injection.
- 8.3.5 Interferences can be eliminated by selecting chromatographic conditions.

9 References

- 9.1 U.S. Environmental Protection Agency (1976), "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I-Principles", EPA-600/9-76-005 Environmental Monitoring and Support Laboratory, Research Triangle Park, North Carolina 27711.

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- 9.2 Grimsrud, E. P., and Knighton, W. B., Anal. Chem. 54, 565 (1982)
- 9.3 Bennett, C. A., and Franklin, M. L., "Statistical Analysis in Chemistry and the Chemical Industry", John Wiley and Sons, Inc., New York, (1954), pp. 222-232.
- 9.4 Ullman, N. R., (1973), "Elementary Statistics", John Wiley and Sons, Inc., New York, pp. 282-298.
- 9.5 Winefordner, J. D. and Long, G. L., Anal. Chem. 55, 712 A (1983).

CAUTION Laboratory Operations Involving Carcinogens

Most halogenated hydrocarbons are identified as human carcinogens; therefore, appropriate precautions should be observed when handling these compounds. Do not release halogenated hydrocarbon vapors to the laboratory atmosphere at any time. When venting or purging, the vapor must be routed to outside air. The OSHA regulations pertaining to the use and handling of halogenated hydrocarbons are published in Title 29 of the Code of Federal Regulations available in the Federal Register, Volume 40, May 28, 1975, pp. 23073.

TABLE 8.1.1
LIMITS OF DETECTION

Compound	Limit of Detection ppb	Concentration ppb	Mean Area	Area St.Dev.	n	% Rel St.Dev.
Methylene Chloride	1	1.37	8,230	800	6	9.7
Chloroform	0.004	0.006	8,290	197	5	2.4
Methyl Chloroform	0.004	0.004	34,000	3600	5	10.6
Carbon Tetrachloride	0.02	0.028	13,900	676	5	4.9
		0.01	2,400	320	6	13.3
Trichloroethylene	0.005	0.0064	15,600	515	5	3.3
Ethylene Dibromide	0.01	0.009	3,150	430	5	13.7
Perchloroethylene	0.004	0.0047	102,700	6080	5	5.9
Ethylene Dichloride	0.2	0.3	61,778	4811	6	7.8
		0.09	26,677	2143	5	8

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Procedure for the Sampling and Analysis
of Atmospheric Benzene
Method 102

1 Introduction

- 1.1 This procedure describes a method of sampling and analyzing atmospheric concentrations of benzene in the range of 0.5 to 1000 parts per billion (ppb).
- 1.2 Lower concentrations may be analyzed by increasing the sample volume and using a cryogenic trap to concentrate the sample.
- 1.3 Higher concentrations may be analyzed by direct injection of a sample into a sample loop of a gas chromatograph.

2 Method

- 2.1 Air is sampled into a Tedlar (polyvinyl fluoride) bag at a constant rate (30 to 40 mL/min) during selected time intervals by means of an automatic sampler.
- 2.2 After sampling, the ambient air bag sample is returned to the laboratory for analysis.
- 2.3 The sample is introduced into the gas chromatograph (GC) sample stream by means of gas injection valves and analyzed by a photoionization detector.
- 2.4 The GC data system quantitates benzene by integrating the peak area and calculating the concentration from factors determined during calibration with standards.

3 Apparatus

- 3.1 The sampler system consists of a diaphragm pump with a by-pass flow constrictor, a solenoid valve, a flow meter with a flow control valve, pressure regulator, fittings, and tubing to convey air samples to the Teflon bag. The entire assembly, including a 7-day timer and associated electrical circuitry to control the filling of the sample bags, is compactly mounted on a metal chassis and operates on a 110 VAC power supply.
- 3.2 Tedlar bags, 2 mil thickness, 50 liter capacity, equipped with stainless steel quick disconnect fittings are used to contain the sample. The bags are prepared in conformity with the ARB document, "Procedure for Fabrication and Testing of Sample Bags", (see Appendix B). For sampling, the bags are placed in rigid opaque containers to protect their contents from the sunlight.

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- 3.3 A gas chromatograph equipped with a gas sampling valve and either a sample loop or freeze-out inlet system and a photoionization detector is required. The detector operates at 10.2 eV.
- 3.4 A freeze-out system consisting of a U-shaped stainless steel trap filled with stainless steel clippings is used to concentrate the sample.
- 3.5 A stainless steel column (6 ft x 1/8 in) packed with 10% N,N-bis(2-cyanoethyl)formamide on 100/120 mesh Chromosorb PAW is used.
- 3.6 For a confirmation of the benzene analysis, an alternate column should be used such as a stainless steel GC column packed with 10% tricyanoethoxy propane (TCEP).
- 3.7 An analog recorder and an electronic integrator to quantify peak areas are required.
- 3.8 Ground glass syringes (100 mL capacity) or other suitable devices are needed to transfer air samples from the Tedlar bag to the GC sample inlet.

4 Reagents

- 4.1 The primary standard used in this analysis should be the National Bureau of Standards (NBS) benzene standard reference material.
- 4.2 Helium with a minimum purity of 99.995% should be used.
- 4.3 Commercial liquid nitrogen (b.p. = -196°) is used to cool freeze-out trap.

5 Procedure

- 5.1 All bags and samplers are prepared for sampling as outlined in Appendix A, "Procedures for Atmospheric Bag Sampling".
- 5.2 The air sample is analyzed for benzene by using either the loop method or the freeze-out method. The freeze-out method is used for lower benzene concentrations of less than 25 ppb.
 - 5.2.1 The procedure for the loop method follows:
 - 5.2.1.1 Transfer the air sample from the air sample bag and inject it into the sample loop of the gas chromatograph using a 100 mL syringe fitted with a Luer-lok to quick-connect adapter.
 - 5.2.1.2 The gas sampling valve has a fixed volume sample loop of about 1 mL.

- 5.2.1.3 Rotate the gas sampling valve. This causes the sample to enter the gas chromatographic analyzer.
- 5.2.2 The procedure for the freeze-out method follows:
 - 5.2.2.1 Immerse the sample trap in liquid nitrogen (LN₂) and allow the temperature to stabilize (approximately 5 min).
 - 5.2.2.2 After flushing the syringe with about 40 mL of the sample withdraw exactly 40 mL from the sample bag with the syringe.
 - 5.2.2.3 Transfer the sample into the trap.
 - 5.2.2.4 Backfill the syringe with 40 mL of helium and flush the 40 mL through the trap; then flush helium through the trap for 2 minutes at 100 mL/min.
 - 5.2.2.5 Stop the helium flushing process.
 - 5.2.2.6 Isolate the cryogenic trap by using the isolation valve, which prevent the escape of the sample.
 - 5.2.2.7 Remove the LN₂ Dewar from the trap and replace it with a Dewar containing hot water at about 80 degC.
 - 5.2.2.8 Allow the trap to warm up.
 - 5.2.2.9 Actuate the sampling valve, thereby causing the carrier gas stream to flush the sample into the gas chromatograph.
- 5.3 With the suggested stainless steel column (see item 3.5), typical operating conditions for both loop and freeze-out methods are:

Helium flow:	20 mL/min
Heating bath temperature for cryogenic trap:	80 degC
Column temperature:	ambient
Detector temperature:	150 degC

- 5.4 Concentrations of benzene may be calculated by using a chromatographic data system or any other suitable electronic integrating device.

6 Calculation

- 6.1 The benzene concentration in ppb is calculated by the data system using the external standard method:

$$\text{Concentration} = \text{Area} \times \text{Calibration Factor}$$

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6 Calculation

- 6.1 The benzene concentration in ppb is calculated by the data system using the external standard method:

Concentration = Area x Calibration Factor

- 6.2 The calibration factor (CF) is calculated during calibration by the equation,

$$CF = \frac{\text{conc}}{\text{Area}}$$

The replicate calibrations are averaged and the arithmetic mean is stored as the CF to be used in subsequent analyses.

- 6.3 Concentrations may be converted from ppb to ug/m^3 by using the following formula:

$$\text{ug}/\text{m}^3 = \frac{(P) \times (MW) \times (\text{ppb}) \times (10^3)}{(82.05) \times (T)}$$

where: P = pressure in atmospheres

MW = molecular weight of benzene, 78.11 g/mole

82.05 = gas constant, $\frac{\text{cm}^3 \times \text{atm}}{\text{mol} \times \text{T}}$

T = absolute temperature, degK

7 Quality Control

- 7.1 Quality control procedures are managed in two areas: sampling and analysis.

- 7.2 The sampling procedures use the following protocol:

- 7.2.1 The Tedlar bag samplers are checked every six months for leakage and contamination. The interval is shortened if any malfunction is suspected. A written record is maintained of the history of each sampler. (See Appendix A).

- 7.2.2 The Tedlar bags are checked for leakage and contamination before being used for sampling. A log book is maintained with a complete history of bag usage. (See Appendix B).

- 7.3 The analytical procedures use the following protocol:

- 7.3.1 Calibrations are performed periodically. Accuracy of the method cannot be determined without an accepted standard reference material (SRM) and independent accuracy evaluation.

- 7.3.1.1 An NBS traceable reference material of 0.25 ppm (parts per million) benzene in nitrogen is used to monitor

the concentration of a secondary working standard.

- 7.3.1.2 Any secondary standards prepared from the reference standard must show the same response factor as the original reference standard. Intercomparisons are made on a monthly basis.
- 7.3.1.3 A working standard, prepared by diluting an NBS reference material of about 10 ppm to about 10 ppb, is generally used for daily calibrations.
- 7.3.1.4 The stability of working standards must be such that there is less than a 10% change in thirty days.
- 7.3.1.5 There shall be at least one working standard whose concentration lies within the interval of 5 to 20 ppb.
- 7.3.1.6 A second working standard of a higher concentration shall be prepared for use in two point calibrations.
- 7.3.1.7 A quality assurance audit of the standards is prepared annually.
- 7.3.2 Calibrations are performed on a daily schedule.
 - 7.3.2.1 The daily calibration consists of at least two calibration points bracketing the anticipated sample concentrations.
 - 7.3.2.2 The calibration is repeated if either the slope or the response at the limit of detection (LOD) of the fitted line changes by more than 5%. If the calibration fails on both runs, an NBS 0.25 ppm reference standard is used to validate the calibration.
 - 7.3.2.3 If the lamp voltage is adjusted, allow time for the lamp to stabilize and repeat the calibration.
 - 7.3.2.4 A record is kept of the lamp voltage settings and all preventative maintenance procedures i.e. lamp replacements, cleaning of lamp windows.
 - 7.3.2.5 Blank samples are run daily between calibrations and sample analyses as necessary.
 - 7.3.2.6 A single point span calibration may be substituted for the two point calibration procedure for a maximum of four consecutive days provided the response factor does not change by more than 10% during the time interval.
- 7.3.3 Linearity is a factor that is checked periodically.
 - 7.3.3.1 A gas chromatographic linearity check is performed annually with standards of at least 4 different con-

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- 7.3.6.3 If the relative standard deviation (RSD) of the replicate analyses is greater than 15% and if the concentration of the sample is greater than 3 x LOD, none of the analyses for that day are acceptable.
- 7.3.6.4 If the range is within 20%, the mean and the standard deviation are reported.
- 7.3.7 Compound confirmation is a quality control procedure.
- 7.3.7.1 Ten percent of the analyses are to be confirmed by a different analytical system (different column or alternate detector, e.g. GC/MS).
- 7.3.7.2 If the confirmatory and the routine analyses differ by more than 20%, none of the analyses for that day are acceptable.
- 7.3.8 Analytical reports are filed.
- 7.3.8.1 Data storage: peak area and compound concentration data are stored unmodified in the electronic storage. Data are archived according to date, site, analysis, and project for easy retrieval. These data are kept for three years in the laboratory electronic storage.
- 7.3.8.2 All data above the minimum detection limits are reported to the requesting agency in hard copy or electronic format.
- 7.3.8.3 All reports are reviewed by at least two qualified staff before they are released.

8 Critique and Comments

- 8.1 The minimum measurable concentration of benzene has been determined to be 0.5 ppb using prescribed instrument conditions i.e. 40 mL sample, cryogenic trap.
- 8.1.1 Table 8.1.1 lists the lower limits of detection for the method and its associated statistics
- 8.2 The range of benzene measurement is 1.0 to 1000 ppb. The upper limit may be expanded by extending the calibration range, by diluting the sample, or by reducing the sample volume.
- 8.3 Any organic compound present in the sample having a retention time similar to that of benzene under the

- 7.3.6.2 If the duplicate analysis differs by more than 20%, and if the concentration of the sample is higher than 3X LOD, then an additional analysis is needed.
- 7.3.6.3 If the relative standard deviation (RSD) of the replicate analyses is greater than 15% and if the concentration of the sample is greater than 3 x LOD, none of the analyses for that day are acceptable.
- 7.3.6.4 If the range is within 20%, the mean and the standard deviation are reported.
- 7.3.7 Compound confirmation is a quality control procedure.
- 7.3.7.1 Ten percent of the analyses are to be confirmed by a different analytical system (different column or alternate detector, e.g. GC/MS).
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- 8.2 The range of benzene measurement is 1.0 to 1000 ppb. The upper limit may be expanded by extending the calibration range, by diluting the sample, or by reducing the sample volume.
- 8.3 Any organic compound present in the sample having a retention time similar to that of benzene under the

operating conditions described in this method may interfere with the quantification. Proof of chemical identity for benzene requires confirmation by other means.

- 8.3.1 Benzene is positively identified by means of a gas chromatograph/mass spectrometer.
- 8.4 Advantages and disadvantages of Method 102 are listed below:
 - 8.4.1 The air sampling equipment is easily set up and involves no liquids. The ambient concentrations of benzene are are stable for at least 24 hours in the Tedlar sampling bags if the sampling bags are kept away from direct sunlight and are not exposed to temperatures greater than 90^oF.
 - 8.4.2 A representative integrated sample is readily attainable because the equipment samples at a constant rate.
 - 8.4.3 The sample is easily and repeatedly introduced into the GC by using a volumetric gas sampling valve or cryogenic trap.
 - 8.4.4 The lower concentration limit of the analysis may be extended by concentrating the sample by freezing out a larger volume of the sample.
 - 8.4.5 The polyvinyl fluoride (Tedlar) film sample bag is susceptible to leaks and permeation through the bag.
 - 8.4.6 The sample is susceptible to contamination when it passes through the sampling system.

9 References

- 9.1 Bennett, C. A. and Franklin, N. L., "Statistical Analysis in Chemistry and the Chemical Industry", pp. 222-232, John Wiley & Sons, Inc., New York (1954).
- 9.2 Draper, N. R. and Smith, H., "Applied Regression Analysis", p.30, John Wiley & Sons, Inc., New York (1966).
- 9.3 Purnell, H., "Gas Chromatography", pp. 301-302, John Wiley & Sons, Inc., New York (1962).
- 9.4 U. S. Environmental Protection Agency, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I - Principles", Research Triangle Park, North Carolina 27711 (1976).

METHOD NO. ADDL002
STANDARD OPERATING PROCEDURE FOR THE DETERMINATION
OF VOLATILE ORGANICS IN AMBIENT AIR USING TENAX TRAP
PRECONCENTRATION GAS CHROMATOGRAPHY AND TANDEM
PHOTOIONIZATION/ELECTRON CAPTURE DETECTORS

1.0 SCOPE

This document describes a procedure for the determination of volatile halogenated hydrocarbons and aromatics having a boiling point of less than 120°C. This procedure is based on documents received from the ARB Haagen-Smit Laboratory, El Monte, as well as EPA Method T01.

2.0 SUMMARY OF PROCEDURE

Ambient air is continuously sampled and collected in a Tedlar bag over a 24 hour period and immediately sent to the laboratory for analysis. A sample from the bag is drawn through a sampling valve attached to a Tekmar LSC-2 Tenax Sample Concentrator (see Figure 1) with a vacuum pump at 50 cc/min for four minutes (total sample volume: 200 cc). The organic constituents are trapped on Tenax and when the collection is complete, the Tenax is purged with 40 cc of helium to remove any trapped moisture. The sample is then thermally desorbed onto the head of the GC column. The GC column is temperature programmed and component peaks

eluting from the column are sequentially detected and quantified, first by a photoionization detector (PID) and then by an electron capture detector (ECD). The components are identified based on retention times. Positive identification or confirmation requires the use of an appropriately configured GC/MS.

3.0 INTERFERENCES/LIMITATIONS

- a. Components having similar GC retention times will interfere, causing misidentification and/or faulty quantitation.
- b. Because of the very low sample concentrations, extreme care must be taken to insure that the sample is not degraded or contaminated by the Tedlar sampling bag, sampling apparatus, or delayed delivery to the laboratory. Exposure of the Tedlar sampling bag to temperatures greater than 25°C should be minimized.
- c. Only components of the sample which can be detected by PID/ECD detectors will be quantified.

4.0 APPARATUS

- a. Varian Model 6000 Gas Chromatograph/PID/ECD system equipped with a Varian Vista 402 dual channel data system.
- b. Tekmar LSC-2 Sample Concentrator equipped with Tenax trap and sampling valves as shown in Figure 1.

eluting from the column are sequentially detected and quantified, first by a photoionization detector (PID) and then by an electron capture detector (ECD). The components are identified based on retention times. Positive identification or confirmation requires the use of an appropriately configured GC/MS.

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- a. Varian Model 6000 Gas Chromatograph/PID/ECD system equipped with a Varian Vista 402 dual channel data system.
- b. Tekmar LSC-2 Sample Concentrator equipped with Tenax trap and sampling valves as shown in Figure 1.

- c. Matheson Model 8240 Mass Flow Controller accurately calibrated in the 5-100 cc/min range.
- d. Laboratory timer, accurate to within 0.1 minutes.
- e. Gas tight microliter syringe, 50 ul.
- f. GC column - 10' x 2 mm i.d. glass column packed with 1 percent SP-1000 on Carbopack B, 60/80 mesh.

5.0 REAGENTS

- a. Primary Gas Standard (Scott Specialty Gases - Research Triangle Institute Certified Series 1)

<u>Compound</u>	<u>Concentration (ppb)</u>
Chloroform	107
Carbon tetrachloride	105
Perchloroethene	106
Vinyl chloride	104
Benzene	107

b. Primary Gas Standard (Scott Specialty Gases - Research Triangle Institute Certified Series 2)

<u>Compound</u>	<u>Concentration (ppb)</u>
1,2-Dichloroethane	101
1,1,1-Trichloroethane	98
Trichloroethene	100
1,2-Dibromoethane	102

c. Stock Gas Standard - Scott-Marrin Blend (assayed against primary cylinders)

<u>Compound</u>	<u>Concentration (ppb)</u>
Dichloromethane	4272
Chloroform	528
1,2-Dichloroethane	3104
1,1,1-Trichloroethane	424
Carbon tetrachloride	46
Trichloroethene	336
1,2-Dibromoethane	5
Perchloroethene	43
Vinyl chloride	4736
Benzene	1888

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a. Sample Trapping

1. The preconcentration system is shown in Figure 1.
2. The high concentration inlet is used for high concentration calibration standards and for other samples with concentrations higher than ambient levels. The sample is introduced through the high concentration inlet and 6 port valve into an appropriate size loop of known volume. The sample then passes through a 10 port valve, mass flow meter, and vacuum pump. Before an analysis, the system is leak checked by blocking the sample inlet port and observing that the mass flow meter reading drops to zero. The high concentration inlet then is connected to a Tedlar sample bag valve and the gas bag valve is opened. The loop is then flushed with sample gas for three minutes. After three minutes of flushing, the 6 port valve is reset so that the sample contained in the loop is carried into the trap by the helium purge gas. This continues for three minutes to ensure that all of the contents of the loop are trapped.

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3. Ambient samples are introduced from Tedlar bags as described above, except that the sample loop is bypassed and the sample goes directly to the 10 port valve. After flushing the system with sample for three minutes, the 10 port valve is reset so that 200 cc's of sample is trapped (50 cc/min. for four minutes). After sample trapping is complete, the Tenax trap is flushed with 40 cc of helium to remove water vapor and any nonadsorbed reactive gases.

4. In both ambient and high concentration cases, after the sample has been trapped, the Tekmar LSC-2 heats the Tenax trap to 180°C while the trap is swept with the G.C.'s internal carrier gas for four minutes. The contents of the trap are thus desorbed and collected on the head of the G.C. column. The trap is baked out after the end of the desorption cycle. In the bakeout cycle, the trap is flushed with helium purge gas for eight minutes while being held at 225°C in order to prepare the trap for the next cycle. After bakeout the trap is isolated from the system and ready for the next sample.

b. Analysis

1. The concentrated sample is separated under the chromatographic condition detailed below. The resulting chromatogram (see Figure II) is then integrated and quantified by reference to calibration standard gases.

2. Instrument Conditions:

GC: Column: 10' x 2 mm i.d. glass column, packed with
1 percent SP-1000 on Carbopack B 60/80 mesh

Temperatures: Injection: 200°C
Detector: 350°C
Oven: 45°C, hold for four minutes,
5°C/min ramp, to 210°C, hold
for eight minutes

Flow Rates: Carrier: He, 20 cc/min
ECD make up: N₂, 40 cc/min

Detectors: ECD: Range X 10, Attenuation X 32
PID: Range X 1, Attenuation X 32, 10.2
ev lamp

Conc: Tekmar LSC-2: Purge: 4 minutes
Desorb: 4 minutes at 180°C
Bake: 8 minutes at 225°C

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ev lamp

Conc: Tekmar LSC-2: Purge: 4 minutes
Desorb: 4 minutes at 180°C
Bake: 8 minutes at 225°C

3. All blanks, standards, control samples, and ambient samples are spiked with surrogate compounds by injecting 50 microliters of the surrogate gas standard (5.e.) during sample trapping. The surrogate compounds, chosen such that they simulate the characteristics of the analytes of interest and are unlikely to occur in the environment, are added to insure that systematic errors or equipment failures will be noted and corrected promptly.
4. The first step in a calibration is to analyze a system blank. This is done by trapping and analyzing a 200 cc sample of auxiliary carrier gas. The system blank must be free of interfering peaks. A system blank must also be run after a high concentration sample is analyzed in order to detect any carry-over within the system.
5. A calibration is performed using a 1.25 cc loop of stock standard gas (5.c.). Two hundred cubic centimeters of helium gas is passed through the loop to carry the standard onto the trap. The calibration analysis is made as a normal analysis. The calculated concentration value for each component should be inspected to insure consistency with previous analyses. The stored chromatographic information may then be used to recalculate the response factors for the subsequent analyses. The G.C. data system will not accept updated response factors which are in excess of plus or minus 15 percent of historic data.

6. Following calibration, 200 cc of the control sample (5.d.) is concentrated on the trap and analyzed. The control sample data are plotted on control charts of the normal Shewhart type. Upper and lower warning limits are plus or minus two times the standard deviation. Any analysis which falls outside the upper and lower warning limits is repeated and the laboratory quality control officer is advised. Upper and lower control limits are plus or minus three times the standard deviation. If any analysis falls outside the upper or lower control limit, the method is discontinued until the out of control situation is remedied. The laboratory quality control officer is advised and provided with written documentation of the out of control condition and how it was remedied. All data generated prior to the out of control situation must be reviewed for possible decertification by laboratory management.

7. Multipoint calibrations are conducted monthly. Each multipoint calibration includes a trap blank and three standard concentration levels to bracket the concentration ranges expected in ambient air. If subsequent data indicate that the resulting least squares analyses are consistently acceptable, less frequent multipoint calibrations may be made.

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7.0 PERFORMANCE

- a. All ambient field samples are analyzed in duplicate. The relative error between analyses must be less than 20 percent. Duplicate analyses having greater than 20 percent relative error must be decertified.
- b. The percent recovery of the surrogate is recorded in the instrument laboratory workbook for each analysis. If this value is outside the 80% to 120% range, the sample analysis must be repeated.

8.0 METHOD SENSITIVITY, PRECISION AND ACCURACY

The method sensitivity, precision and accuracy are outlined in Table I. These data were produced with gaseous calibration standards, and using carrier gas as the sample matrix. The relative accuracy of the method, with the exception of dichloromethane, is based on reference to the Research Triangle Institute Certified Gas Standards (NBS traceable). Authoritative reference calibration standards for dichloromethane are under development at NBS but are not yet available. The concentration value of the present standard was assigned by the commercial manufacturer and found to be in good agreement with diluted pure dichloromethane prepared in our laboratory. The absolute accuracy of the method has not been determined by interlaboratory testing.

Figure 1

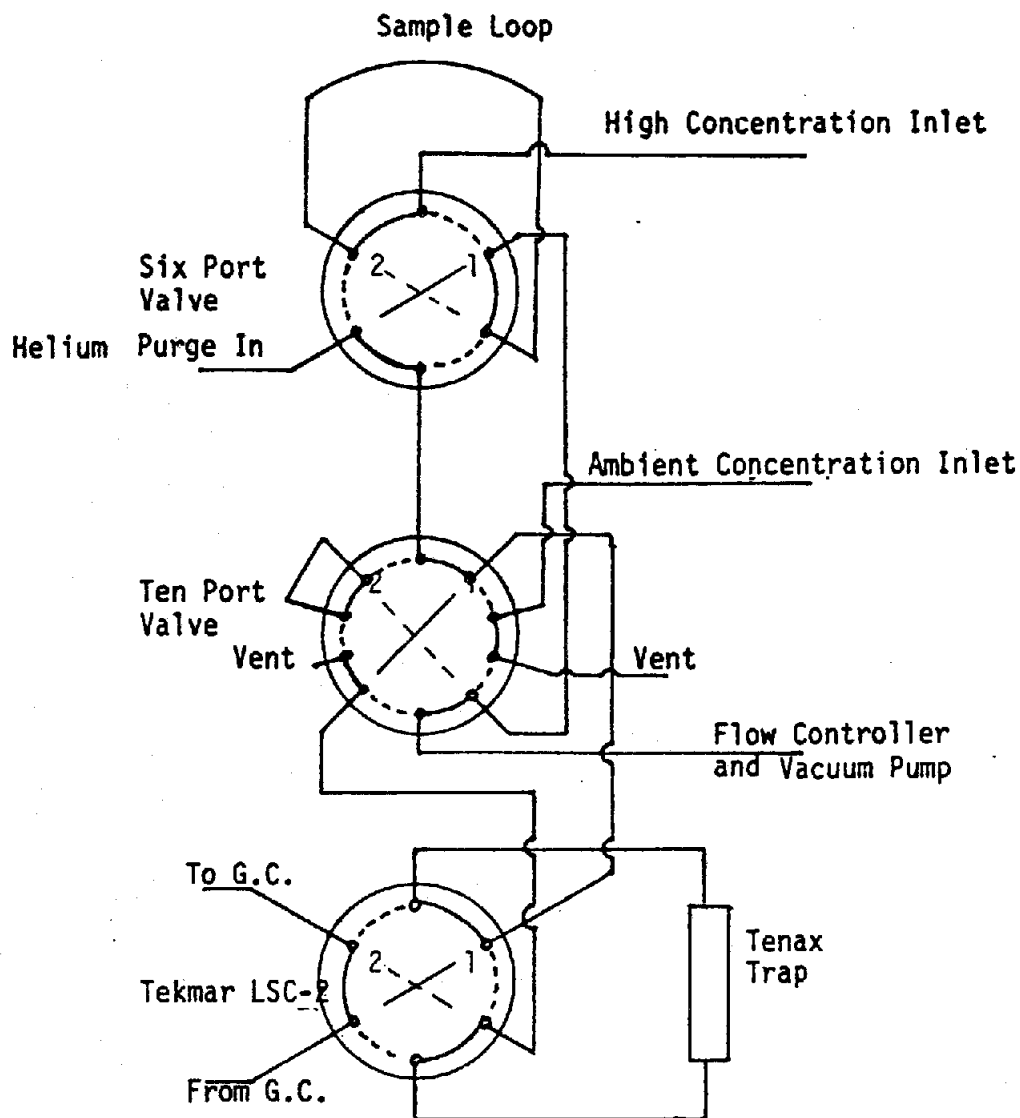


Figure 1. Schematic of concentrator system. Sampling Conditions are: 200 cc volume, purge at 40cc/min, 1 min., desorb at 180 C for 4 min., bake for 8 min. at 225 C.

SYSTEM GUIDE

Operational Step	Valve Position			
	6-Port	10-Port	LSC-2	Purge Gas
Loop Fill	1	1	1	Off
Loop Trap	2	1	1	On
Ambient Trap	1	2	1	Off
Trap Desorb	1	1	2	Off
Trap Bake Out	1	1	1	On

Figure 1

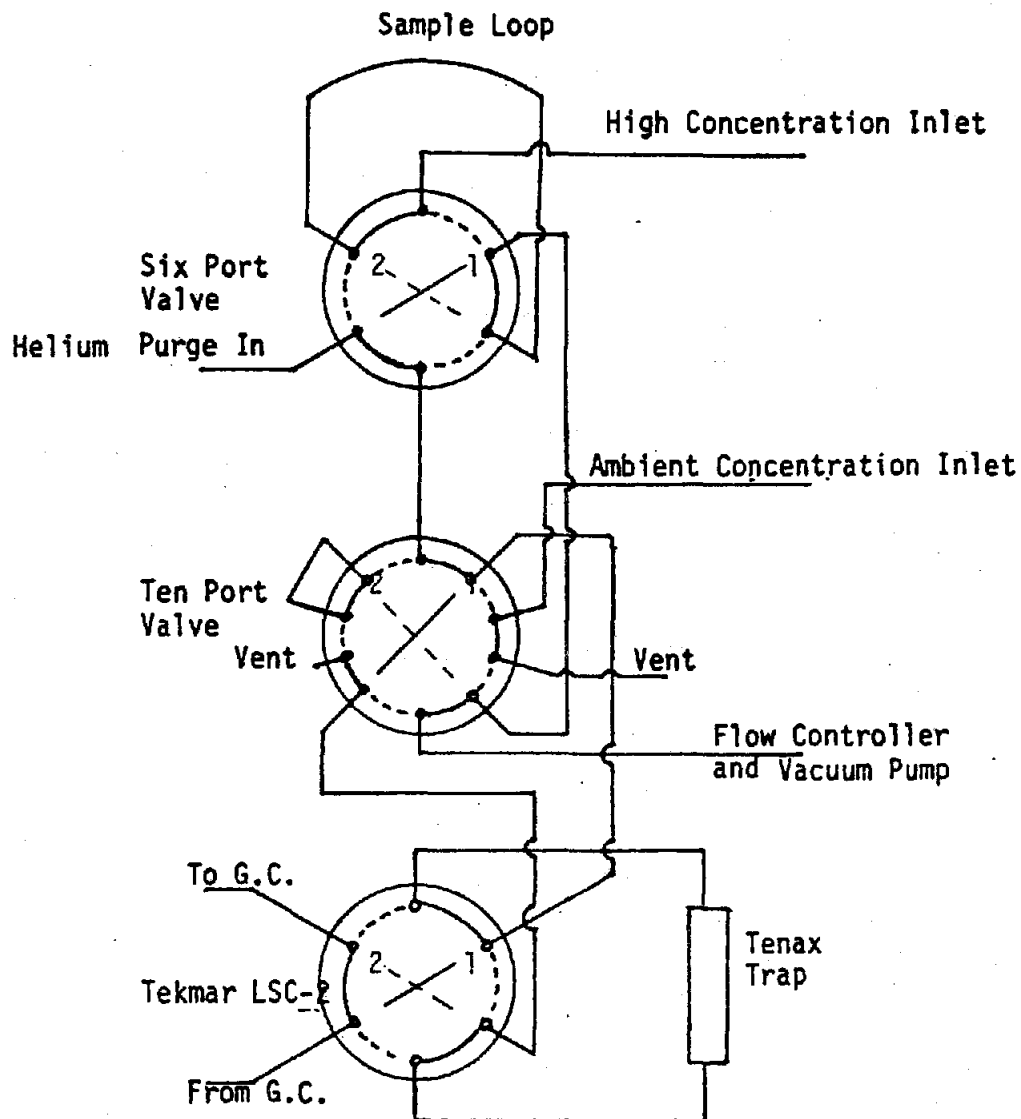


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Trap Desorb	1	1	2	Off
Trap Bake Out	1	1	1	On

PRELIMINARY DRAFT

DATE _____ SIGNATURE _____

STATE OF CALIFORNIA
AIR RESOURCES BOARD
AEROMETRIC DATA DIVISION LABORATORY

Method For Determination Of Benzene, Xylenes,
Toluene And Ethyl Benzene In Ambient Air Using Tenax
Preconcentration And Gas Chromtography/Photoionization Detection

Introduction

This document describes a packed column GC/PID method to separate and quantitate the *o*-, *m*-, and *p*-xylene isomers plus benzene, toluene and ethyl benzene in ambient air samples. This method consists of preconcentrating ambient air samples using a Tenax trap and then thermally desorbing the components onto a packed glass column for analysis by PID. Air-actuated valves and data processing using a data system make this a highly automated system.

Apparatus

1. Varian Model 6000 Gas Chromatograph/EMU photoionization detector (GC/PID) system equipped with a Vista 402 Data System.
2. A sampling and analysis valve system consisting of a 6-port and 4-port valve, 1/8" x 6" Ni trap filled with 60/80 mesh Tenax and an injection system for standards as shown in Figure 1.
3. Matheson Model 8240 Mass Flow Controller accurately calibrated in the 5-100 cc/minute range and a Metal Bellows Pump for sampling.
4. Gas-tight microliter syringes with on/off valves for injection of standard gas mixtures.

Reagents and Standards

1. SRM-1806 benzene 10 ppm in nitrogen standard.
2. Chemical standards of highest purity available.
3. Methanol ACS grade.
4. Stock solutions for standards.

Table I
Method Sensitivity and Precision

<u>Compound</u>	<u>Correlation Coefficient</u>	<u>Slope</u>	<u>R.S.D.* (Percent)</u>	<u>Detector</u>	<u>LOD ppbv</u>
Vinyl Chloride	0.997	0.946	16	PID	0.8
Dichloromethane	0.999	0.975	5	ECD	0.6
1,1-Dichloroethylene	0.991	0.966	6	ECD	0.05
Chloroform	0.999	0.901	3	ECD	0.02
1,2-Dichloroethane	0.999	1.054	7	ECD	0.1
1,1,1-Trichloroethane	0.999	0.989	9	ECD	0.01
Carbon Tetrachloride	0.999	0.980	6	ECD	0.005
Trichloroethylene	0.999	0.992	6	ECD	0.02
Benzene	0.998	0.950	10	PID	0.5
1,2-Dibromoethane	0.974	1.067	9	ECD	0.005
Tetrachloroethylene	0.994	1.080	10	ECD	0.01

* R.S.D. - Relative Standard Deviation at 5 x LOD, n = 5

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1,1,1-Trichloroethane	0.999	0.989	9	ECD	0.01
Carbon Tetrachloride	0.999	0.980	6	ECD	0.005
Trichloroethylene	0.999	0.992	6	ECD	0.02
Benzene	0.998	0.950	10	PID	0.5
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Tetrachloroethylene	0.994	1.080	10	ECD	0.01

* R.S.D. - Relative Standard Deviation at 5 x LOD, n = 5

Stock solutions are prepared by dilution of pure chemicals into methanol. The following volumes are diluted to 50 ml using a volumetric flask.

<u>Compound</u>	<u>Stock Standard</u> ul/50 ml	<u>Gas Standard-ppmv</u> (10 ul/250 cc)	<u>Trap Standard-ppbv</u> (50 ul/200 cc)
Benzene	182	40	10
Toluene	217	40	10
Ethyl benzene	250	40	10
<u>o</u> -xylene	246	40	10
<u>m</u> -xylene	251	40	10
<u>p</u> -xylene	252	40	10

A 10 ul aliquot of the stock solution is injected into a 250 ml glass dilution bulb filled with zero air. The bulb is heated in an oven at 40°C for 1 hour. After equilibration, a gas-tight syringe is used to inject 1.8 ppb to 7.2 ppb samples in order to construct a calibration curve. The following data in Table I was obtained:

Table I

<u>Compound</u>	<u>Slope</u>	<u>Correlation Coefficient</u>	<u>R.S.D. at 5.4 ppb</u> (Percent)	<u>M.D.L.</u> (ppb)
Benzene	255	0.9998	1.3	0.5
Toluene	229	0.9996	5.6	1
Ethyl benzene	182	0.9995	2.7	0.5
<u>p</u> -xylene	169	0.9987	1.3	1
<u>m</u> -xylene	185	0.9982	3.5	1
<u>o</u> -xylene	161	0.9563	1.4	1

M.D.L. = Minimum Detectable Limit = Intercept + (3 x R.S.D. x Intercept)

Instrument Conditions

Column : 10 ft x 2 mm i.d. glass
5% SP1200/1.75% bentone on 100/120
Supelcoport

Injector Temperature : 200°C

Detector Temperature : 160°C

Detector Range : X1

Detector Attenuation : X32

PID Lamp : 10.2 eV

Valve Temperature : 180°C

Flow Rate : 30 ml/minute helium

Oven Temperature Program: 10°C for 1 minute
10°C to 45°C at 8°/minute
45°C to 100°C at 3°/minute

Procedure

Apparatus shown in Figure 1.

1. With the 6-port valve in the "Fill Position" and the 4-port valve closed, the Teflon sampling line is attached to the Tedlar sample bag. The sample line is then flushed for 5 minutes at a flow rate of 20 cc/minute. The isolated Tenax trap is cooled to 30°C during this initial flushing. (Relays 2, 3, 7, 8 off.)
2. When flushing is completed, the 4-port valve is switched to the "Fill Position" and sample is pumped through the trap for 10 minutes at 20 cc/minute. At the beginning of the trapping the internal standard and calibration gas standard are injected through the in-line injector into the gas stream. (Relay 3 on.)
3. At the end of 10 minutes the Tenax trap is isolated (4-port valve closed) and the trap heated to 210°C. The sample inlet is disconnected from the Tedlar sample bag and connected to the auxiliary carrier gas supply to sweep out any residual sample in the lines. (Relay 3 off, then Relay 8 on.)
4. The 6-port valve is switched to the "Sweep Position" allowing the carrier gas to be directed through the 4-port trap valve which is still in the isolated position. (Relay 2 on.)
5. With the GC oven and data system ready the 4-port valve is switched to the "Fill Position" and the data system and the column temperature program are started. (Relays 3, 7 on.)
6. The resulting chromatogram is analyzed and the results quantitated and tabulated. (See Figure 2.)

Automation of this system has been accomplished by use of relay switches/ automatically actuated valves and a data system. The following chart details the automation:

<u>Time (Minutes)</u>	<u>Relay On</u>	<u>Relay Off</u>
0.00		2, 3, 7, 8
0.01	3	
10.01		3
10.10	8	
12.00	2	
13.00	3, 7	
23.00		2, 3
24.00		8

Relay 2 = 6-port valve
Relay 3 = 4-port valve
Relay 7 = data system
Relay 8 = Tenax trap heater

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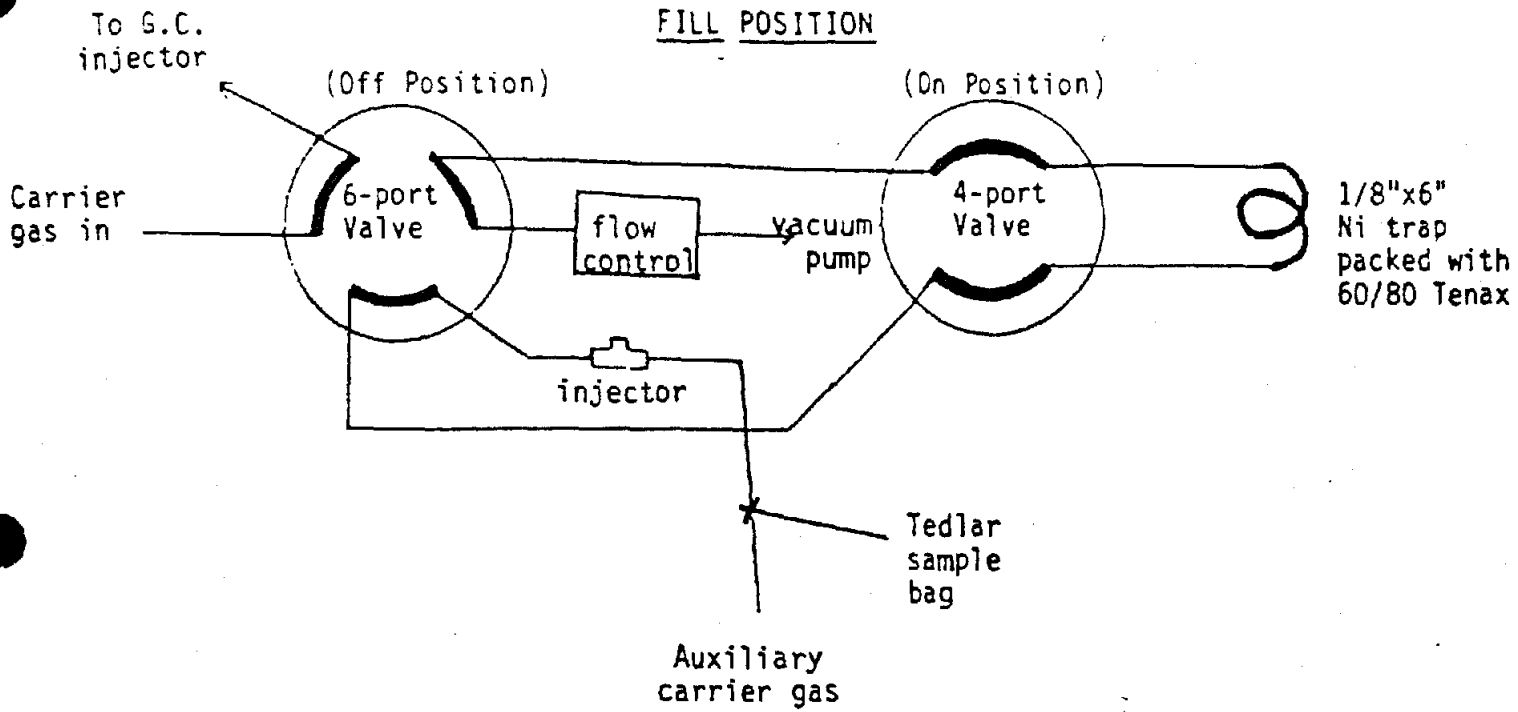
Automation of this system has been accomplished by use of relay switches/ automatically actuated valves and a data system. The following chart details the automation:

<u>Time (Minutes)</u>	<u>Relay On</u>	<u>Relay Off</u>
0.00		2, 3, 7, 8
0.01	3	
10.01		3
10.10	8	
12.00	2	
13.00	3, 7	
23.00		2, 3
24.00		8

- Relay 2 = 6-port valve
- Relay 3 = 4-port valve
- Relay 7 = data system
- Relay 8 = Tenax trap heater

TRAP SYSTEM

FILL POSITION



SWEEP POSITION

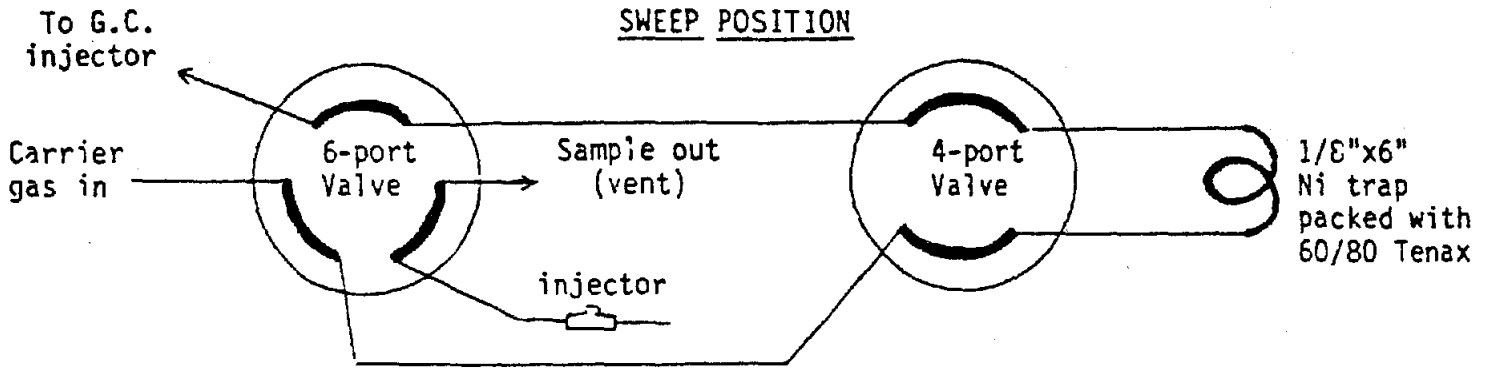
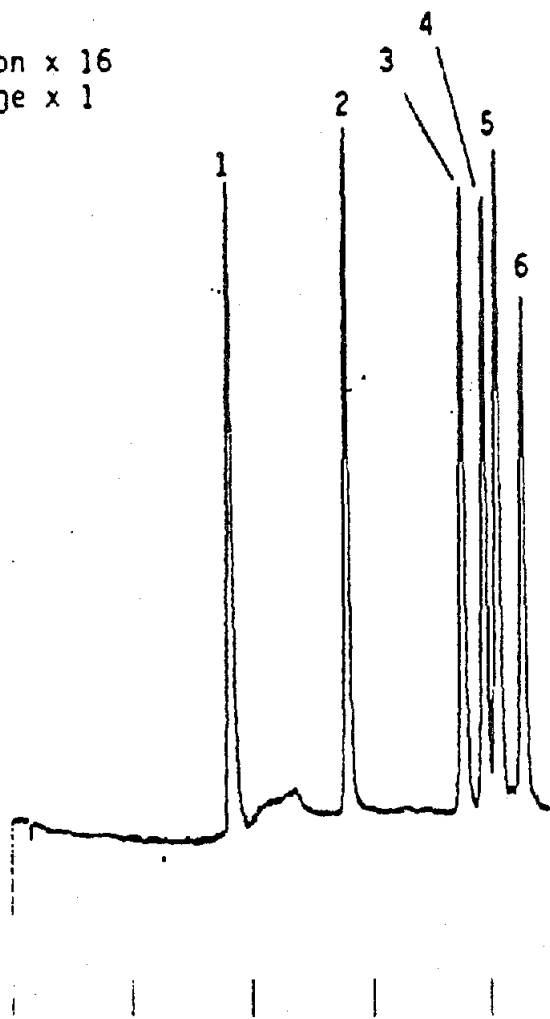


Figure 2

Standard Aromatic Mixture
10ppb/component

Attenuation x 16
Range x 1

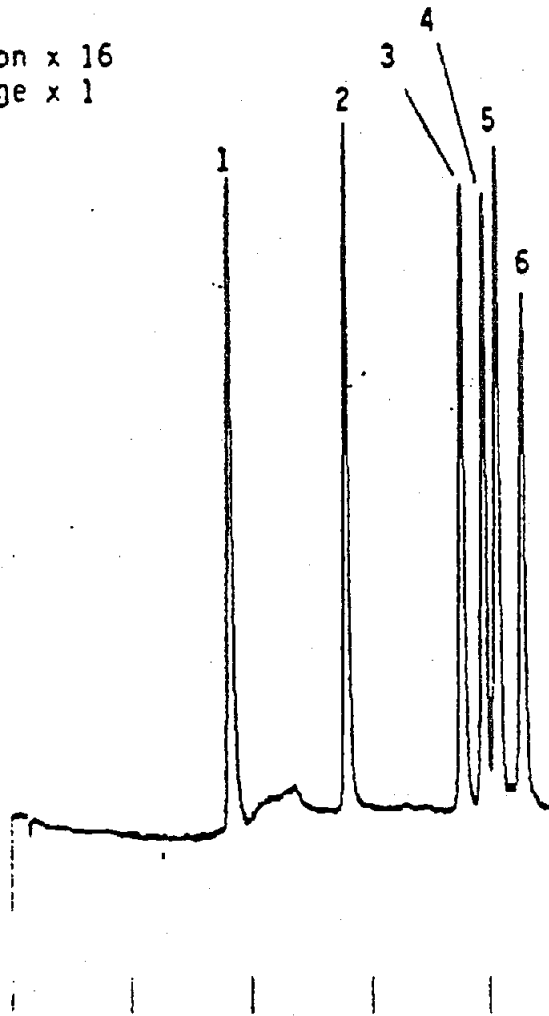


<u>Compound</u> 10 ppb each	<u>Retention Time</u> minutes
1. Benzene	9.114
2. Toluene	13.367
3. Ethyl benzene	18.834
4. <u>p</u> -xylene	19.766
5. <u>m</u> -xylene	20.350
6. <u>o</u> -xylene	21.404

Figure 2

Standard Aromatic Mixture
10ppb/component

Attenuation x 16
Range x 1



<u>Compound</u> <u>10 ppb each</u>	<u>Retention Time</u> <u>minutes</u>
1. Benzene	9.114
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3. Ethyl benzene	18.834
4. <u>p</u> -xylene	19.766
5. <u>m</u> -xylene	20.350
6. <u>o</u> -xylene	21.404

CHAIN OF CUSTODY RECORD

REPORTING AGENCY: _____

STATION ADDRESS: _____

STATION NAME: _____

STATION OPERATOR:* _____

Relinquished By:*	Received By:*	Date/Time
Relinquished By:*	Received By:*	Date/Time
Received for Laboratory By:*		Date/Time

Method of Shipment: _____

TO BE COMPLETED BY LABORATORY

SAMPLE NO.	LABORATORY NO.

DISPOSITION:

IMMEDIATE ANALYSIS

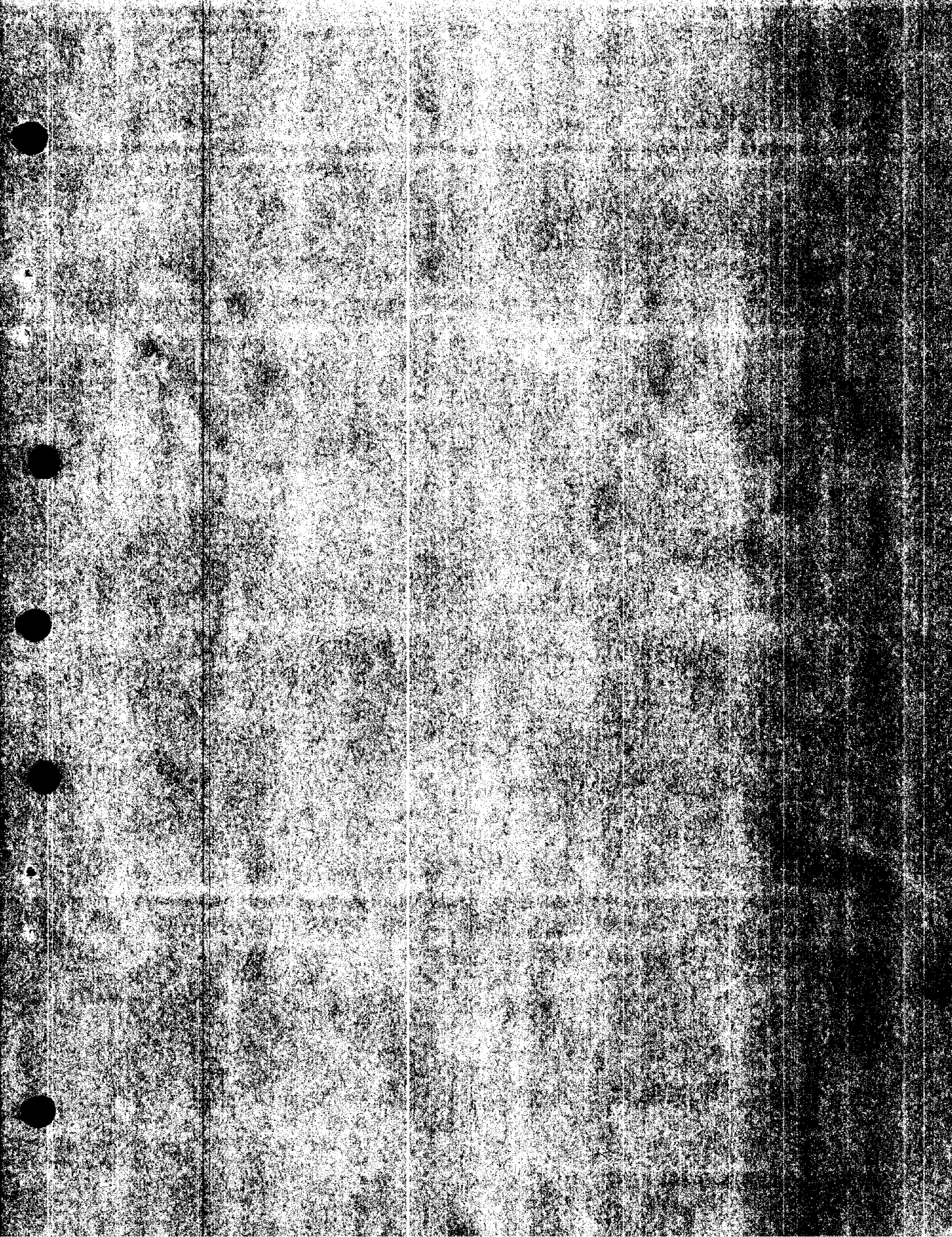
STORAGE

REFRIGERATOR
FREEZER

ID _____
ID _____

SECURED
YES
NO

* Print name after signature.



THEORY OF

State of California
AIR RESOURCES BOARD

Resolution 87-11

January 23, 1987

Agenda Item No.: 87-2-3

WHEREAS, Health and Safety Code Section 39600 requires the Air Resources Board ("Board") to do such acts as may be necessary for the proper execution of the powers and duties granted to, and imposed upon, the Board;

WHEREAS, the Budget Act of 1986 requires the Air Resources Board in consultation with the Department of Health Services (DHS) and the Department of Food and Agriculture (DFA), to report to the Joint Legislative Budget Committee, the fiscal committees, and appropriate policy committees on the progress of the Board's toxic air contaminants program;

WHEREAS, staff has prepared a report titled "Toxic Air Contaminants: A Program Status Report," which contains the following information requested in the Budget Act language:

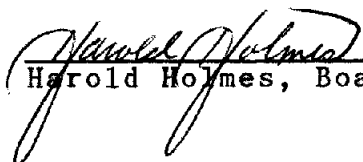
1. the substances (including pesticides) that have been referred to DHS and the Scientific Review Panel (SRP) for evaluation, the referral dates and the length of time for evaluation;
2. the anticipated 1987 schedule for the DHS and the SRP to complete their evaluations of each substance (including pesticides) submitted to them;
3. the 1987 and 1988 schedule for identification of toxic air contaminants and for adoption of control measures by the Board;
4. where applicable, the reasons for the SRP not completing its evaluations within the statutory deadline;
5. the Board's fiscal year 1986-87 and 1987-88 proposed budget for the SRP by type of activity; and
6. the pesticides which have been referred and are expected to be referred to the Board in 1987 by DFA, the date or anticipated date of referral, and the Board schedule for monitoring pesticide emissions;

WHEREAS, the Board has held a duly noticed public meeting at which it received public comments and considered the draft report prepared and presented to it by staff; and

WHEREAS, the Board finds that the report responds to the direction of the Legislature in the 1986 Budget Act.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board approves the report titled "Toxic Air Contaminants: A Program Status Report" and directs the Executive Officer to forward the report to the appropriate legislative committees.

I certify that the above is a true and correct copy of Resolution 87-11 as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-12
February 26, 1987

Agenda Item No. 87-3-4

WHEREAS, the Legislature has declared that an effective research program is an integral part of the broad-base statewide effort to combat air pollution in California, pursuant to Health and Safety Code Section 39700;

WHEREAS, the Air Resources Board has been directed to administer and coordinate all air pollution research funded, in whole or in part, with state funds, pursuant to Health and Safety Code Section 39703;

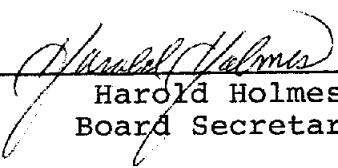
WHEREAS, the Air Resources Board has been directed to establish objectives for air pollution research in California, pursuant to Health and Safety Code Section 39703;

WHEREAS, the Air Resources Board has been directed to appoint a Research Screening Committee to give advice and recommendations with respect to all air pollution research projects funded by the state, pursuant to Health and Safety Code Section 39705;

WHEREAS, the Research Screening Committee has reviewed and approved a Long-Range Research Plan, dated January 1987, for air pollution research in California;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by the Health and Safety Code Sections 39703 and 39705, hereby concurs in the recommendation of the Research Screening Committee and approves the Long-Range Research Plan, dated January 1987, for air pollution research in California.

I hereby certify that the above is a true and correct copy of Resolution 87-12 as adopted by the Air Resources Board.



Harold Holmes
Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-13
February 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1489-131, entitled "The Role of Lung Inflammation in Ozone-Induced Hyperresponsiveness at Two Concentrations," has been submitted by the University of California, Davis;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

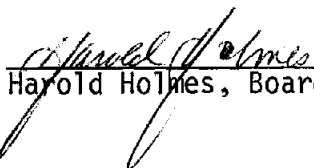
Proposal Number 1489-131, entitled "The Role of Lung Inflammation in Ozone-Induced Hyperresponsiveness at Two Concentrations," submitted by the University of California, Davis for a total amount not to exceed \$18,072.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1489-131, entitled "The Role of Lung Inflammation in Ozone-Induced Hyperresponsiveness at Two Concentrations," submitted by the University of California, Davis for a total amount not to exceed \$18,072.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$18,072.

I hereby certify that the above is a true and correct copy of Resolution 87-13, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-3-5 (b) 1
DATE: February 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1489-131 entitled "The Role of Lung Inflammation in Ozone-Induced Hyperresponsiveness at Two Concentrations."

RECOMMENDATION: Adopt Resolution 87-13 approving Proposal No. 1489-131 for funding in an amount not to exceed \$18,072.

SUMMARY: Several investigations have demonstrated that human subjects exposed to sufficient ozone to produce a reduced pulmonary function on one day usually experience an even greater reduction with the same exposure on the day following the first exposure. The objective of this study is to investigate how this sensitive protocol for pulmonary function tests relates to lung inflammation. This work would support an objective of the Health Effects Section of the Long Range Research Plan.

The experiment will expose healthy young male subjects to ozone while they engage in exercise. The next day the subjects will be reexposed to ozone at the same level (0.35 ppm) and, during a separate experiment, reexposed at a lower level (0.20 ppm). The investigators will assess the effects of the ozone exposures by measuring each subject's pulmonary function and blood levels of specific compounds that are involved in the mediation of inflammation.

If reductions in this sensitive approach to pulmonary function testing are observed to be linked to inflammation, then uncertainty about the medical significance of acute pulmonary function reductions in healthy subjects will be substantially reduced. More confidence in the interpretation of the result will aid in assessing the level of harm of ozone and possibly other pollutants.

The contractor for this work is the University of California, Davis and the principal investigator is Dr. William Adams.

B U D G E T S U M M A R Y

University of California, Davis

"The Role of Lung Inflammation in
Ozone-Induced Hyperresponsiveness at Two Concentrations"

BUDGET ITEMS:

Salaries	\$7,915	
Benefits	399	
Supplies*	4,551	
Other Costs**	1,584	
Travel	0	
Human Subject Compensation	1,980	
TOTAL, Direct Costs		\$16,429
TOTAL, Indirect Costs		1,643
	<u>TOTAL PROJECT COST</u>	<u>\$18,072</u>

* Supplies: Materials for analysis of prostaglandins in the blood.

** Other costs: Computer analysis and report.

State of California
AIR RESOURCES BOARD

Resolution 87-14
February 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1483-130(R), entitled "Toxicity of Mobile Source-Related Fine Particles in Atmospheres Containing Oxidant Gases," has been submitted by the University of California, Irvine;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

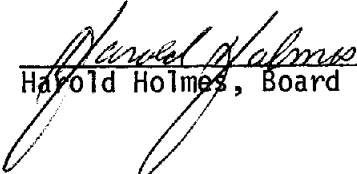
Proposal Number 1483-130(R), entitled "Toxicity of Mobile Source-Related Fine Particles in Atmospheres Containing Oxidant Gases," submitted by the University of California, Irvine for a total amount not to exceed \$301,220.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1483-130(R), entitled "Toxicity of Mobile Source-Related Fine Particles in Atmospheres Containing Oxidant Gases," submitted by the University of California, Irvine for a total amount not to exceed \$301,220.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$301,220.

I hereby certify that the above is a true and correct copy of Resolution 87-14, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-3-5(b) 2
DATE: February 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1483-130(R) entitled "Toxicity of Mobile Source-Related Fine Particles in Atmospheres Containing Oxidant Gases."

RECOMMENDATION: Adopt Resolution 87-14 approving Proposal No. 1483-130(R) for funding in an amount not to exceed \$301,220.

SUMMARY: This study will evaluate the health effects of exposure to diesel-generated emissions in an ozone atmosphere. The results will indicate whether there is a hazard when such diesel emissions, which contain fine particles and nitrogen oxides, enter air that is already substantially polluted with ozone. There have already been studies showing effects of higher levels of particles in acidic atmospheres, as well as effects of ozone itself. The work is part of the Board's effort to enhance the basis of the ambient air quality standard for particles, as outlined in the Board's Long Range Research Plan.

Rats will be exposed to the test atmosphere or clean air. They will then be sacrificed, and a comprehensive set of effects will be measured. These effects include multiple measures of changes in cells and tissues involved in the respiratory defense system, changes in lung permeability and damage to cells of the deep lung.

The exposure is planned at two different levels. The first is at high ambient levels for five days and the second is at lower levels for twenty-one days. At the recommendation of the Research Screening Committee the second exposure would not be performed and expenditures would be limited to \$190,000 if the first experiment produced a negative result.

The contractor for this work is the University of California, Irvine and the principal investigator is Dr. Michael Kleinman.

B U D G E T S U M M A R Y

University of California, Irvine

"Toxicity of Mobile Source-Related Fine Particles in
Atmospheres Containing Oxidant Gases"

BUDGET ITEMS *:

Salaries	\$172,749	
Benefits	47,415	
Supplies	39,400	(2)
Consultant		
Dr. Rao, Immunologist	2,500	
Other Costs	2,500	(1)
Travel	2,000	
Equipment (Microscope parts)	8,000	
TOTAL, Direct Costs		\$274,564
TOTAL, Indirect Costs		26,656
	<u>TOTAL PROJECT COST</u>	<u>\$301,220</u>

* Budget subject to satisfactory completion of first experiment.
First experiment cost not to exceed \$190,000.

- (1) Copying, library charges, phone, equipment maintenance.
(2) Animals and animal care (\$13,550); Histopathology (\$3,500), Air sampling and Analysis (\$19,350); Computer use (\$2,000), Waste disposal (\$1,000)

State of California
AIR RESOURCES BOARD

Resolution 87-15
February 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1501-131, entitled "Relationship Between Acute Ozone Responsiveness and the Chronic Loss of Lung Function in Residents Exposed to Recurrent Oxidant Air Pollution," has been submitted by University of California, Los Angeles;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

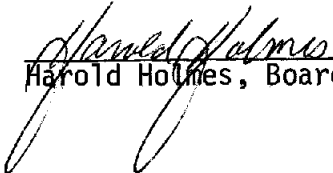
Proposal Number 1501-131, entitled "Relationship Between Acute Ozone Responsiveness and the Chronic Loss of Lung Function in Residents Exposed to Recurrent Oxidant Air Pollution," submitted by University of California, Los Angeles, for a total amount not to exceed \$145,299.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1501-131, entitled "Relationship Between Acute Ozone Responsiveness and the Chronic Loss of Lung Function in Residents Exposed to Recurrent Oxidant Air Pollution," submitted by University of California, Los Angeles, for a total amount not to exceed \$145,299.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$145,299.

I hereby certify that the above is
a true and correct copy of Resolution
87-15, as adopted by the Air Resources
Board,



Harold Holmes, Board Secretary

ITEM NO.: 87-3-5(b) 3

DATE: February 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1501-131 entitled "Relationship Between Acute Ozone Responsiveness and the Chronic Loss of Lung Function in Residents Exposed to Recurrent Oxidant Air Pollution."

RECOMMENDATION: Adopt Resolution 87-15 approving Proposal No. 1501-131 for funding in an amount not to exceed \$145,299.

SUMMARY: This project investigates the high rate of pulmonary function decline observed in a previous study of a population frequently exposed to high concentrations of ambient oxidants in Glendora. The objectives of the present study are: 1) to determine if the previously observed rate of decline in pulmonary function has continued, 2) to investigate the relationship between present pulmonary function response to acute clinical ozone exposure and long-term rates of decline in pulmonary function, and 3) to determine whether several physiological and biochemical markers are related to the long-term rates of decline.

This study addresses one of the objectives in the Long Range Research Plan, exploration of the link between acute and chronic exposures to air pollution. The degree to which such a link is found will be important in interpreting the significance of the results of short term exposure tests. In addition, the work affords an important opportunity to check previous trends.

The work for which funding is sought was originally funded by the U.S. EPA as part of the first year of a multi-year project, which evolved from ideas initiated by ARB. The work is currently starting; however, due to budget cuts, EPA cannot provide complete funding for the first year. This proposal would provide funds to complete the first year of the multi-year study, and ensure that a unique opportunity to study a key population is not lost.

The contractor for this work is the University of California, Los Angeles and the principal investigator is Dr. Henry Gong.

B U D G E T S U M M A R Y

University of California, Los Angeles

"Relationship Between Acute Ozone Responsiveness and the
Chronic Loss of Lung Function in Residents Exposed
to Recurrent Oxidant Air Pollution"

BUDGET ITEMS:

Salaries	\$32,094	
Benefits	7,726	
Supplies	1,446	
Equipment	3,407	
Carbon Monoxide Analyzer		
Respiratory Test Meter		
Subcontracts*	30,461	
Other Costs**	56,176	
Travel	780	
TOTAL, Direct Costs		\$132,090
TOTAL, Indirect Costs		13,209
	<u>TOTAL PROJECT COST</u>	<u>\$145,299</u>

* The portions of subcontracts with Rancho Los Amigos Medical Center for clinical pulmonary function testing and with City of Hope Medical Center for facilities not funded by EPA.

** Detail of Other Costs:

The portion of "other costs" not funded by EPA	\$29,191
Partial cost of attending physician	\$ 7,935
Travel cost for Dr. McDonnell	6,535
Dr. Steven Colome, Consultant	6,300
Dr. Joseph Taylor, Consultant	6,215
TOTAL	<u>\$56,176</u>

The U.S. Environmental Protection Agency is providing funding in the amount of \$206,867.

State of California
AIR RESOURCES BOARD

Resolution 87-16
February 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A6-099-32 entitled "Southern California Air Quality Study: Measurements of Peroxyacetyl Nitrate (PAN)," has been submitted by Daniel Grosjean and Associates, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this augmentation for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

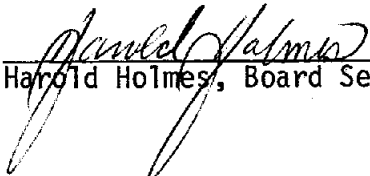
Augmentation to Contract Number A6-099-32, entitled "Southern California Air Quality Study: Measurements of Peroxyacetyl Nitrate (PAN)," submitted by Daniel Grosjean and Associates, Inc. by \$4,919 for a total amount not to exceed \$39,221.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation Contract Number A6-099-32, entitled "Southern California Air Quality Study: Measurements of Peroxyacetyl Nitrate (PAN)," submitted by Daniel Grosjean and Associates, Inc. by \$4,919 for a total amount not to exceed \$39,221.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort proposed herein by \$4,919 for a total amount not to exceed \$39,221.

I hereby certify that the above is a true and correct copy of Resolution 87-16, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-3-5(b) 4
DATE: February 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Augmentation for Contract No. A6-099-32 entitled "Southern California Air Quality Study: Measurements of Peroxyacetyl Nitrate (PAN)."

RECOMMENDATION: Adopt Resolution 87-16 approving a budget augmentation of Contract No. A6-099-32 by \$4,919 for a total contract amount not to exceed \$39,221.

SUMMARY: This augmentation will provide funds to perform aircraft measurements of PAN concentrations aloft from two aircraft during the SCAQS intensive study days. Ground-based PAN measurements are part of an earlier contract to Daniel Grosjean Associates (DGA). The PAN measurements aloft will complement the ground-based PAN data obtained by DGA, and are a necessary and integral part of the SCAQS program.

The principal investigator for this study is Dr. Daniel Grosjean of DGA.

State of California
AIR RESOURCES BOARD

Resolution 87-17

February 26, 1987

Agenda Item No.: 87-3-1

WHEREAS, Section 39602 of the Health and Safety Code designates the Air Resources Board ("ARB" or the "Board") as the air pollution control agency for all purposes set forth in federal law and as the state agency responsible for the preparation of the State Implementation Plan (SIP) required by the Clean Air Act, and further provides that the SIP shall include only those provisions necessary to meet the requirements of the Clean Air Act;

WHEREAS, Sections 110 and 171 et seq. of the Clean Air Act require the SIP in designated nonattainment areas of the state to provide for the attainment and maintenance of national ambient air quality standards by specified deadlines;

WHEREAS, pursuant to Clean Air Act Section 107, Kern County has been designated a nonattainment area for ozone, and therefore the Kern County Air Pollution Control Board adopted a 1979 Plan for attainment of the national ambient air quality standard for ozone;

WHEREAS, the national ozone standard of 0.12 parts per million ("ppm") averaged over one hour has not been attained in central or western Kern County;

WHEREAS, Clean Air Act Section 172(b)(2) requires the nonattainment area plan to provide for the implementation of all reasonably available control measures as expeditiously as practicable;

WHEREAS, Section 110(a)(2)(H) of the Clean Air Act requires the Environmental Protection Agency ("EPA") to call for a revision to the SIP when the EPA finds that a SIP is substantially inadequate to meet the ambient air quality standards;

WHEREAS, on February 24, 1984, the EPA Administrator issued such a "SIP call" for Kern County;

WHEREAS, extensive cooperative discussions among the staffs of the ARB, the EPA, and Kern County led to the preparation of a draft 1986 Kern County Plan for consideration by the Kern County Board which met most of the requirements of the Clean Air Act;

WHEREAS, the modeling in the draft Plan indicated that control of both reactive organic gases ("ROG") and oxides of nitrogen ("NOx"), both of which are precursors to the formation of ozone, would reduce ozone concentrations in Kern County, but the Plan adopted by the Kern County Air Pollution Control Board on March 31, 1986 contained no new control measures for NOx;

WHEREAS, the failure to include NOx measures made the plan inconsistent with the Clean Air Act requirement in that the Plan did not contain all reasonably available measures to reduce ozone precursor emissions from existing sources in both central and western Kern County;

WHEREAS, the Kern County Board submitted the 1986 Kern County Plan to the ARB on April 21, 1986 and requested that it be submitted to the EPA as part of California's State Implementation Plan;

WHEREAS, the Board held a public hearing on August 21 and 22, 1986 to consider the 1986 Kern County Plan pursuant to the requirements and procedures set forth in Health and Safety Code Sections 41502 and 41650-41652;

WHEREAS, on August 22, 1986 the Board amended the 1986 Kern County Plan for the reasons set forth in ARB Resolution 86-76, incorporated by reference herein;

WHEREAS, among other revisions, the Board amended the 1986 Kern County Plan by adding a commitment that Kern County APCD Rule 425, Oxides of Nitrogen Emissions from Steam Generators Used in Thermally Enhanced Oil Recovery, will be considered for amendment at a public hearing by September 30, 1987, to (1) limit NOx emissions from oil and gas-fired steam generators in Kern County to 0.14 pound per million Btu of actual heat input; (2) eliminate Section C (banking provision) of the rule; (3) require that Section E of the rule be amended to (a) require that presently required compliance plans include enforceable, generator-specific emission limits and (b) specify criteria and procedures which must be followed before these limits may be changed; and (4) disallow the inclusion of nonoperating and unbuilt steam generators into the field-wide average emission calculations;

WHEREAS, the Board also added a commitment to the Plan that a public hearing will be held to consider the adoption by September 30, 1987, of a rule that is at least as effective as the South Coast AQMD's Rule 1110.1 to control NOx emissions from gas-fired internal combustion engines in Kern County;

WHEREAS, both of the above commitments apply to requirements applicable throughout the San Joaquin Valley Air Basin portion of the County, i.e. to both central and western Kern;

WHEREAS, the Board also appointed a committee of the Board to review the question of whether NOx controls need to be implemented on the west side at this time in order to attain the ozone ambient air quality standard and directed the Executive Officer to forward the Plan as amended to the EPA unless the Board determined on the basis of the committee report to consider revisions at a public hearing;

WHEREAS, the committee met several times to gather information and consider testimony and on November 20, 1986 submitted to the Board its written report, which included a number of formal findings, incorporated by reference herein;

WHEREAS, in its report dated November 20, 1986 the committee also made recommendations to the Board pertaining to NOx controls on the west side, incorporated by reference herein and summarized as follows:

1. The Board should schedule a public hearing to consider amending the Kern County Plan to require the implementation of NOx controls on the west side only if the national ozone standard is exceeded after the statutory deadline for attainment;
2. The Board should consider establishing the following description of an exceedance of the standard in western Kern County: ambient ozone concentration of 0.13 ppm or greater at any western Kern station on four or more separate days during the period from January 1, 1986 through December 31, 1988; and
3. The entire Kern County Plan as amended by the Board August 22, 1986 should be immediately submitted to the EPA with a request that the EPA take no formal action on the NOx control measures for western Kern until the amendments proposed above are considered by the Board and any resulting changes submitted to the EPA;

WHEREAS, the Board endorsed the report submitted by the committee and adopted Resolution 86-104 on November 20, 1986, which directed the Executive Officer to forward the 1986 Kern County Plan as amended to the EPA and requested the EPA to withhold final action on the Plan until March 31, 1987 and further directed the Executive Officer to schedule a hearing in February 1987 for the purpose of considering amendments to the Plan relating to NOx controls on the west side;

WHEREAS, the California Environmental Quality Act and ARB regulations require that no action which may have an adverse impact on the environment be undertaken if feasible alternatives or mitigation measures are available which would eliminate or substantially diminish such impacts, and that specified findings be made in the event significant effects may occur;

WHEREAS, on February 26, 1987 the Board held a noticed public hearing in accordance with the provisions and procedures set forth in Health and Safety Code Sections 41502, 415651 and 41652;

WHEREAS, the Board has considered the significant issues raised and written evidence presented by interested persons and Board staff, and has addressed such issues in Attachment C to this resolution;

WHEREAS, based upon the report presented by the committee of the Board, the information presented by the staff, and the written and oral testimony received prior to and at the hearing, the Board finds:

1. The degree of violation of the ozone standard in western Kern County is marginal, and the number of violations fewer than in central Kern County;

2. Meteorological factors cannot explain the year-to-year variations in the ambient ozone concentrations in western Kern County (i.e., based on the limited data available, a statistical analysis showed meteorological variables accounting for only approximately 15-35% of the variation in ozone concentrations);
3. Modeling analyses currently available do not establish whether or not the ozone standard will be attained in western Kern County with ROG controls alone;
4. The ozone benefits to be derived from the control of ROG emissions from heavy oil test stations have not yet occurred but are expected to occur in the near future and may be sufficient to enable attainment of the ozone standard;
5. While reductions in emissions of both ROG and NOx will reduce ozone by a greater amount than reductions of ROG alone in western Kern County, the simultaneous reduction of both precursors will not necessarily result in earlier attainment of the ozone standard;
6. If reductions in ROG emissions do not result in attainment of the ozone standard, reductions of NOx emissions will be necessary and should be expeditiously implemented;
7. In light of the impossibility of predicting with sufficient certainty future ozone levels in western Kern County, it is advisable to plan for the automatic imposition of NOx controls if further exceedances of the ozone standard as defined below occur;
8. It is appropriate to condition the imposition of NOx controls in western Kern County, if needed to attain the ozone standard, upon the occurrence of more than three measured exceedances of the ozone standard during a three-year period in order to be consistent with federal regulations for calculating violations of ambient standards;
9. It is appropriate that the three-year period begin in 1988 and end in 1990 in order to allow for an evaluation of the full ozone benefits due to the control of ROG emissions from the heavy oil test stations;
10. If shown to be necessary, the control measures for NOx can be implemented on the west side within approximately 15 to 18 months from the determination that the ozone standard has been violated, a period which allows adequate lead time for equipment installation. A compliance schedule for implementing the NOx controls is set forth in Attachment B;
11. The March 31, 1986 Plan submitted to the ARB for review by Kern County remains inadequate to meet California Air Ambient requirements with regard to the west side because it does not provide for the expeditious implementation of NOx controls if they are found to be necessary for attainment of the ozone standard;

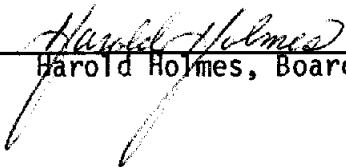
12. The most appropriate definition of western Kern County for purposes of this action is that portion of Kern County which lies to the west of Interstate Highway 5;

WHEREAS, the staff report identified several potential significant adverse environmental effects which may result from the deferral or elimination of NOx controls in western Kern County. Therefore, the following findings are appropriate:

1. If the ozone standard is attained with the implementation of the ROG controls already in the plan, ozone levels will be lower than present ambient levels and will satisfy the requirements of the Clean Air Act, and the ARB is constrained by Health and Safety Code Section 39602 from including in the SIP measures not required by the Clean Air Act;
2. If the ozone standard is not attained with the implementation of the ROG controls alone, the automatic implementation of NOx controls when measured ozone concentrations exceed the standard after 1988 substantially mitigates all of the significant environmental effects of not requiring NOx controls on the west side at this time;
3. If the ozone standard is attained with the implementation of ROG controls alone, the planned reduction of approximately 41 tons per day (in 1995) of NOx emissions in western Kern County will not occur and any beneficial effects of this reduction of NOx emissions in further reducing ozone to meet the state oxidant standard and in reducing particulate matter and wet and dry acid deposition will be foregone; however, the ARB is prevented by Health and Safety Code Section 39602 from retaining the NOx controls in the SIP as a result of this hearing if they are not necessary to attain the national ozone standard;
4. As mitigation for the foregone benefits of NOx controls described in 3. above, NOx controls, among other strategies, will be considered at appropriate meetings concerning the attainment of the state PM₁₀ standard, the national particulate matter standard, and the reduction of acid deposition;
5. In addition to legal considerations, the cost to industry and the public of imposing NOx controls at a time when their need has not been established for attainment of the ozone standard makes the no-project alternative (i.e. retention of NOx controls on the west side) inappropriate within the context of this proceeding;
6. The benefits of this action outweigh the unavoidable adverse environmental effects of the action under all of the contingencies described above because most of the impacts are substantially mitigated; economic and legal considerations make infeasible the imposition of NOx controls on the west side at this time within the context of attaining the ozone standard; and appropriate strategies for reducing acid deposition and particulate matter will be considered as necessary in appropriate proceedings.

NOW, THEREFORE, BE IT RESOLVED that the Board directs the Executive Officer to amend the 1986 Kern County Plan submitted to the EPA in November 1986 as set forth in Attachment A, incorporated by reference herein, and further directs the Executive Officer to submit the amendments to the EPA as a revision to the State of California State Implementation Plan and to the Kern County Air Pollution Control District as expeditiously as practicable.

I hereby certify that the above is a true and correct copy of Resolution 87-17, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

APR 11 1987
KERN COUNTY AIR
POLLUTION CONTROL DISTRICT

ATTACHMENT A

1. The measures for the control of NOx emissions (i.e., amendments to Rule 425 and a regulation for gas-fired internal combustion engines) which the Board added to the Kern County Plan in August of 1986 shall not be required in western Kern County as defined herein unless the implementation of existing ROG controls fails to attain the national ozone standard as specified in 2. below.
2. Implementation of existing ROG controls shall be deemed to have failed to attain the national ozone standard if measured ozone concentrations in western Kern County as defined herein exceed 0.12 ppm on more than three separate days during the three-year period of January 1, 1988, through December 31, 1990.
3. The NOx controls contained in the 1986 Kern County Plan shall be adopted and implemented in central Kern County as specified in Resolution 86-76 and shall be required and automatically imposed in western Kern County at any time during those three years that a fourth exceedance of the standard occurs.
4. The imposition of NOx controls in western Kern County, if needed as described in 3. above, shall be in accordance with the compliance schedule set forth in Attachment B, incorporated by reference herein.
5. For the purposes of this Plan revision concerning control measures for oxides of nitrogen, western Kern County shall be defined as that portion of Kern County in the San Joaquin Valley Air Basin which lies to the west of Interstate Highway 5.
6. The emission inventory and forecasts shall be revised as necessary to reflect best available data regarding the emissions and emission reductions of reactive organic gases from the heavy oil test stations.
7. All changes to the text of the Kern County Plan which are necessary to implement the above amendments to the Plan shall be made prior to sending the revision to EPA.

ATTACHMENT B
COMPLIANCE SCHEDULES

<u>SIZE OF SOURCE</u>	<u>DESCRIPTION</u>	<u>COMPLIANCE</u>
<u>Internal Combustion Engines</u>		
500 hp and over ¹	Rich ² over 200 hp	15 months ³
	Rich >50 and ≤ 200 hp	12/31/95
	Lean ² over 500 hp	15 months ³
	Lean >50 and ≤ 500 hp	12/31/95
Under 500 hp ¹	All	12/31/95
<u>Steam Generators</u>		
All	All	18 months ³

- 1 Cumulative total (installed brake horsepower) of all internal combustion engines at one source.
- 2 Rich means rich-burn engines.
Lean means lean-burn engines.
- 3 From the fourth exceedance of the ozone standard after January 1, 1988.

OPPOSING CONSIDERATIONS AND BOARD RESPONSE

OPPOSING CONSIDERATION: WOGA REQUESTED THAT THE BOARD FURTHER REVISE THE PLAN SO THAT CONTROL OF FUGITIVE HYDROCARBON EMISSIONS FROM OIL AND GAS PLANTS IN WESTERN KERN COUNTY WOULD BE HANDLED IN THE SAME MANNER AS THE STAFF PROPOSED FOR NITROGEN OXIDE EMISSIONS. THAT IS, THAT THE FUGITIVE EMISSION CONTROLS NOT BE REQUIRED UNLESS THE OZONE STANDARD IS EXCEEDED ON MORE THAN THREE DIFFERENT DAYS BETWEEN JANUARY 1, 1988, AND DECEMBER 31, 1990. IN THIS REGARD, KERN COUNTY ASKED WHETHER WOGA'S REQUEST COULD BE CONSIDERED BY THE DISTRICT DURING ITS RULEMAKING PROCESS.

BOARD RESPONSE: THIS SUGGESTED MODIFICATION IS BEYOND THE SCOPE OF THE HEARING NOTICE FOR THIS HEARING. FEDERAL REGULATIONS (40 CFR SECTION 51.4) AND STATE LAW LIMIT THE BOARD'S ABILITY TO MODIFY THE KERN COUNTY SIP AT THIS HEARING TO MATTERS SPECIFICALLY CITED IN THE HEARING NOTICE (THAT IS, MATTERS RELATED TO THE CONTROL OF EMISSIONS OF OXIDES OF NITROGEN IN WESTERN KERN COUNTY).

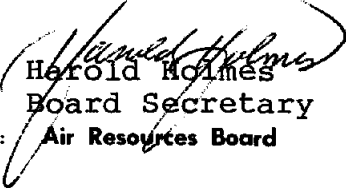
THE KERN COUNTY PLAN AS REVISED BY THE BOARD IN AUGUST 1986 COMMITS THE BOARD TO CONSIDER AMENDMENTS TO RULES (INCLUDING THE FUGITIVE RULES) AND SUBMIT THEM TO EPA AS SIP REVISIONS. THE PLAN FURTHER PROVIDES THE DISTRICT THE OPPORTUNITY TO ADOPT RULES FOR THIS PURPOSE. THESE RULES MUST BE APPROVED BY THE BOARD AS

Memorandum

To : Gordon Van Vleck
Secretary
Resources Agency

Date : March 12, 1987

Subject: Filing of Notice of
Decisions of the Air
Resources Board


Harold Holmes
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

ATTACHMENTS

86-76

86-104

87-17

State of California
AIR RESOURCES BOARD

Resolution 87-18
March 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1491-131, entitled "Methods Development for Assessment of Vapor-Phase Mutagens and Carcinogens in Ambient Air," has been submitted by the Department of Environmental Toxicology, University of California, Davis;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

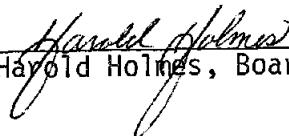
Proposal Number 1491-131, entitled "Methods Development for Assessment of Vapor-Phase Mutagens and Carcinogens in Ambient Air," submitted by the Department of Environmental Toxicology, University of California, Davis for a total amount not to exceed \$146,927.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1491-131, entitled "Methods Development for Assessment of Vapor-Phase Mutagens and Carcinogens in Ambient Air," submitted by the Department of Environmental Toxicology, University of California, Davis for a total amount not to exceed \$146,927.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$146,927.

I hereby certify that the above is a true and correct copy of Resolution 87-18, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 1
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1491-131 entitled "Methods Development for Assessment of Vapor-Phase Mutagens and Carcinogens in Ambient Air."

RECOMMENDATION: Adopt Resolution 87-18 approving Proposal No. 1491-131 for funding in an amount not to exceed \$146,927.

SUMMARY: The purpose of this project is to develop and demonstrate methods to sample vapor-phase contaminants in ambient air and to identify and quantify the most active mutagenic/carcinogenic fractions using short-term, bioassay-directed chemical analyses. This study will address two objectives for toxic air contaminant research contained in the ARB's Long-Range Research Plan; specifically, to investigate and characterize priority toxic air contaminants from selected sources and to conduct health effects assessments for selected toxic air contaminants.

The methods which will be developed by the investigators in this study will be used by the Air Resources Board and others to determine the relative importance of vapor-phase and particle-phase mutagens and carcinogens in ambient air and to determine the identity and source of vapor-phase constituents that may contribute to adverse health effects.

The test methods selected for sampling and the biological/chemical analyses of vapor-phase mutagens will be validated using model compounds, first in the laboratory, and finally at several field testing sites. Test protocols will include a quality control program to ensure reliable data.

The contractor for this project is the University of California, Davis, Department of Environmental Toxicology. The principal investigator will be Dr. Dennis P. H. Hsieh. A member of the ARB staff, Dr. Norman Kado, is one of the originators of the microsuspension bioassay technique to be used in the study, and he will participate as a co-principal investigator for the study.

B U D G E T S U M M A R Y

University of California, Davis
Department of Environmental Toxicology

"Methods Development for Assessment of Vapor-Phase
Mutagens and Carcinogens in Ambient Air"

BUDGET ITEMS:

Salaries	\$82,344	
Benefits	19,838	
Supplies	20,970	
Equipment	7,000	
(GC Thermal Conductivity Detector, GC/MS charge, etc.		
Travel	2,245	
Other	<u>1,400</u>	
TOTAL, DIRECT COSTS		\$133,797
TOTAL, INDIRECT COSTS		<u>13,130</u>
	<u>TOTAL PROJECT COST</u>	<u>\$146,927</u>

State of California
AIR RESOURCES BOARD

Resolution 87-19
March 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1497-131, entitled "Determination of Particle Size Distributions and Chemical Composition of Particulate Matter from Selected Sources in California," has been submitted by OMNI Environmental Services, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

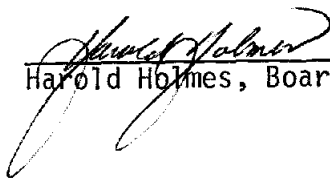
Proposal Number 1497-131, entitled "Determination of Particle Size Distributions and Chemical Composition of Particulate Matter from Selected Sources in California," submitted by OMNI Environmental Services, Inc. for a total amount not to exceed \$245,967.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1497-131, entitled "Determination of Particle Size Distributions and Chemical Composition of Particulate Matter from Selected Sources in California," submitted by OMNI Environmental Services, Inc. for a total amount not to exceed \$245,967.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$245,967.

I hereby certify that the above is a true and correct copy of Resolution 87-19, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 2
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1497-131 entitled "Determination of Particle Size Distributions and Chemical Composition of Particulate Matter from Selected Sources in California."

RECOMMENDATION: Adopt Resolution 87-19 approving Proposal No. 1497-131 for funding in an amount not to exceed \$245,967.

SUMMARY: The purpose of this study is to determine the size distribution and chemical composition of directly-emitted particles from selected sources. This study addresses one of the objectives for the stationary source research element, as contained in the ARB's Long-Range Research Plan; specifically, to better define emissions of hydrocarbons, oxides of nitrogen, oxides of sulfur, and PM₁₀ from selected source categories that contribute to violations of ambient air quality standards.

The results of this study will be used to relate source contributions to measured particulate concentrations in the atmosphere. This information will be used to help develop a least-cost strategy to attain the (anticipated) federal and state ambient air quality standards for PM₁₀.

The study will be conducted by OMNI Environmental Services, Inc. The principal investigator will be Dr. James E. Houck.

B U D G E T S U M M A R Y

OMNI Environmental Services, Inc.

"Determination of Particle Size Distributions
and Chemical Composition of Particulate
Matter from Selected Sources in California"

BUDGET ITEMS:

Salaries	\$ 48,912	
Benefits	11,855	
Supplies	2,430	
Equipment Rental	17,700	
Chemical Analyses	39,250	
Other Costs	6,089	
Travel	<u>16,823</u>	
TOTAL, Direct Costs		\$143,059
TOTAL, Indirect Costs		<u>102,908</u>
	<u>TOTAL PROJECT COST</u>	<u>\$245,967</u>

State of California
AIR RESOURCES BOARD

Resolution 87-20
March 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1512-132, entitled "Evaluation of a Method for Determining Vapor Pressures of Petroleum Mixtures by Headspace Gas Chromatography," has been submitted by the University of California, Davis;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1512-132, entitled "Evaluation of a Method for Determining Vapor Pressures of Petroleum Mixtures by Headspace Gas Chromatography," submitted by the University of California, Davis for a total amount not to exceed \$29,539.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1512-132, entitled "Evaluation of a Method for Determining Vapor Pressures of Petroleum Mixtures by Headspace Gas Chromatography," submitted by the University of California, Davis for a total amount not to exceed \$29,539.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$29,539.

I hereby certify that the above is a true and correct copy of Resolution 87-20, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 3
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1512-132 entitled "Evaluation of a Method for Determining Vapor Pressures of Petroleum Mixtures by Headspace Gas Chromatography."

RECOMMENDATION: Adopt Resolution 87-20 approving Proposal No. 1512-132 for funding in an amount not to exceed \$29,539.

SUMMARY: The purpose of this project is to complete development and demonstration of a method for measuring the vapor pressure of complex petroleum mixtures such as crude oil. This study addresses one of the objectives of the stationary source research element, as stated in the ARB's Long-Range Research Plan, specifically, to better define emissions of hydrocarbons, oxides of nitrogen, oxides of sulfur, and PM_{10} from selected source categories that contribute to violations of ambient air quality standards.

The method will be used by ARB staff and others, along with other data, to assess hydrocarbon emissions from crude oil storage and processing facilities. These emissions account for a major portion of the uncertainty in the statewide emissions of volatile organic compounds.

The study will be conducted at the University of California, Davis. The principal investigator will be Dr. James N. Seiber.

State of California
AIR RESOURCES BOARD

Resolution 87-21
March 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1516-132, entitled "Proposal to Conduct Data Management for the Southern California Air Quality Study," has been submitted by Environmental Research & Technology, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

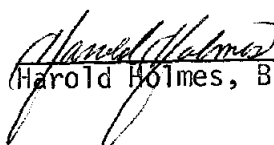
Proposal Number 1516-132, entitled "Proposal to Conduct Data Management for the Southern California Air Quality Study," submitted by Environmental Research & Technology, Inc. for a total amount not to exceed \$49,953.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1516-132, entitled "Proposal to Conduct Data Management for the Southern California Air Quality Study," submitted by Environmental Research & Technology, Inc. for a total amount not to exceed \$49,954.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$49,954.

I hereby certify that the above is a true and correct copy of Resolution 87-21, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 4
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1516-132 entitled "Proposal to Conduct Data Management for the Southern California Air Quality Study,"

RECOMMENDATION: Adopt Resolution 87-21 approving Proposal No. 1516-132 for funding in an amount not to exceed \$49,954.

SUMMARY: The purpose of this project is to provide the data manager for the Southern California Air Quality Study. SCAQS is a multi-year, integrated air quality study whose overall goal, as stated in the ARB's Long-Range Research Plan, is to develop a comprehensive and properly archived air quality and meteorological data base for the South Coast Air Basin. This data base will be used to test, evaluate and improve elements of air quality simulation models for oxidants, PM₁₀, fine particles, toxic air contaminants and acidic species.

The contractor will compile, review, archive and distribute all of the data from the Southern California Air Quality Study, including all data collected by ARB-sponsored and non ARB-sponsored participants and other governmental agencies.

The principal investigator will be Mr. John Collins of Environmental Research & Technology, Inc.

State of California
AIR RESOURCES BOARD

Resolution 87-22,
March 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A5-157-32, entitled "Southern California Air Quality Study - Program Management," has been submitted by Sonoma Technology, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this augmentation for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A5-157-32, entitled "Southern California Air Quality Study - Program Management," submitted by Sonoma Technology, Inc. by \$52,046 for a total amount not to exceed \$289,666.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A5-157-32, entitled "Southern California Air Quality Study - Program Mangement," submitted by Sonoma Technology, Inc. by \$52,046 for a total amount not to exceed \$289,666.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein by \$52,046 for a total amount not to exceed \$289,666.

I hereby certify that the above is a true and correct copy of Resolution 87-22, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 5
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Augmentation for Contract A5-157-32 entitled "Southern California Air Quality Study - Program Management."

RECOMMENDATION: Adopt Resolution 87-22 approving a budget augmentation of Contract No. A5-157-32 by \$52,046 for a total contract amount not to exceed \$289,666.

SUMMARY: This augmentation will provide funds for type A (intensive measurement) site preparation expenses at Upland and Long Beach during the SCAQS program, as defined in the ARB's Long-Range Research Plan. Included in the site preparation and field expenses during the study are costs for sampling platforms, security guards, and telecommunications between the two sites. Several million dollars' worth of equipment will be located at each site.

The principal investigator for this proposed effort is Dr. Donald Blumenthal of Sonoma Technology Inc.

B U D G E T S U M M A R Y

Sonoma Technology, Inc.

"Southern California Air Quality Study - Program Management"

BUDGET ITEMS:

Sampling Platform	\$11,545
Gas Cylinder and Supplies	2,100
Telecommunications	5,990
Trailer Rentals	<u>4,200</u>

TOTAL, Direct Costs	\$23,835
TOTAL, Indirect Costs	<u>2,383</u>

OTHER:

Expenses required for security guard duty, portable toilet facilities, distilled water and miscellaneous expenses to be purchased by Research Division staff.	<u>\$25,828</u>
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<u>TOTAL PROJECT COST</u>	<u>\$52,046</u>
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State of California
AIR RESOURCES BOARD

Resolution 87-23
March 26, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1507-132, entitled "Activity Pattern Study of California Residents," has been submitted by the University of California, Berkeley; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1507-132, entitled "Activity Pattern Study of California Residents," submitted by the University of California, Berkeley for a total amount not to exceed \$199,386.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1507-132, entitled "Activity Pattern Study of California Residents," submitted by the University of California, Berkeley for a total amount not to exceed \$199,386.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$199,386.

I hereby certify that the above is a true and correct copy of Resolution 87-23, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 6
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1507-132 entitled "Activity Pattern Study of California Residents."

RECOMMENDATION: Adopt Resolution 87-23 approving Proposal No. 1507-132 for funding in an amount not to exceed \$199,386.

SUMMARY: This solicited proposal represents the first research project of a new ARB program in indoor air quality and total exposure, which was initiated by a Budget Change Proposal for FY 1986-87.

The purpose of this study is to obtain statistically representative information regarding the time Californians spend in various locations and activities, particularly those indoor and outdoor locations and activities likely to result in exposure to harmful air pollutants. This information is needed to improve estimates of actual exposure to toxic air contaminants and criteria pollutants in order to make more realistic assessments of risks to health.

The contractor for this study is the University of California, Berkeley, and the principal investigator is Dr. James Wiley, Assistant Director of UCB's Survey Research Center. The project director is Dr. John Robinson, one of the leading researchers in activity pattern research in the U.S.

B U D G E T S U M M A R Y

University of California, Berkeley

"Activity Pattern Study of
California Residents"

BUDGET ITEMS:

Salaries/Benefits*	\$151,960	
Supplies	500	
Other Costs	28,300	
Travel	<u>500</u>	
TOTAL, Direct Costs		\$181,260
TOTAL, Indirect Costs		<u>18,126</u>
	<u>TOTAL PROJECT COST</u>	<u>\$199,386</u>

* The original budget did not separate benefits from salaries. A revised budget itemizing benefits separately has been requested from UCB.

State of California
AIR RESOURCES BOARD

Resolution 87-24
March 26, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California, pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a unsolicited research proposal, Number 145-22, entitled "Control of the Dry Deposition Flux of Nitrogen-Containing Air Pollutants," has been submitted by the California Institute of Technology;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

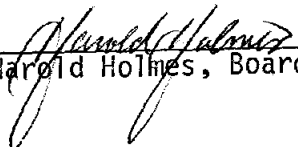
Proposal Number 145-22, entitled "Control of the Dry Deposition Flux of Nitrogen-Contained Air Pollutants," submitted by the California Institute of Technology for a total amount not to exceed \$199,727.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 145-22, entitled "Control of the Dry Deposition Flux of Nitrogen-Containing Pollutants," submitted by the California Institute of Technology for a total amount not to exceed \$199,727.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$199,727.

I hereby certify that the above is a true and correct copy of Resolution 87-24, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 7
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 145-22 entitled "Control of the Dry Deposition Flux of Nitrogen-Containing Air Pollutants."

RECOMMENDATION: Adopt Resolution 87-24 approving Proposal No. 145-22 for funding in an amount not to exceed \$199,727.

SUMMARY: The purpose of this study is to determine the effect of a number of candidate emissions control strategies on the dry deposition fluxes of nitrogen-containing gases (NO, NO₂, PAN, nitric acid, and ammonia) and aerosols (ammonium nitrate) to the surface of the South Coast Air Basin (SoCAB). The proposed control strategies include both mobile and stationary source controls for hydrocarbon and NO_x emissions. Dry deposition fluxes of nitric acid and aerosol nitrate are believed to be significantly more than the wet deposition fluxes (rain) and have the potential to damage economically valuable forest areas, crops and materials.

A three-dimensional grid (Eulerian) model would be modified to include state-of-the-art techniques to calculate dry deposition to the surface. The model would be run and validated for the "base case" of August 30-31, 1982 for which extensive field data were collected by the Caltech group. In the next step, the effect of emissions controls will be evaluated by comparing against the base case. The emission control measures for hydrocarbon and NO_x will be grouped into a 3 x 3 matrix of mobile and stationary source controls that will be tested for their effect on dry deposition patterns in the SoCAB. The matrix of control combinations includes increasingly stringent stationary source NO_x controls added to a minimal motor vehicle control program, as well as increasingly stringent mobile source emission reductions added to a minimal stationary source control program. Each of the nine combinations of emissions controls will be tested for their effect on dry deposition patterns. The project would provide useful information in designing acid deposition management strategies for the South Coast Air Basin. The study of such management strategies is mandated by the Kapiloff Acid Deposition Act.

The research contractor is the California Institute of Technology and the principal investigator will be Dr. Glen Cass.

B U D G E T S U M M A R Y

California Institute of Technology

"Control of the Dry Deposition Flux of
Nitrogen-Containing Air Pollutants"

BUDGET ITEMS:

Salaries	\$55,600	
Benefits	15,121	
Supplies	5,040	
Travel	8,000	
Other Costs ¹	<u>43,472</u>	
TOTAL, Direct Costs		\$127,233
TOTAL, Indirect Costs		<u>72,494</u>
	<u>TOTAL PROJECT COST</u>	<u>\$199,727</u>

1- Includes \$36,872 for computer (VAX) time and \$6,600 for publication costs.

State of California
AIR RESOURCES BOARD

Resolution 87-25
March 26, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California, pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an augmentation research proposal, Number 133-19A, entitled "Acidic Aerosol Size Distribution During SCAQS - Winter Period," has been submitted by California Public Health Foundation;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

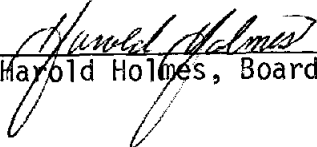
Proposal Number 133-19A, entitled "Acidic Aerosol Size Distribution During SCAQS - Winter Period," submitted by California Public Health Foundation for a total amount not to exceed \$68,905.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 133-19A, entitled "Acidic Aerosol Size Distribution During SCAQS - Winter Period," submitted by California Public Health Foundation for a total amount not to exceed \$68,905.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$68,905.

I hereby certify that the above is a true and correct copy of Resolution 87-25, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 8
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Research Proposal No. 133-19A entitled "Acidic Aerosol Size Distribution During SCAQS - Winter Period."
- RECOMMENDATION: Adopt Resolution 87-25 approving Proposal No. 133-19A for funding in an amount not to exceed \$68,905.
- SUMMARY: The purpose of this study is to provide data on size-resolved chemical composition of aerosols during the winter portion of the Southern California Air Quality Study (SCAQS). (The summer portion of this project was funded by the Board in November 1986.) The overall goal of the SCAQS is to develop a comprehensive and properly archived air quality and meteorological data base for the South Coast Air Basin that can be used to test, evaluate, and improve elements of air quality simulation models for oxidants, PM₁₀, fine particles, toxic air contaminants and acidic species.
- Gas and Aerosol phase computer models require, for their validation, spatially and temporally resolved ambient measurements of aerosols, including information on organic ions (nitrate, sulfate, chloride, ammonium, potassium, and sodium). To provide these data, the proponent would use the nine stage Berner cascade impactor, which was demonstrated successfully during the ARB-sponsored Nitrogen Species Measurement Methods Comparison Study held in Claremont in September 1985.
- The Contractor will measure the particle size distribution of major inorganic ions during the summer intensive study period of SCAQS, approximately 4 weeks (6 sampling days) beginning in November 1987. The Berner impactors will be operated at three stations including the two type "A" (intensive) stations, and a mobile station which would be situated in an upwind area. In addition to the above measurements, the contractor would analyze ten percent of the samples collected for calcium and magnesium ions, and formic and acetic acids.
- The research contractor is the California Public Health Foundation and the principal investigator will be Dr. Walter John.

B U D G E T S U M M A R Y

California Public Health Foundation

"Acidic Aerosol Size Distribution During SCAQS: Winter Period"

BUDGET ITEMS:

Salaries	\$32,324	
Benefits	9,236	
Supplies ¹	7,000	
Travel	6,034	
Equipment	<u>842</u>	
TOTAL, Direct Costs		\$55,436
TOTAL, Indirect Costs		<u>13,469</u>
	<u>TOTAL PROJECT COST</u>	<u>\$68,905</u>

¹ - Includes mechanical supplies (\$3,000), chemical supplies (\$3,000), and electronic supplies (\$1,000)

State of California
AIR RESOURCES BOARD

Resolution 87-26
March 26, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California, pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a solicited research proposal, Number 132-19, entitled "Assessment of Dry Deposition During the Southern California Air Quality Study," has been submitted by Carnegie-Mellon University;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

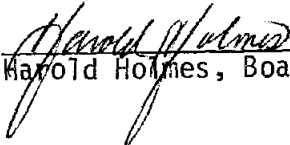
Proposal Number 132-19, entitled "Assessment of Dry Deposition During the Southern California Air Quality Study," submitted by Carnegie-Mellon University for a total amount not to exceed \$58,708.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 132-19, entitled "Assessment of Dry Deposition During the Southern California Air Quality Study," submitted by Carnegie-Mellon University for a total amount not to exceed \$58,708.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$58,708.

I hereby certify that the above is a true and correct copy of Resolution 87-26, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 9
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Research Proposal No. 132-19 entitled "Assessment of Dry Deposition During the Southern California Air Quality Study."
- RECOMMENDATION: Adopt Resolution 87-26 approving Proposal No. 132-19 for funding in an amount not to exceed \$58,708.
- SUMMARY: Carnegie-Mellon University will measure the dry deposition of particulate sulfate, particulate nitrate, nitric acid vapor, and the trace elements Ca, K, and Pb to natural and surrogate surfaces during SCAQS. The deposition fluxes of these species will be directly measured, and the information obtained will be used by modelers for boundary conditions in PM₁₀, ozone, and acid deposition models. Ultimately, these models will provide direction for the Board in establishing PM₁₀, ozone, and acid deposition management strategies. The principal investigator on this project will be Dr. Cliff Davidson.

State of California
AIR RESOURCES BOARD

Resolution 87-27
March 26, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California, pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 150-23, entitled "Measurement of the Dry Deposition of Atmospheric Coarse Particle Nitrate and Sulfate in Los Angeles," has been submitted by Illinois Institute of Technology;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee has reviewed and recommends for funding:

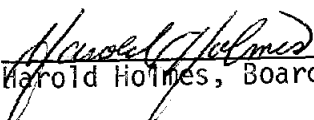
Proposal Number 150-23, entitled "Measurement of the Dry Deposition of Atmospheric Coarse Particle Nitrate and Sulfate in Los Angeles," submitted by Illinois Institute of Technology for a total amount not to exceed \$5,000.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 150-23, entitled "Measurement of the Dry Deposition of Atmospheric Coarse Particle Nitrate and Sulfate in Los Angeles," submitted by Illinois Institute of Technology for a total amount not to exceed \$5,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$5,000.

I hereby certify that the above is a true and correct copy of Resolution 87-27, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 10
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 150-23 entitled "Measurement of the Dry Deposition of Atmospheric Coarse Particle Nitrate and Sulfate in Los Angeles."

RECOMMENDATION: Adopt Resolution 87-27 approving Proposal No. 150-23 for funding in an amount not to exceed \$5,000.

SUMMARY: The Illinois Institute of Technology is planning to participate in the upcoming Southern California Air Quality Study beginning in June 1987. IIT will measure the airborne concentrations of large particle nitrate and sulfate and simultaneously measure the deposition flux to a greased plate. These measurements will be used to improve our understanding of large particle deposition processes; processes which are important because they are the only way to remove large particles from the atmosphere. IIT will provide funding for the Principal Investigator and analysis, but has requested funding from ARB for travel. This resolution is to provide travel expenses to participate in SCAQS. The principal investigator on this project will be Dr. Kenneth Noll.

B U D G E T S U M M A R Y

Illinois Institute of Technology

"Measurement of the Dry Deposition of Atmospheric Coarse Particle
Nitrate and Sulfate in Los Angeles"

BUDGET ITEMS:

Salaries	\$-----	
Benefits	-----	
Supplies	-----	
Other Costs	-----	
Travel	<u>5,000*</u>	
TOTAL, Direct Costs		\$5,000
TOTAL, Indirect Costs		<u> --</u>
	<u>TOTAL PROJECT COST</u>	<u>\$5,000</u>

* Car rental \$2,000, Gasoline \$800, Motel \$1,500, per diem \$700

State of California
AIR RESOURCES BOARD

Resolution 87-28

March 27, 1987

Agenda Item No.: 87-5-2

WHEREAS, on September 19, 1985, pursuant to Health and Safety Code Section 39662, the Air Resources Board ("ARB" or the "Board") identified ethylene dichloride as a toxic air contaminant for which there is not sufficient available scientific evidence to support the identification of a threshold exposure level below which no significant adverse health effects are anticipated (Title 17, California Administrative Code, Section 93000);

WHEREAS, following identification of ethylene dichloride as a toxic air contaminant, the staff prepared for the Board's review a report titled "Control Plan for Airborne Ethylene Dichloride" (the "Report") which addresses the present and future uses and emissions of ethylene dichloride, the exposure to and risk from ethylene dichloride, the persistence of ethylene dichloride in the ambient air, and the potential for reducing risk through application of control measures for ethylene dichloride;

WHEREAS, the people of California in general are, or will be by 1990, exposed to an annual average ambient concentration, based on a modelling analysis, of ethylene dichloride of less than .01 part per billion;

WHEREAS, current ethylene dichloride monitoring techniques are not sufficiently sensitive to report ambient concentrations and thus confirm the modelled exposures;

WHEREAS, the Department of Health Services ("DHS") concluded in its health effects evaluation that the added lifetime cancer risk from ethylene dichloride ranges from 53 to 88 excess cases per million people continuously exposed to one part per billion of ethylene dichloride;

WHEREAS, the Scientific Review Panel, established pursuant to Health and Safety Code Section 39670, concurred with DHS' estimates of risk from ethylene dichloride;

WHEREAS, recent federal regulations affecting the use of ethylene dichloride (restrictions on its use as a pesticide and restrictions on lead content in gasoline) are expected to reduce the 1983 emission rates by approximately 80 percent by 1990;

WHEREAS, in the absence of additional control measures, the general cancer risk from exposure to ambient concentrations of ethylene dichloride in California will decline, and by the year 1990 the estimated potential risk will be 0.5 lifetime case per million persons;

WHEREAS, the staff has concluded in the Report that control measures for ethylene dichloride should not be developed at this time for the following reasons: (1) the highest estimated basinwide ethylene dichloride risk in 1990 in the state is 0.5 case per million persons in the South Coast Air Basin; (2) this estimate is based entirely on modelling emission data and cannot be confirmed with monitoring until a more sensitive analytical method is developed, and (3) because of the uncertainty of the data it cannot be determined if application of controls on the large ethylene dichloride point sources in the South Coast Air Basin will result in a quantifiable reduction in the health risk;

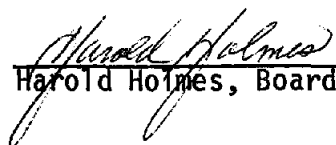
WHEREAS, the staff of the Board made the Report available to the public and to the Technical Review Group consisting of representatives from the districts, the ARB, and the Environmental Protection Agency;

WHEREAS, at a duly noticed public meeting held March 27, 1987, the Board reviewed the Report and considered the written comments and public testimony it received; and

WHEREAS, the Board finds that the Report adequately discusses the public health risks from exposure to ethylene dichloride and the need for control measures for ethylene dichloride;

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves the staff report titled "Control Plan for Airborne Ethylene Dichloride" and concurs with the staff's conclusion that control measures for ethylene dichloride should not be developed at this time; that staff is to submit information to the South Coast Air Quality Management District staff on emissions, risks, and potential controls for the three large ethylene dichloride sources in the District and work with the District to further analyze the information; that the staff should continue development of a sensitive ambient monitoring technique to monitor ambient levels of ethylene dichloride; and that if the staff determines that ethylene dichloride ambient concentrations and the corresponding risks are quantifiable with a higher degree of certainty than estimated in this report, the staff will reassess control of the specific sources and report its findings to the Board.

I hereby certify that the above is a true and correct copy of Resolution 87-28, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-29

March 27, 1987

Agenda Item No.: 87-5-1

WHEREAS, the Air Resources Board ("Board") and the Environmental Protection Agency have established health-based ambient air quality standards for oxidant and ozone, respectively, and these standards are frequently violated in many of the state's air basins;

WHEREAS, Health and Safety Code Sections 39003, 39500, 39602, and 41500 authorize the Board to coordinate, encourage, and review efforts to attain and maintain state and national ambient air quality standards;

WHEREAS, Health and Safety Code Sections 39600 and 39605 authorize the Board to act as necessary to execute the powers and duties granted to and imposed upon the Board and to assist the air pollution control districts;

WHEREAS, the statewide Technical Review Group for Suggested Control Measure Development (TRG) has approved a proposed Suggested Control Measure for Control of Ethanol Emissions from Winery Fermentation Tanks (the "Suggested Control Measure") and has forwarded the Suggested Control Measure to the Board for consideration;

WHEREAS, a commitment has been made by at least one district in California to consider the control of ethanol emissions from winery fermentation tanks as part of its Nonattainment Area Plan;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as proposed if feasible alternatives or mitigation measures are available;

WHEREAS, the Board has held a duly noticed public meeting to consider approval of the Suggested Control Measure and has heard and considered the comments presented by representatives of the Board, TRG, districts, affected industries, and other interested persons and agencies; and

WHEREAS, the Board finds that:

Methods to reduce emissions of ethanol from winery fermentation tanks potentially include ducting the fermentation exhaust gases to a pollution control device which removes ethanol from the exhaust stream;

There is a need for further evaluation of these methods as applicable to wineries;

A demonstration program to evaluate further the methods to reduce emissions of ethanol from winery fermentation tanks, as set forth in Attachment A, "Plan for a Demonstration Program to Determine the Technical Feasibility, Availability, and Cost to Control Ethanol Emissions from Winery Fermentation Tanks," will provide the information necessary to evaluate further the technological feasibility, the cost, and the cost-effectiveness of the proposed Suggested Control Measure;

The Wine Institute has submitted a letter (Attachment B) indicating to the Board its intent to carry out the demonstration program to evaluate the methods to reduce emissions of ethanol from winery fermentation tanks as set forth in Attachment A; and

No significant adverse environmental impacts associated with the proposed demonstration program have been identified, and no potentially significant adverse environmental effects are likely to result from the implementation of the proposed demonstration program.

NOW, THEREFORE, BE IT RESOLVED that the Board approves the demonstration program as set forth in Attachment A and that the Board defers taking action on the Suggested Control Measure for control of ethanol emissions from winery fermentation tanks forwarded to the Board by the TRG pending the outcome of the demonstration program.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to notify the TRG of its action with respect to the Suggested Control Measure.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer and/or his designees to serve as representatives on an Ad Hoc Advisory Committee to participate with the Wine Institute in carrying out the "Plan for a Demonstration Program to Determine the Technical Feasibility, Availability, and Cost to Control Ethanol Emissions from Winery Fermentation Tanks" as set forth in Attachment A. The Executive Officer shall invite representatives of the TRG to participate on the committee.

BE IT FURTHER RESOLVED that at least one Board staff member appointed to the Ad Hoc Advisory Committee (or his/her designee) shall participate in a study of wineries in the Fresno area during the 1987 fermentation season to monitor tank usage as set forth in Attachment A, and that the Board shall provide source testing support for testing fermentation tank exhaust gases as set forth in Attachment A.

BE IT FURTHER RESOLVED that the Executive Officer shall schedule for the Board a public meeting to consider the report of the Ad Hoc Advisory Committee as set forth in Attachment A and to determine, in light of the results of the demonstration program, the availability and appropriate level of control and applicability and an implementation schedule for the Suggested Control Measure for the control of ethanol emissions from winery fermentation tanks, and the Executive Officer shall forward the Board's recommendation to the TRG.

I hereby certify that the above is a true and correct copy of Resolution 87-29, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

PLAN FOR A DEMONSTRATION PROGRAM TO DETERMINE
THE TECHNICAL FEASIBILITY, AVAILABILITY, AND COST
TO CONTROL ETHANOL EMISSIONS FROM WINERY
FERMENTATION TANKS

This plan for a demonstration program to determine the technical feasibility, availability, and cost to control ethanol emissions from winery fermentation tanks specifies the functions and procedures which shall apply to the California Air Resources Board (ARB or Board) and the Wine Institute. It also details the procedures through which the proposed demonstration program shall be implemented.

Ad Hoc Advisory Committee

1. An Ad Hoc Advisory Committee will be created to develop and implement the demonstration program. The committee shall consist of two representatives of the ARB staff (the Executive Officer and/or his designees) and two members appointed by the Wine Institute. The Executive Officer of the Board will invite up to two members of the TRG to participate on the committee. The committee shall operate by consensus and shall be governed by rules that it establishes itself.

2. The committee shall select a contractor and the location for the demonstration program, review and approve the design of the fermentation tank exhaust ducting systems and control equipment, and develop a detailed workplan and schedule for the demonstration program. The committee shall meet periodically during the course of the program to evaluate the progress of the work and to approve any procedural changes that the committee determines are necessary.

3. The committee shall evaluate the results of the demonstration program and present the results to the TRG and to the Air Resources Board.

Demonstration Program

1. The demonstration program shall consist of two phases. Phase I shall be conducted during the 1987 fermentation season, and Phase II during the 1988 fermentation season, if Phase II is found to be necessary. If the Ad Hoc Advisory Committee determines that the above schedule cannot be reasonably achieved, or that additional work is necessary to complete Phase I, the committee may revise the schedule accordingly.

2. Phase I of the demonstration program shall consist of the following: (1) a pilot program to evaluate scrubbing, carbon adsorption, and catalytic incineration as technologies to reduce the ethanol content of the fermentation tank exhaust gases; (2) an evaluation of tank usage at three operating wineries; and (3) preparation of conceptual cost estimates for the three operating wineries based on the results of the pilot program and tank usage evaluation.

3. Phase I of the demonstration program shall be conducted as follows:

- (a) Three tanks, each greater than 1,000 gallons in capacity, shall be modified to incorporate exhaust ducting and control equipment. An unmodified tank shall be used to monitor product and process differences between uncontrolled and controlled tanks.

- (b) An open ducting system shall be installed on the three modified tanks. The committee shall determine how the tanks are to be ducted - singly or grouped. Three types of controls shall be evaluated - scrubbing, carbon adsorption and catalytic incineration.
- (c) The Ad Hoc Advisory Committee shall determine the number of cycles, type of wine, and fermentation temperature to be used in the tanks. At least one low temperature, white wine fermentation cycle shall be tested in each tank.
- (d) The parameters to be monitored and/or tested shall include, but not be limited to: (1) exhaust gas flow rate; (2) pressure changes within the tank; (3) ethanol, hydrogen sulfide, carbon dioxide, and water concentration in the exhaust gases; and (4) density of the exhaust gases. The method and frequency of testing shall be determined by the Ad Hoc Advisory Committee.
- (e) Each of the control devices shall be designed to achieve at least a 90 percent reduction in the ethanol content of the exhaust gases. The actual control efficiency of the control devices shall be determined by measuring the ethanol concentration in the exhaust gases before they enter the control device and after they exit the control device.

- (f) The operating costs shall be determined for each type of control. In addition, the following technical questions specific to each control device shall be evaluated: (1) scrubber - the amount of water usage, the amount of water/ethanol product (wastewater) generated, and the evaporation of ethanol from the wastewater when land disposed; (2) carbon adsorption - the concentration of ethanol in the condensate created by regeneration of the carbon, the storage time and capacity required for the condensate, the steam requirement of the regeneration system, and the efficiency of the regeneration system; and (3) catalytic incineration - the fuel requirement, and the attrition and poisoning of the catalyst. The methods of evaluation of the control devices shall be developed by the Ad Hoc Advisory Committee.
- (g) Product quality shall be evaluated by comparing wine produced in the unmodified tank with wine produced in tanks equipped with ducting and controls. Quality parameters shall include taste (determined by a trained panel of testers), wine composition, and a gas chromatographic profile of wine volatiles, and any other parameters recommended by the Ad Hoc Advisory Committee.
- (h) The kinds of bacteria, molds, fungi and other microorganisms, and the amount and rate of bacterial

growth, if any, in the ducting system shall be identified, and the effect of simulated or actual foam-over events on bacterial growth shall be evaluated.

- (i) One of the Ad Hoc Advisory Committee's ARB staff representatives, or his/her designee, shall participate in a study of three wineries in the Fresno area (Gallo, Christian Brothers, and Guild-Cribari) during the 1987 fermentation season to monitor tank usage and study tank usage patterns and requirements. In addition, the Wine Institute shall provide the committee with tank usage data from those three wineries for the 1984-1986 fermentation seasons. The data will be used to reconcile the discrepancy between the cost estimates obtained by the Wine Institute and those presented in the Technical Support Document to the SCM. The committee shall evaluate the tank usage data and the 1987 tank monitoring data to estimate the number of tanks that would have to be ducted and controlled for each of the three wineries.
- (j) Based upon the results of the pilot program and tank usage evaluation, and in consultation with the contractor, the Ad Hoc Advisory Committee shall develop conceptual cost estimates for each of the three wineries. Those estimates will take into account the results of the pilot program, but shall ultimately be based on concepts appropriate for full-scale application.

(k) The Ad Hoc Advisory Committee shall review the results of the pilot program, the tank usage evaluation, and the cost estimates, and prepare a report evaluating those results. Based on the committee's findings, the committee shall determine by consensus whether Phase II of the demonstration program shall be conducted.

4. If the Ad Hoc Advisory Committee determines that the demonstration program shall conclude with Phase I, the committee's written report and any minority report shall be presented to the Air Resources Board with a copy to the TRG. The Executive Officer shall schedule a public meeting of the Board to determine the availability and appropriate level of control and applicability, and an implementation schedule, based on the results of the Phase I study.

5. Phase II of the demonstration program, if conducted, shall consist of the following: (1) evaluation of exhaust ducting and one of the three control technologies evaluated in Phase I, using one or more fermentation tanks at an operating winery; and (2) preparation of refined cost estimates for the three operating wineries evaluated in Phase I based on the installation of controls on large fermentation tanks.

6. Phase II of the demonstration program shall be conducted as follows:

(a) The details of this program, including the number and location of tank(s) to be controlled, the type of control device, the design of the ducting and capture system, and the type and number of fermentation cycles, shall be developed by the Ad Hoc Advisory Committee after the

completion of Phase I and shall be based on the results obtained in Phase I. Phase II shall be designed to address any technical questions not adequately resolved during the pilot program. Particular emphasis shall be placed on evaluating sanitation, capture efficiency, control efficiency, and safety considerations.

- (b) Based on the information obtained in the full-scale demonstration program, the Ad Hoc Advisory Committee shall prepare revised conceptual cost estimates for the same three wineries evaluated in Phase I - the Gallo, Christian Brothers, and Guild-Cribari Wineries in the Fresno area.
- (c) The Ad Hoc Advisory Committee shall review the results of the full-scale demonstration program and the revised conceptual cost estimates and prepare a report evaluating those results. Any committee member who chooses not to support any portion of the committee report may submit a minority report.

7. The Ad Hoc Advisory Committee's written report and any minority report shall be presented to the Air Resources Board with a copy to the TRG. The Executive Officer shall schedule a public meeting of the Board to determine the availability and appropriate level of control and applicability, and an implementation schedule, based on the results of the demonstration program.

Funding of the Demonstration Program

1. Funding for the demonstration program shall be provided by the Wine Institute.

WINE INSTITUTE

185 POST STREET • SAN FRANCISCO, CALIFORNIA 94108

TELEPHONE 415/986-0878

JOHN A. DE LUCA
PRESIDENT

March 12, 1987

Air Resources Board
RECEIVED
MAR 19 1987

LEGAL BRANCH

Mr. James Boyd
Executive Officer
California Air Resources Board
1102 Q Street
Sacramento, California 95814Re: Proposed Demonstration Program for
Winery Fermentation Tanks

Dear Mr. Boyd:

On behalf of the Wine Institute and our member companies I wish to confirm our intent, subject to your Board's adoption of the plan and accompanying resolution, to carry out the demonstration program outlined in the "Plan to Develop A Suggested Control Measure for Control of Ethanol Emissions from Winery Fermentation Tanks."

Our association deeply appreciates the opportunity to work with the ARB staff and the Technical Review Group to implement the demonstration program. Our goal is to determine the technological feasibility and economic reasonableness of controlling ethanol emissions from winery fermentation tanks and, if warranted, the appropriate level of control.

We look forward to working with you and your colleagues.

Sincerely,

John A. De Luca
President

State of California
Air Resources Board

Resolution 87-30

March 27, 1987

Agenda Item No.: 87-5-3

WHEREAS, Health and Safety Code Sections 39600 and 39601 authorize the Air Resources Board (the "Board") to adopt standards, rules and regulations necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, Sections 43013, 43101 and 43107 of the Health and Safety Code authorize the Board to adopt and implement emission standards for new 1977 and later model year motorcycles registered or sold in California which standards the Board has found to be necessary and technologically feasible to control air pollution caused by motor vehicles;

WHEREAS, Health and Safety Code Section 43104 authorizes the Board to adopt test procedures for determining whether new motor vehicles and new motor vehicle engines are in compliance with vehicular emission standards adopted by the Board, and provides that the Board shall base its test procedures on federal test procedures or on driving patterns typical in the urban areas of California;

WHEREAS, Health and Safety Code Section 43835 authorizes the Board to adopt specifications for the fill pipes and openings of motor vehicle fuel tanks for the purpose of ensuring compatibility with gasoline-dispensing nozzles for the purpose of vapor control and further authorizes the Board to exempt from such specifications those classifications of vehicles for which the Board determines the specifications are technologically infeasible;

WHEREAS, the Board's present motorcycle exhaust and evaporative emission test procedures, and associated certification requirements, are set forth in Sections 1958, 1976, and 2290, Title 13, California Administrative Code;

WHEREAS, the Board's present test procedures are largely equivalent to Environmental Protection Agency (EPA) federal certification test procedures contained in Title 40, Code of Federal Regulations, Part 86, Subparts E and F, as the federal procedures existed on April 15, 1978;

WHEREAS, the EPA has promulgated numerous changes to the federal certification procedures for new motorcycles since April 15, 1978, with the most recent changes promulgated July 7, 1986;

WHEREAS, the staff has proposed amendments to the Board's certification test procedures for motorcycles applicable to the 1988 and later model years to incorporate the federal test procedures as they existed July 7, 1986;

WHEREAS, the staff has proposed amendments to the Board's certification test procedures for motorcycles applicable to the 1988 and later model years to incorporate the federal test procedures as they existed July 7, 1986;

WHEREAS, the staff has also proposed amendments specific to California certification of new motorcycles;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available which would substantially reduce or avoid such impacts;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of the Government Code; and

WHEREAS, the Board finds that:

The amendments set forth in Attachment A incorporate the most recent federal test procedures and alignment with such federal procedures will reduce the certification costs and administrative burdens of motorcycle manufacturers without adversely affecting California air quality;

The existing specifications for fill pipes and openings would require redesign of most motorcycle fuel tanks and are, therefore, determined to be technologically infeasible for those vehicles;

In order to limit evaporative emissions from motorcycles which do not comply with the established specifications for fill pipes and openings, it is appropriate, necessary and feasible, to require that such motorcycles certify 0.2 grams per test below the applicable exhaust emission standard;

Where a manufacturer's federal test vehicle does not meet the applicable California standards, the use of exhaust emission control system durability data derived from the federal configured engine family together with exhaust emission data from the California configured engine family tested at the specified "minimum test distance" will reduce the manufacturer's certification costs without increasing the risk of noncompliance with California emission standards;

Certain minor, nonsubstantive amendments are appropriate to provide additional explanation or detail for the purpose of clarifying the regulations set forth in Attachment A;

The attached amendments will not result in any significant adverse environmental impacts.

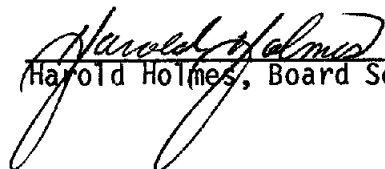
NOW, THEREFORE, BE IT RESOLVED that the Board approves the amendments to Title 13, California Administrative Code, Sections 1958(b) and (c), 1976(b), and 2290, as set forth in Attachment A.

BE IT FURTHER RESOLVED THAT the Board directs the Executive Officer to adopt the amendments to Title 13, California Administrative Code, Sections 1958(b) and (c), 1976(b), and 2290, as set forth in Attachment A, after making them available to the public for a period of 15 days, provided that the Executive Officer shall consider such written comment as may be submitted during this period, shall make such modifications as may be appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if he determines that this is warranted.

BE IT FURTHER RESOLVED that the Board hereby determines that the amendments approved herein will not cause the California emission standards, in the aggregate, to be less protective of public health and welfare than applicable federal standards, will not cause the California requirements to be inconsistent with Section 202(a) of the Clean Air Act, and raise no new issues affecting previous waiver determinations of the Administrator of the EPA pursuant to Section 209(b) of the Clean Air Act.

BE IT FURTHER RESOLVED that the Executive Officer shall forward the amended regulations to the EPA with a request for confirmation that the amendments are within the scope of an existing waiver pursuant to Section 209(b)(1) of the Clean Air Act.

I hereby certify that the above is a true and correct copy of Resolution 87-30, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Public Hearing to Consider Amendments to Regulations
Regarding Certification Test Procedures for New Motorcycles

Agenda Item No.: 87-5-3

Public Hearing Date: March 27, 1987

Response Date: April 28, 1987

Issuing Authority: Air Resources Board

Comment: No comments were received identifying any significant environmental issues pertaining to this item. The staff report identified no adverse environmental effects.

Response: N/A

Certified: _____

Cory Peterson
Board Secretary

Date: _____

1/29/88

State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : August 24, 1988

Subject : Filing of Notice of
Decisions of the Air
Resources Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

ATTACHMENTS

87-30
87-62
87-82
87-83
87-90
87-91
87-92
87-95
88-9
88-41

State of California
AIR RESOURCES BOARD

Resolution 87-31
March 26, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 142-22, entitled "An Integrated Watershed Study: Biological and Chemical Characteristics of Emerald Lake and Streams and Their Responses to Acidic Deposition," has been submitted by the University of California, Santa Barbara;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

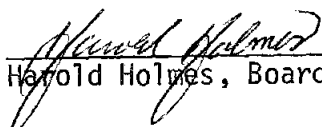
Proposal Number 142-22, entitled "An Integrated Watershed Study: Biological and Chemical Characteristics of Emerald Lake and Streams and Their Responses to Acidic Deposition," has been submitted by the University of California, Santa Barbara for a total amount not to exceed \$370,000.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 142-22, entitled "An Integrated Watershed Study: Biological and Chemical Characteristics of Emerald Lake and Streams and Their Responses to Acidic Deposition," submitted by the University of California, Santa Barbara for a total amount not to exceed \$370,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$370,000.

I hereby certify that the above is a true and correct copy of Resolution 87-31, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 11
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 142-22 entitled "An Integrated Watershed Study: Biological and Chemical Characteristics of Emerald Lake and Streams and Their Responses to Acidic Deposition."

RECOMMENDATION: Adopt Resolution 87-31 approving Proposal No. 142-22 for funding in an amount not to exceed \$370,000.

SUMMARY: The purpose of this study is to characterize the chemistry and biology of Emerald Lake and its associated streams in the Sierra Nevada. This project will also investigate the response of these aquatic systems to acidic inputs. Sources of buffering material will be identified and quantified during the 1987 field season.

The Kapiloff Acid Deposition Act calls for an evaluation of natural ecosystem sensitivity to acid deposition. In response to this mandate, the Air Resources Board initiated the Integrated Watershed Study at Emerald Lake in Sequoia National Park. In 1984 field work began at this site to assess the susceptibility of a high-elevation lake (9200 ft.) to acid deposition. This aquatic research program also was designed to evaluate the response of biota to acid inputs.

This proposal outlines a 14-month effort to collect baseline information on the chemistry and biology of Emerald Lake and its associated streams and to develop dose-response relationships for the effects of acid inputs on biota. This research program will estimate the flux of neutralizing material from the sediments, the cycling of nitrogen within the water column and the physical structure of the lake. All of these data will be useful in constructing mass balances for the lake and in formulating a model to predict the effects of acid deposition on lake processes. Biological work will be focused on two sensitive groups: fish populations and zooplankton populations (microscopic aquatic animals).

This study will be conducted by Drs. Melack, Cooper and Jenkins at the University of California, Santa Barbara.

B U D G E T S U M M A R Y

University of California, Santa Barbara

"An Integrated Watershed Study: Biological and Chemical
Characteristics of Emerald Lake and Streams and Their
Responses to Acidic Deposition"

BUDGET ITEMS:

Salaries/Benefits	\$260,723	
Equipment ¹	8,800	
Supplies ²	13,555	
Other Costs ³	18,600	
Travel ⁴	<u>35,486</u>	
TOTAL, Direct Costs		\$337,164
TOTAL, Indirect Costs (10%)		<u>32,836</u>
	<u>TOTAL PROJECT COST</u>	<u>\$370,000</u>

-
1. Equipment includes bag enclosures (\$2,500), benthic chambers (\$1,200), scuba gear (\$1,200) and a current meter (\$1,500).
 2. Supplies include laboratory items (filters, reagents bottles, pipettes, isotopes) and field equipment (nets, pH electrodes, sample bottles and probes).
 3. Other costs include samples analyses (\$5,600) equipment repair (\$700), helicopter fees (\$2,500), computer time (\$1,800) and publication costs (\$4,000).
 4. Travel includes mileage to study site and per diem expenses (\$27,354), travel to Sacramento and conference travel (\$8,132).

State of California
AIR RESOURCES BOARD

Resolution 87-32
March 26, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California, pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 143-22, entitled "Characterization of Cloud Chemistry and Frequency of Canopy Exposure to Clouds in the Sierra Nevada," has been submitted by California Institute of Technology;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee has reviewed and recommends for funding:

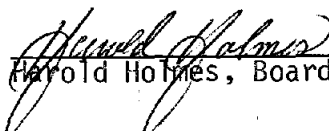
Proposal Number 143-22, entitled "Characterization of Cloud Chemistry and Frequency of Canopy Exposure to Clouds in the Sierra Nevada," submitted by California Institute of Technology for a total amount not to exceed \$267,901.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 143-22, entitled "Characterization of Cloud Chemistry and Frequency of Canopy Exposure to Clouds in the Sierra Nevada," submitted by California Institute of Technology for a total amount not to exceed \$267,901.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$267,901.

I hereby certify that the above is a true and correct copy of Resolution 87-32, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-5-4(b) 12
DATE: March 26, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 143-22 entitled "Characterization of Cloud Chemistry and Frequency of Canopy Exposure to Clouds in the Sierra Nevada."

RECOMMENDATION: Adopt Resolution 87-32 approving Proposal No. 143-22 for funding in an amount not to exceed \$267,901.

SUMMARY: The objectives of this study are twofold. The first is to determine the temporal and elevational variations in the frequency of cloud impaction and cloudwater chemistry within Sequoia National Park and Yosemite National Park. Sampling will be conducted continuously from July 1987 to June 1988. Several special studies will also be conducted during the year at Sequoia National Park. Measurement of gas-phase and aerosol concentrations would be made prior to, during, and following two to three major events per year to look for evidence of a coupling between frontal approach and increased pollutant levels in Sequoia National Park. At the same time, the drip from several species of trees located near the main site will be collected and analyzed to determine whether significant acid leaching of cations from the needles is occurring. Samples of cloudwater, fractionated by droplet size, will also be collected and analyzed to determine whether any significant difference exists between the chemical composition of small vs. large cloudwater droplets.

The second objective is to construct five automated fogwater collectors suitable for routine monitoring and to assist the ARB in establishing a network of fogwater collection sites in other areas of the state. The equipment will be turned over to the ARB along with a recommendation for site locations, sampling protocol and equipment maintenance support for one year.

The contractor for this project is the California Institute of Technology; Professor Michael Hoffman would be the principal investigator.

B U D G E T S U M M A R Y

California Institute of Technology

"Characterization of Cloud Chemistry and Frequency of Canopy
Exposure to Clouds in the Sierra Nevada"

BUDGET ITEMS:

Salaries	\$ 45,800	
Benefits	12,036	
Supplies ¹	16,000	
Travel Expenses ²	12,500	
Equipment ³	118,850	
Other direct costs ⁴	<u>8,000</u>	
TOTAL, Direct Costs		\$213,186
TOTAL, Indirect Costs		<u>54,715</u>
	<u>TOTAL PROJECT COST</u>	<u>\$267,901</u>

-
1. Includes \$7,000 for laboratory supplies, \$4,000 for machine shop supplies, \$2,500 for computer maintenance, and \$2,500 for printing of final report.
 2. Includes \$10,000 for travel and per diem during field program.
 3. Includes \$55,625 for five new automated fogwater samplers for routine monitoring, \$3,400 for modification of two existing fogwater samplers, \$16,500 for Scintrex LMA-3 low threshold nitrogen dioxide monitor and external calibrator, \$13,875 for fifteen passive cloudwater collectors, \$11,500 for data loggers, and \$11,450 for meteorological equipment.
 4. Subcontracts with the Park Service to service field equipment.

State of California
AIR RESOURCES BOARD

Resolution 87-33

March 27, 1987

WHEREAS, the venerable Harmon Wong-Woo has faithfully served the Air Resources Board since its inception in 1969, from the Year of the Rooster to the Year of the Hare, spanning the terms of three Governors, six Board Chairpersons, and five Executive Officers; and

WHEREAS, Harmon has most recently served with dedication and dignity as Deputy Executive Officer in charge of the Aerometric Data, Compliance, Haagen-Smit Laboratory, and Stationary Source Divisions; and

WHEREAS, as Chief of the Stationary Source Control Division, Harmon, also known as the Godfather, sired and thereafter nurtured the modern California version of New Source Review, exacting a pound of emission reductions to offset each pound of new pollution; and

WHEREAS, Harmon has given form, substance, and wise counsel to numerous other Air Resources Board programs, including the State Implementation Plan, the air pollution subvention program, California's successful vapor recovery program, countless technology-forcing suggested control measures, and the toxic air contaminants program; and

WHEREAS, Harmon has had a profound and salutary effect on California's forty-one air pollution control districts, their control officers, and their constituents; and

WHEREAS, Harmon's appreciation of the finer things in life, and his affectionate care and feeding of his numerous admirers resulted in considerable gluttony and revelry at the splendid Chinese banquets which punctuated more staid Board proceedings; and

WHEREAS, Harmon is well-known and will be long-remembered for his sage-like diplomacy, his charitable inclinations toward the Lung Association and other worthy organizations, his silver tongue and iron fist, and his infamous red pencil; and

WHEREAS, Harmon has expressed his intention to retire from the realm of state service and enjoy the fruits which flow from a long career of selfless and enlightened public service; and

WHEREAS, Harmon's pungent humor, philosophical insight, historical perspective, gastronomical expertise, and dedication to the cause of clean air in California will be sorely missed and loudly lamented by Board Members, the Executive Officer, and staff alike.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board extends its heartfelt appreciation to Harmon Wong-Woo for his outstanding dedication to the cause of clean air and wishes him and his effervescent wife, Pearl, a long and happy retirement.

Jananne Sharpless, Chairwoman

George Bailey, Member

Betty S. Ichikawa, Member

Eugene A. Boston, M.D., Member

John S. Lagarias, Member

John N. Cefalu, Member

Harriett M. Wieder, Member

Roberta H. Hughan, Member

Andrew Wortman, Ph.D., Member

State of California
AIR RESOURCES BOARD

Resolution 87-34
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A5-188-32, entitled "A Study of Excess Motor Vehicle Emissions - Causes and Control," has been submitted by Sierra Research, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

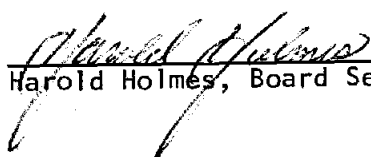
Augmentation to Contract Number A5-188-32, entitled "A Study of Excess Motor Vehicle Emissions - Causes and Control," submitted by Sierra Research, Inc. by \$56,971, for a total amount not to exceed \$256,908.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A5-188-32, entitled "A Study of Excess Motor Vehicle Emissions - Causes and Control," submitted by Sierra Research, Inc. by \$56,971, for a total amount not to exceed \$256,908.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$56,971, for a total amount not to exceed \$256,908.

I hereby certify that the above is a true and correct copy of Resolution 87-34, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-6-2(b) 1
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Augmentation for Contract No. A5-188-32 entitled "A Study of Excess Motor Vehicle Emissions - Causes and Control."

RECOMMENDATION: Adopt Resolution 87-34 approving a budget augmentation of Contract Number A5-188-32 by \$56,971 for a total contract amount not to exceed \$256,908.

SUMMARY: This augmentation will provide funds for the contractor to perform two additional tasks that were not included in the original contract but which are now needed on a priority basis. The additional tasks are the analysis of regulatory and legislative changes needed to implement improvements to the Inspection/Maintenance program and the assessment of options for a post-1990 Inspection/Maintenance program. This work is necessary to carry out the recommendations of the California Inspection/Maintenance Review Committee which were prepared for the California Legislature.

Both the original study and this augmentation address objectives for diesel and motor vehicle research contained in the ARB's Long-Range Research Plan, specifically, to define causes of excess emissions from in-use motor vehicles and to reduce emissions from in-use motor vehicles.

The principal investigator for this proposed effort is Mr. Robert G. Dulla of Sierra Research, Inc.

State of California
AIR RESOURCES BOARD

Resolution 87-35
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1524-133, entitled "Costs of Reducing Aromatics and Sulfur Levels in Motor Vehicle Fuels," has been submitted by Arthur D. Little, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee staff has reviewed and recommends for funding:

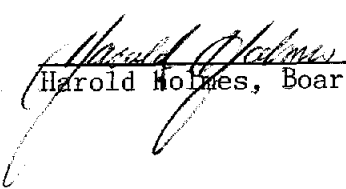
Proposal Number 1524-133, entitled "Costs of Reducing Aromatics and Sulfur Levels in Motor Vehicle Fuels," submitted by Arthur D. Little, Inc. for a total amount not to exceed \$124,994.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1524-133, entitled "Costs of Reducing Aromatics and Sulfur Levels in Motor Vehicle Fuels," submitted by Arthur D. Little, Inc. for a total amount not to exceed \$124,994.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$124,994.

I hereby certify that the above is a true and correct copy of Resolution 87-35, as adopted by the Air Resources Board.


Harold Holmes, Board secretary

ITEM NO.: 87-6-2(b) 2
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1524-133 entitled "Costs of Reducing Aromatics and Sulfur Levels in Motor Vehicle Fuels."

RECOMMENDATION: Adopt Resolution 87-35 approving Proposal No. 1524-133 for funding in an amount not to exceed \$124,994.

SUMMARY: The purpose of this study is to estimate the costs of reducing the levels of aromatic hydrocarbons and sulfur-containing compounds in diesel and gasoline motor vehicle fuels. Limits on these constituents are being considered as a means of reducing pollutant emissions when these fuels are used in motor vehicles.

This study addresses two objectives for diesel and motor vehicle research contained in the ARB's Long-Range Research Plan, specifically, to identify ways to reduce or eliminate visible emissions from diesel vehicles, and to reduce excess emission of hydrocarbons from in-use vehicles. It also addresses an objective for toxic air contaminant research, i.e., to investigate control strategies for toxic air contaminants.

Reductions in aromatic and sulfur content would improve diesel fuel quality and would result in improved combustion and lower smoke and sulfate emissions from diesel vehicles. This study will investigate the incremental costs and feasibility of achieving a range of reductions in aromatic and sulfur levels in diesel fuel and the incremental costs for reducing aromatics in gasoline fuel.

The contractor for this study is Authur D. Little, Inc. The principal investigator will be John R. Felten.

State of California
AIR RESOURCES BOARD

Resolution 87-36
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1540-133, entitled "A Study of Multi-Day Storage Patterns for Gasoline-Fueled Vehicles in the South Coast Air Basin," has been submitted by Valley Research Corporation;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

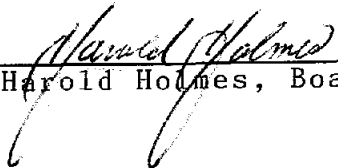
Proposal Number 1540-133, entitled "A Study of Multi-Day Storage Patterns for Gasoline-Fueled Vehicles in the South Coast Air Basin," submitted by Valley Research Corporation for a total amount not to exceed \$99,985.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1540-133, entitled "A Study of Multi-Day Storage Patterns for Gasoline-Fueled Vehicles in the South Coast Air Basin," submitted by Valley Research Corporation for a total amount not to exceed \$99,985.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$99,985.

I hereby certify that the above is a true and correct copy of Resolution 87-36, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-6-2(b)3
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1540-133 entitled "A Study of Multi-Day Storage Patterns for Gasoline-Fueled Vehicles in the South Coast Air Basin."

RECOMMENDATION: Adopt Resolution 87-36 approving Proposal No. 1540-133 for funding in an amount not to exceed \$99,985.

SUMMARY: The purpose of this project is to characterize the frequency, duration and location of gasoline-fueled on-road vehicles standing idle (soaking) for multiple days in the South Coast Air Basin. Recent ARB and EPA vehicle emission test data have shown that extended periods of soaking can overload charcoal canisters and result in excess evaporative emissions of hydrocarbons above the levels to which the systems were originally certified. This study will provide specific, detailed vehicle usage information needed to estimate these excess emissions.

This study addresses an objective for diesel and motor vehicle research contained in the ARB's Long-Range Research Plan, specifically, to define the causes of excess emissions of hydrocarbons from in-use motor vehicles.

The contractor would conduct eight separate surveys in the South Coast Air Basin to obtain storage pattern data for privately-owned and commercially-owned vehicles, both registered and unregistered. These surveys would obtain data on soak frequency, duration and location of all gasoline-fueled on-road vehicles and determine the number of vehicles experiencing multiple-day soaking in the Basin. The results will be used by ARB staff to improve the vehicular emissions inventory and to more accurately characterize ozone AAQS attainment efforts.

The contractor for the study is Valley Research Corporation. The principal investigator will be Dr. Yuji Horie.

State of California
AIR RESOURCES BOARD

Resolution 87-37
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1490-131, entitled "Control of Benzene Emissions from Light-Duty Motor Vehicles," has been submitted by Southwest Research Institute;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1490-131, entitled "Control of Benzene Emissions from Light-Duty Motor Vehicles," submitted by Southwest Research Institute, for a total amount not to exceed \$148,517.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1490-131, entitled "Control of Benzene Emissions from Light-Duty Motor Vehicles," submitted by Southwest Research Institute, for a total amount not to exceed \$148,517.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$148,517.

I hereby certify that the above is a true and correct copy of Resolution 87-37, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-6-2-(b)5
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Research Proposal No. 1531-133 entitled "Measurements of Toxic Exhaust Emissions from Gasoline-Powered Light-Duty Vehicles"
- RECOMMENDATION: Adopt Resolution 87-38 approving Proposal No. 1531-133 for funding in an amount not to exceed \$199,604.
- SUMMARY: The purpose of this study is to measure known and suspected toxic substances in the exhaust emissions of gasoline-powered passenger cars. In particular, the contractor will conduct screening tests to determine the presence or absence of specific contaminants in vehicle exhaust, and then will determine the emission rates using standard vehicle emission test protocols.
- This study will address an objective for toxic air contaminant research contained in the ARB's Long-Range Research Plan, specifically, to investigate toxic air contaminant emissions from mobile sources.
- The information provided by this study will permit ARB and others to assess the need for reducing emissions of specific toxic substances from this category of sources.
- The study would be performed by the Southwest Research Institute. The principal investigator would be Dr. Lawrence R. Smith.

State of California
AIR RESOURCES BOARD

Resolution 87-38
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1531-133, entitled "Measurements of Toxic Exhaust Emissions from Gasoline-Powered Light-Duty Vehicles," has been submitted by Southwest Research Institute;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

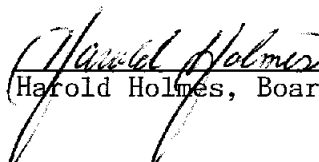
Proposal Number 1531-133, entitled "Measurements of Toxic Exhaust Emissions from Gasoline-Powered Light-Duty Vehicles," submitted by Southwest Research Institute, for a total amount not to exceed \$199,604.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1531-133, entitled "Measurements of Toxic Exhaust Emissions from Gasoline-Powered Light-Duty Vehicles," submitted by Southwest Research Institute, for a total amount not to exceed \$199,604.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$199,604.

I hereby certify that the above is a true and correct copy of Resolution 87-38, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-6-2(b) 4
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1490-131 entitled "Control of Benzene Emissions from Light-Duty Motor Vehicles."

RECOMMENDATION: Adopt Resolution 87-37 approving Proposal No. 1490-131 for funding in an amount not to exceed \$148,517.

SUMMARY: The main purpose of this project is to investigate the potential reduction of benzene and total organic gas emissions from gasoline-powered light-duty vehicles through the development of a total emission control system optimized for reducing such emissions, without sacrificing control of other criteria pollutants.

This study will address two objectives for motor vehicle and toxic air contaminant research contained in the ARB's Long-Range Research Plan, specifically, to reduce emissions from in-use motor vehicles and to reduce emissions of priority toxic compounds from selected sources.

Benzene has been identified by the Air Resources Board as a toxic air contaminant. Benzene is a constituent of gasoline, and is also formed as a combustion by-product from other aromatic compounds in gasoline. Motor vehicle exhaust and evaporative emissions constitute the largest known source of benzene in the atmosphere.

The contractor would identify the most promising control techniques for reducing benzene and hydrocarbon emissions from light-duty vehicles, design a prototype system for benzene emission control, install the system on a 1987 model vehicle, and operate the vehicle for 5,000 miles. Following this test, a second vehicle would be fitted with the same system and both vehicles would be delivered to the ARB for a 12-month durability test.

The contractor for this study is Southwest Research Institute. The principal investigator will be Harry E. Dietzmann.

B U D G E T S U M M A R Y

Southwest Research Institute

"Measurements of Toxic Exhaust Emissions from
Gasoline-Powered Light-Duty Vehicles"

BUDGET ITEMS:

Salaries	\$52,509	
Benefits	20,478	
Supplies	6,518	
Equipment Rental*	8,082	
Other Costs	2,000	
Travel	<u>7,205</u>	
TOTAL, Direct Costs		\$ 96,792
TOTAL, Indirect Costs		<u>102,812</u>
	TOTAL PROJECT COST	<u>\$199,604</u>

* Rental of test vehicles

State of California
AIR RESOURCES BOARD

Resolution 87-39
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1542-133, entitled "Chlorinated Dibenzodioxin and Furan Contamination of the Food Chain," has been submitted by Midwest Research Institute;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1542-133, entitled "Chlorinated Dibenzodioxin and Furan Contamination of the Food Chain," submitted by Midwest Research Institute for a total amount not to exceed \$74,978.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1542-133, entitled Chlorinated Dibenzodioxin and Furan Contamination of the Food Chain," submitted by Midwest Research Institute for a total amount not to exceed \$74,978.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$74,978.

I hereby certify that the above is a true and correct copy of Resolution 87-39, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-6-2(B) 6
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1542-133 entitled "Chlorinated Dibenzodioxin and Furan Contamination of the Food Chain"

RECOMMENDATION: Adopt Resolution 87-39 approving Proposal No. 1542-133 for funding in an amount not to exceed \$74,978.

SUMMARY: The purpose of this study is to determine the concentrations of polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) in the diet of California residents. These substances are being reviewed for possible regulation as toxic air contaminants, in accordance with Section 39650 of the California Health and Safety Code. Dietary concentrations of the PCDDs and PCDFs, along with airborne concentrations, contribute to the body burdens of these substances. The airborne concentrations and body burdens are being measured in other studies sponsored or planned by the ARB.

This study will address an objective for toxic air contaminant research contained in the ARB's Long-Range Research Plan, specifically, to conduct health effects assessments for selected toxic air contaminants.

The data from this study, to be conducted in the Los Angeles area, will be coordinated with data from related studies on the body burdens and airborne emissions of these pollutants to assess the relationship between levels of PCDDs and PCDFs in air, diet and body burden.

The contractor for this work is Midwest Research Institute and the principal investigator is Dr. John Stanley.

State of California
AIR RESOURCES BOARD

Resolution 87-40
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1534-133, entitled "Determination of Current Body Burdens of Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans in California Residents," has been submitted by the Midwest Research Institute;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

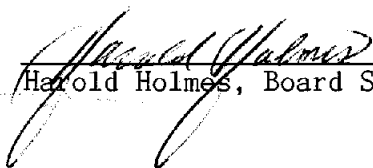
Proposal Number 1534-133, entitled "Determination of Current Body Burdens of Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans in California Residents," submitted by the Midwest Research Institute, for a total amount not to exceed \$149,930.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1534-133, entitled "Determination of Current Body Burdens of Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans in California Residents," submitted by the Midwest Research Institute, for a total amount not to exceed \$149,930.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$149,930.

I hereby certify that the above is a true and correct copy of Resolution 87-40, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-6-2(b)7
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1534-133 entitled "Determination of Current Body Burdens of Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans in California Residents."

RECOMMENDATION: Adopt Resolution 87-40 approving Proposal No. 1534-133 for funding in an amount not to exceed \$149,930.

SUMMARY: The purpose of this research is to determine the current body burden of polychlorinated dibenzodioxins and dibenzofurans in California residents.

This study will address four objectives: (1) determine, through a program of sampling and analysis of human tissues, the current body burden of dioxins and furans in a representative sample of the California population; (2) analyze the samples for those 15 specific dioxin and furan isomers and congeners that have been identified as toxic air contaminants; (3) determine if any correlation exists between body burden and personal or lifestyle factors (such as age, sex, occupation, or area of residence); and (4) carry out these studies in a manner which ensures the quality and reliability of the data.

This research proposal is part of the Air Resources Board's plan to increase its knowledge of the actions, effects and exposure to chlorinated dioxins and furans. Both the Air Resources Board and the Scientific Review Panel on Toxic Air Contaminants have asked the ARB staff to continue to update its knowledge on levels of these compounds in air, food and human tissues. Board members have indicated that when the Board makes risk management decisions for dioxins and furans, they would like to have further information on these risk assessment issues.

The contractor for this project is the Midwest Research Institute. The principal investigator will be Dr. John Stanley, who has been involved in several studies to determine the levels of polychlorinated dibenzodioxins and dibenzofurans in human tissues.

B U D G E T S U M M A R Y

Midwest Research Institute,

"Determination of Current Body Burdens of Polychlorinated
Dibenzo-p-Dioxins and Dibenzofurans in California Residents"

BUDGET ITEMS:

Salaries	\$26,004
Benefits	8,901
Supplies	14,620
Subcontract*	30,200
Other Costs	2,250
Travel	<u>5,300</u>

TOTAL, Direct Costs	\$ 87,275
TOTAL, Indirect Costs	<u>62,655</u>

TOTAL PROJECT COST \$149,930

* Selection and collection of samples of human adipose tissue.

State of California
AIR RESOURCES BOARD

Resolution 87-41
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1538-133, entitled "A Coordinated Multidisciplinary Research Program on Carbon Monoxide Health Effects," has been submitted by the University of California, Irvine;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Division has reviewed and recommends for funding:

Proposal Number 1538-133, entitled "A Coordinated Multidisciplinary Research Program on Carbon Monoxide Health Effects," submitted by the University of California, Irvine for a total amount not to exceed \$191,945.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1538-133, entitled "A Coordinated Multidisciplinary Research Program on Carbon Monoxide Health Effects," submitted by the University of California, Irvine for a total amount not to exceed \$191,945.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$191,945.

I hereby certify that the above is a true and correct copy of Resolution 87-41, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-6-2(b)8

DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1538-133 entitled "A Coordinated Multidisciplinary Research Program on Carbon Monoxide Health Effects."

RECOMMENDATION: Adopt Resolution 87-41 approving Proposal No. 1538-133 for funding in an amount not to exceed \$191,945.

SUMMARY: The scientific basis for both the state and national ambient air quality standards for carbon monoxide (CO) has recently come under close scrutiny. This scrutiny has precipitated research to confirm earlier findings in patients prone to developing chest pain due to an insufficient supply of oxygen to the heart muscle (angina pectoris). The conduct of these recent studies has brought to light some concerns about current knowledge of the effects of CO. The first year of this two-year project was funded to allow an interdisciplinary team of investigators at UC Irvine, headed by Dr. Michael Kleinman, to begin a coordinated and thorough study of the effects of CO. This proposal is to fund the second year of the project. This study addresses an objective for health effects research identified in the ARB's Long Range Research Plan; specifically, to study the physiological effects of CO.

The project has four objectives:

The first objective is to develop and use improved experimental protocols to study the response of people prone to experiencing angina pain due to CO exposure. The results of the first year's study will be used to design a clinical study proposed to take place in the second year of the project. This work at the altitude of Lake Tahoe will be important in the review of the ambient air quality standard applicable to that air basin. Additionally, this proposed study will explore the effect of CO in an atmosphere with the oxygen content lowered to simulate an altitude of 2,000 meters (approximately 6,000 feet).

The second objective of this project is to resolve problems with techniques for measuring carboxyhemoglobin (COHb) levels by improving protocols

for operating the instrument most widely used for this purpose, and to evaluate a new instrument to measure COHb. Much of the work under this objective will be completed during the first year of this project, but several studies will continue into the second year.

The third objective is to evaluate factors that contribute to differences in COHb levels in different individuals. The investigator will conduct a thorough literature survey of relevant physiological parameters in various parts of the population, and will conduct tests on selected subjects to experimentally determine how differences in selected parameters affect CO uptake.

The fourth objective is to develop study protocols and conduct limited pilot studies to investigate the effects of CO on people prone to developing heart beat irregularities. Work under the third and fourth objectives was begun in the first year and will continue into the second year.

B U D G E T S U M M A R Y

University of California, Irvine

"A Coordinated Multidisciplinary Research
Program on Carbon Monoxide Health Effects"

BUDGET ITEMS:

Salaries	\$105,591
Benefits	29,105
Supplies	12,800
Other Costs*	21,000
Travel	2,000
Consultant**	<u>4,000</u>

TOTAL, Direct Costs	\$174,496
TOTAL, Indirect Costs	<u>17,449</u>

TOTAL PROJECT COST \$191,945

* Other Costs:

Rental of Echocardiography equipment	\$7,500
Human subject compensation	8,000
Computer costs	1,500
Publication costs	1,000
Equipment maintenance	3,000

** Consultant:

Brian Whipp to advise on
improvements to respiratory
gas exchange evaluation

State of California
AIR RESOURCES BOARD

Resolution 87-42
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1536-133, entitled "Studies of Air Pollution: NO₂ Effects on Airway Caliber and Reactivity in Asthmatic Subjects; Nasal and Bronchial Effects of SO₂ in Asthmatic Subjects; NO₂ Effects on Lung Lymphocytes and Antiprotease Activity," has been submitted by the Univeristy of California, San Francisco;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1536-133, entitled "Studies of Air Pollution: NO₂ Effects on Airway Caliber and Reactivity in Asthmatic Subjects; Nasal and Bronchial Effects of SO₂ in Asthmatic Subjects; NO₂ Effects on Lung Lymphocytes and Antiprotease Activity," submitted by the University of California, San Francisco for a total amount not to exceed \$119,486.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1536-133, entitled "Studies of Air Pollution: NO₂ Effects on Airway Caliber and Reactivity in Asthmatic Subjects; Nasal and Bronchial Effects of SO₂ in Asthmatic Subjects; NO₂ Effects on Lung Lymphocytes and Antiprotease Activity," submitted by the University of California, San Francisco for a total amount not to exceed \$119,486.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$119,486.

I hereby certify that the above is a true and correct copy of Resolution 87-42, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-6-2(b) 9
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Research Proposal No. 1536-133 entitled "Studies of Air Pollution: NO₂ Effects on Airway Caliber and Reactivity in Asthmatic Subjects; Nasal and Bronchial Effects of SO₂ in Asthmatic Subjects; NO₂ Effects on Lung Lymphocytes and Antiprotease Activity."
- RECOMMENDATION: Adopt Resolution 87-42 approving Proposal No. 1536-133 for funding in an amount not to exceed \$119,486.
- SUMMARY: The response of asthmatic subjects to nitrogen dioxide (NO₂) provided a basis for the State's current one hour ambient air quality standard for NO₂. Very recently, the scientific evidence on the responsiveness of asthmatic subjects to NO₂ has become more ambiguous. This proposal is to fund a project at the University of California, San Francisco, headed by Dr. Homer Boushey, to study the effects of NO₂, and to fund a smaller related investigation into the effects of SO₂. This study addresses an objective for health effects research identified in the ARB's Long Range Research Plan; specifically, to investigate the effects of gaseous criteria pollutants on sensitive subjects.
- The first objective of the project is to resolve contradictions in the evidence on the effects of exposure of asthmatics to ambient levels of NO₂. The investigators will expose carefully characterized asthmatic subjects to 0.3 ppm NO₂ and will assess each subject's response by employing lung function tests and tests that reflect changes that occur in the deep lung. This study will also examine whether NO₂ exposures affect the subject's responses to SO₂.
- The second objective of this project is to investigate, in asthmatics, the relationship between the response of the nasal chamber and the response of the bronchial airways to inhaled SO₂. This study is an extension of work underway. The investigators will administer SO₂ via each subject's nose on one occasion, and via the mouth on a separate occasion, and will measure resultant changes in resistance to airflow.

The third objective of this project is to determine whether cellular and biochemical indices of injury can be detected in human subjects exposed repeatedly to NO₂ and to correlate any such changes with possible lung function changes. Healthy subjects will inhale NO₂ on four separate occasions. The investigators will evaluate the effect of the exposures by measuring changes in lung function, changes in important cells in the immune system, and changes in a key enzyme.

B U D G E T S U M M A R Y

University of California, San Francisco

"Studies of Air Pollution: NO₂ Effects on Airway Caliber
and Reactivity in Asthmatic Subjects; Nasal and Bronchial Effects
of SO₂ in Asthmatic Subjects; NO₂ Effects on Lung Lymphocytes
and Antiprotease Activity

BUDGET ITEMS:

Salaries	\$66,100
Benefits	18,725
Supplies	7,511
Other Costs*	12,044
Travel	1,800
Equipment**	<u>2,765</u>

TOTAL, Direct Costs	\$108,945
TOTAL, Indirect Costs	<u>10,541</u>

TOTAL PROJECT COST \$119,486

* Other Costs:

Human subject compensation	\$8,144
Phones, copies, publications	\$1,500
Equipment maintenance and repair	\$2,400

** Equipment:

Regulator for NO ₂ tank	\$1,000
Immunoelectrophoresis kits	900
Electrophoresis cell	865

State of California
AIR RESOURCES BOARD

Resolution 87-43
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1544-133, entitled "Pilot Survey of Human Lung Tissue for Air Pollution Effects in Los Angeles County," has been submitted by the University of Southern California;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

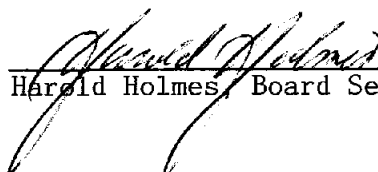
Proposal Number 1544-133, entitled "Pilot Survey of Human Lung Tissue for Air Pollution Effects in Los Angeles County," submitted by the University of Southern California for a total amount not to exceed \$219,330.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1544-133, entitled "Pilot Survey of Human Lung Tissue for Air Pollution Effects in Los Angeles County," submitted by the University of Southern California for a total amount not to exceed \$219,330.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$219,330.

I hereby certify that the above is a true and correct copy of Resolution 87-43 as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-6-2(b)10
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1544-133 entitled "Pilot Survey of Human Lung Tissue for Air Pollution Effects in Los Angeles County."

RECOMMENDATION: Adopt Resolution 87-43 approving Proposal No. 1544-133 for funding in an amount not to exceed \$219,330.

SUMMARY: The objective of this pilot project is to investigate the impact of long-term exposure to ambient air pollution on human lung tissue. This study addresses a Board objective for health effects research identified in the Long Range Research Plan; specifically, to investigate the effects of long-term exposure to ambient air pollution. This study will be performed by Dr. Russell Sherwin of the University of Southern California in cooperation with: staff of the University of California, Los Angeles; the State Department of Health Services; and the Los Angeles County Coroner. This study will use methods that were developed in earlier Board-sponsored studies of mouse lungs.

The investigative team will collect autopsy samples of lung tissue from approximately 120 to 150 traffic accident victims 15 to 25 years old. The study will use information about each victim's residence history, lifestyle, and smoking habits to estimate pollutant exposure history.

The investigators will study the lung tissues using microscopic techniques to detect changes in the lung structure related to the development of chronic diseases, changes in cell populations shown to occur in test animals in response to air pollutants, and changes in tissues associated with repeated irritation of the lung. The investigators will also culture specific living cells collected from the lungs of some of those subjects to obtain information on the effects of long-term exposure to air pollution on the overall level of immune system activity in the lung.

B U D G E T S U M M A R Y

University of Southern California

"Pilot Survey of Human Lung Tissue for
Air Pollution Effects in Los Angeles County"

BUDGET ITEMS:

Salaries	\$86,417
Benefits	24,629
Supplies	8,714
Other Costs*	27,779
Travel	4,650
Consultants**	7,650
Equipment***	<u>11,540</u>

TOTAL, Direct Costs	\$171,379
TOTAL, Indirect Costs	<u>47,951</u>

TOTAL PROJECT COST \$219,330

* Other Costs:

Computer supplies	\$ 915
Lung tissue processing	3,720
Equipment maintenance	10,493
Phone, library, publications	3,720
Epidemiologic evaluations	8,931

**Consultants:

Statistician	\$ 4,650
Technical writer	3,000

***Equipment:

Camera replacement for image analyzer	\$10,650
Magneta sealer	890

State of California
AIR RESOURCES BOARD

Resolution 87-44
April 23, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1537-133, entitled "Variability of Cultivar Responses to Ozone," has been submitted by the University of California, Riverside;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1537-133, entitled "Variability of Cultivar Responses to Ozone," submitted by the University of California, Riverside for a total amount not to exceed \$124,806.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1537-133, entitled "Variability of Cultivar Responses to Ozone," submitted by the University of California, Riverside for a total amount not to exceed \$124,806.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$124,806.

I hereby certify that the above is a true and correct copy of Resolution 87-44 as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-6-2(b)11
DATE: April 23, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1537-133 entitled "Variability of Cultivar Responses to Ozone."

RECOMMENDATION: Adopt Resolution 87-44 approving Proposal No. 1537-133 for funding in an amount not to exceed \$124,806.

SUMMARY: The investigator will study the differences in growth, yield and physiological response of four varieties of each of six crops to ambient oxidants and ozone. The crops will include: tomatoes, dry beans, cotton, lettuce, broccoli, and onions. The crops will be grown in both ambient air and purified air in the Board's open top field chambers.

The results of this study will be used to strengthen the Air Resources Board's statewide crop loss assessment efforts by providing information on the relative sensitivities and representativeness of crop varieties grown throughout California. This information has been requested by the Chair of the Agricultural Advisory Committee. Additionally, if a clear relationship can be determined between yield response and physiological response, then that relationship may provide a means of screening crop varieties for sensitivity to ozone without the need for costly season-long field studies.

The contractor for this project is the University of California, Riverside. The principal investigator will be Dr. Patrick J. Temple, who has previously participated in the U.S. EPA National Crop Loss Assessment Program.

State of California
AIR RESOURCES BOARD

Resolution 87-46

Agenda Item No.: 87-6-1

WHEREAS, the South Coast Air Basin is faced with one of the most severe air pollution problems in the nation in that it has not been able to demonstrate attainment of a number of national ambient air quality standards by the end of 1987 as required by the Clean Air Act;

WHEREAS, the continuing unhealthful air quality problem in the South Coast Air Basin is a result of both stationary and mobile sources of air pollution;

WHEREAS, in order to achieve clean air in the South Coast Air Basin, emissions from both stationary and mobile sources must be greatly reduced;

WHEREAS, the South Coast Air Quality Management District Board convened a special meeting to discuss air quality goals on April 17, 1987 and made a commitment to aggressively pursue emissions reductions from stationary sources; and


WHEREAS, the Air Resources Board discussed the South Coast Air Basin problems on April 23, 1987 and agreed that all reasonable efforts must be made to attain the national ambient air quality standard for ozone.

NOW, THEREFORE, BE IT RESOLVED that the state Air Resources Board will work in concert with the South Coast Air Quality Management District Board and the Southern California Association of Governments to develop and implement programs which will result in needed emissions reductions from stationary sources.

BE IT FURTHER RESOLVED that the Air Resources Board will continue to implement an aggressive program to further reduce emissions from mobile sources of air pollution as described in California's Post-1987 Motor Vehicle Plan for Continued Progress Toward Attainment of the National Ambient Air Quality Standards for Ozone and Carbon Monoxide, issued by the Air Resources Board staff on April 10, 1987.

BE IT FURTHER RESOLVED that the Air Resources Board urges local, regional, and state governments to pursue the development and implementation of transportation control measures which will promote changes in the degree and nature of the use of mobile sources so as to minimize emissions from such sources.

I hereby certify that the above is a true and correct copy of Resolution 87-46, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolutions 87-47

May 21, 1987

WHEREAS, Joyce McCann, Ph.D., has served with distinction as a member of the Air Resources Board's Scientific Review Panel on Toxic Air Contaminants from July, 1984 to mid-May, 1987; and

WHEREAS, Dr. McCann, a charter member of the Panel, through her dedicated efforts has greatly assisted the Board in the successful implementation of the Toxic Air Contaminant Program; and

WHEREAS, Dr. McCann has exhibited the finest attributes as a scientist and public official in carrying out her duties as a member of the Scientific Review Panel; and

WHEREAS, Dr. McCann's participation with the Scientific Review Panel has contributed greatly toward improvements in public health for the State of California.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board extends its deepest appreciation and thanks to Dr. Joyce McCann for her contributions to environmental protection and the cause for clean air in California.

Jananne Sharpless, Chairwoman

George Bailey, Member

Betty S. Ichikawa, Member

Eugene A Boston, M.D., Member

John S. Lagarias, Member

John N. Cefalu, Member

Harriett M. Wieder, Member

Roberta H. Hugan, Member

Andrew Wortman, Ph.D., Member

State of California
AIR RESOURCES BOARD

Resolution 87-48
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a solicited research proposal, Number 158-23, entitled "Hydrochemical Modeling at Emerald Lake, Sequoia National Park," submitted by U. S. Geological Survey to the ARB; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

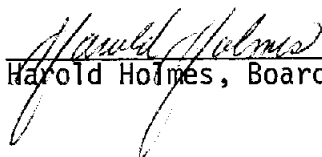
Proposal Number 158-23, entitled "Hydrochemical Modeling at Emerald Lake, Sequoia National Park," submitted by U. S. Geological Survey for a total amount not to exceed \$83,400.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 158-23, entitled "Hydrochemical Modeling at Emerald Lake, Sequoia National Park," submitted by U. S. Geological Survey for a total amount not to exceed \$83,400.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$83,400.

I hereby certify that the above is a true and correct copy of Resolution 87-48, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-48
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 158-23 entitled "Hydrochemical Modeling at Emerald Lake, Sequoia National Park."

RECOMMENDATION: Adopt Resolution 87-48 approving Proposal No. 158-23 for funding in an amount not to exceed \$83,400.

SUMMARY: This project is part of the Research Division's modeling effort for determining the effects of acid deposition on Sierran Lakes. The modeling effort consists of three main objectives: 1) the evaluation of existing lake acidification models; 2) the development of a process model for Emerald Lake Watershed, and; 3) the development of a simple predictive model that can be applied to all lakes in the Sierra Nevada. This proposal addresses the first objective.

The primary purpose of this research project is to provide a systematic evaluation of existing lake watershed acidification models for application to high-elevation Sierran watersheds. Because most lake acidification models have been developed for lakes in quite different geographic locations compared to the Sierra Nevada, an evaluation of this nature will determine the components of various models that can be used to describe lake acidification processes in the Sierra Nevada. Based on this evaluation the research group will provide a process-driven lake model that will be combined with a watershed compartment model formulated by the University of Arizona research group.

The results of this research will aid the Air Resources Board in defining the differences in acidification response between Sierran watersheds and those in other parts of the United States. In addition, the study will provide the first estimates of the relative importance of different watershed processes that may exert control on lake surface water chemistry and the response of lake water chemistry to inputs of strong mineral acids.

State of California
AIR RESOURCES BOARD

Resolution 87-49
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a solicited research proposal, Number 151-23, entitled "Development of Watershed Models for Emerald Lake Watershed in Sequoia Natural Park and for Other Lakes of the Sierra Nevada," has been submitted by the University of Arizona to the ARB; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

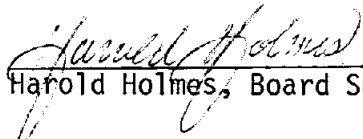
Proposal Number 151-23, entitled "Development of Watershed Models for Emerald Lake Watershed in Sequoia National Park and for Other Lakes of the Sierra Nevada," submitted by the University of Arizona, for a total amount not to exceed \$150,000.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 151-23, entitled "Development of Watershed Models for Emerald Lake Watershed in Sequoia National Park and for Other Lakes of the Sierra Nevada," submitted by the University of Arizona, for a total amount not to exceed \$150,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$150,000

I hereby certify that the above is a true and correct copy of Resolution 87-49, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-49
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Research Proposal No. 151-23 entitled "Development of Watershed Models for Emerald Lake Watershed in Sequoia National Park and for Other Lakes of the Sierra Nevada"
- RECOMMENDATION: Adopt Resolution 87-49 approving Proposal No. 151-23 for funding in an amount not to exceed \$150,000.
- SUMMARY: This project is part of the Research Division's modeling effort for determining the effects of acid deposition on Sierran Lakes. The modeling effort consists of three main objectives: 1) the evaluation of existing lake acidification models; 2) the development of a process model for Emerald Lake Watershed; and 3) the development of a simple predictive model that can be applied to all lakes in the Sierra Nevada. This proposal addresses the second objective.
- The purpose of this research project is to develop a process-driven lake acidification model for Emerald Lake of the Integrated Watershed Study (IWS), and to develop from the process model a simple predictive model for general application to other Sierran lakes. The project serves as the single most important unifying component of the IWS modeling effort. It integrates the various individual watershed projects into a dynamic model capable of simulating and demonstrating the means by which the watershed processes interact with each other to control lake water chemistry. Consideration of the dominant watershed processes derived from the process model will be generalized for applications across the Sierra. In addition, the results of this modeling effort will be used by the University of Iowa researchers in developing a simple predictive model to assess "Resources at Risk" (see Item 3).
- The contractor is the University of Arizona. The principal investigators are Drs. Sorooshian and Bales.

B U D G E T S U M M A R Y

University of Arizona

"Development of Watershed Models for Emerald Lake Watershed
in Sequoia National Park and for Other Lakes of the Sierra Nevada"

BUDGET ITEMS:*

Salaries	\$80,000	
Benefits	4,040	
Supplies	5,000	
Travel	5,000	
Other Costs**	<u>8,000</u>	
TOTAL, Direct Costs		\$102,040
TOTAL, Indirect Costs		<u>47,960</u>
	TOTAL PROJECT COST	<u>\$150,000</u>

* The breakdown of budget items is approximate pending receipt of final budget from the contractor. The total project cost, however, is exact.

** Computing Services (\$8,000)

State of California
AIR RESOURCES BOARD

Resolution 87-50
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a solicited research proposal, Number 160-23, entitled "California Lake Resources at Risk to Acid Deposition with Application of the Enhanced Trickle-Down Model to Emerald Lake," has been submitted by the University of Iowa to the ARB; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

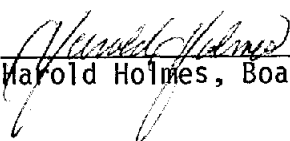
Proposal Number 160-23, entitled "California Lake Resources at Risk to Acid Deposition with Application of the Enhanced Trickle-Down Model to Emerald Lake," submitted by the University of Iowa, for a total amount not to exceed \$100,000.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 160-23, entitled "California Lake Resources at Risk to Acid Deposition with Application of the Enhanced Trickle-Down Model to Emerald Lake," submitted by the University of Iowa, for a total amount not to exceed \$100,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$100,000.

I hereby certify that the above is a true and correct copy of Resolution 87-50, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-50
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 160-23 entitled "California Lake Resources at Risk to Acid Deposition with Application of the Enhanced Trickle-Down Model to Emerald Lake."

RECOMMENDATION: Adopt Resolution 87-50 approving Proposal No. 160-23 for funding in an amount not to exceed \$100,000.

SUMMARY: This project is part of the Research Division's modeling effort for determining the effects of acid deposition on Sierran Lakes. The modeling effort consists of three main objectives: 1) the evaluation of existing lake acidification models; 2) the development of a process model for Emerald Lake Watershed, and; 3) the development of a simple predictive model that can be applied to all lakes in the Sierra Nevada. This proposal addresses the third objective.

The purpose of this research project is to estimate the response of Sierran lake water chemistry to changes in loadings of acidic deposition through time. This modeling effort will provide information on classification of lakes according to sensitivity to acidic deposition, information on the chronology of lake acidification, and information on the buffering capacity or ability of lake water to resist changes in pH due to a given deposition loading. This "resources at risk" analysis has been used in other parts of the United States to predict the extent and timing of lake acidification.

The results of this research will be used to identify sensitivity criteria for California, identify lake systems that could be sensitive to acidic deposition, and determine if lakes have become acidified. The modeling results can be compared with similar analyses in other parts of the United States in order to define the regional characteristics important for predicting lake acidification potential.

The contractor is the University of Iowa. Dr. Jerald Schnoor is the principal investigator.

B U D G E T S U M M A R Y

University of Iowa

"California Lake Resources at Risk to Acid Deposition
with Application of the Enhanced Trickle-Down Model to Emerald Lake"

BUDGET ITEMS:*

Salaries	\$48,784	
Benefits	12,185	
Supplies	1,500	
Travel	4,000	
Other Costs **	<u>5,000</u>	
TOTAL, Direct Costs		\$71,429
TOTAL, Indirect Costs		<u>28,571</u>
	<u>TOTAL PROJECT COST</u>	<u>\$100,000</u>

* The breakdown of budget items is approximate pending receipt of final budget from the contractor. The total project cost, however, is exact.

** Computing Services (\$5,000).

State of California
AIR RESOURCES BOARD

Resolution 87-51
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a solicited research proposal, Number 161-23, entitled "Survey of Soils of the Sierra Nevada for Sensitivity to Acid Deposition," has been submitted by North State Resources to the ARB; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

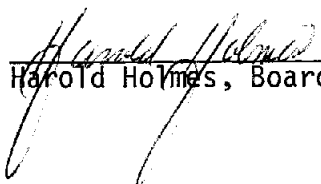
Proposal Number 161-23, entitled "Survey of Soils of the Sierra Nevada for Sensitivity to Acid Deposition," submitted by North State Resources, for a total amount not to exceed \$150,000.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 161-23, entitled "Survey of Soils of the Sierra Nevada for Sensitivity to Acid Deposition," submitted by North State Resources, for a total amount not to exceed \$150,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$150,000.

I hereby certify that the above is a true and correct copy of Resolution 87-51, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-51
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 161-23 entitled "Survey of Soils of the Sierra Nevada for Sensitivity to Acid Deposition."

RECOMMENDATION: Adopt Resolution 87-51 approving Proposal No. 161-23 for funding in an amount not to exceed \$150,000.

SUMMARY: This research project is designed to produce a soils map of the western slope of the Sierra based on soil sensitivity to acidic deposition. To accomplish this the researchers will combine soil survey information with a new soil sensitivity scheme derived from important soil chemical reactions and soil physical properties. The researchers will then identify important areas of the western slope not included in the present surveys and conduct an appropriate scale survey of the region.

The research outputs will allow the ARB to identify watersheds and forest areas that may be susceptible to the effects of acidic deposition based in part on the extent and type of soil cover. Since the nature and properties of soils play an important part in terrestrial and aquatic ecosystem response to acidic deposition, the map and classification system produced by this effort will be of considerable use in assessing the potential for soil mediated acid deposition effects in California.

The contractor is North State Resources and the principal investigator is Mr. Timothy Reilly.

B U D G E T S U M M A R Y

North State Resources, Inc.

"Survey of Soils of the Sierra Nevada
for Sensitivity to Acid Deposition"

BUDGET ITEMS:

Salaries	\$39,380.08	
Benefits	9,845.02	
Supplies	8,166.63	
Other Cost*	50,000.00	
Travel	<u>9,285.00</u>	
TOTAL, Direct Costs		\$116,676.73
TOTAL, Indirect Costs		<u>33,323.27</u>
	TOTAL PROJECT COST	<u>\$150,000.00</u>

* Includes:

1. U.C. Davis subcontract (\$25,000) for developing soil sensitivity scheme.
2. Technical expert (\$9,000) for correlating soil survey and soil property information. (Mr. Daniel Enstrom)
3. Lab analysis (\$16,000) of soil samples. (CH2MHILL)

State of California
AIR RESOURCES BOARD

Resolution 87-52
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 165-23, entitled "Monitoring of Ozone and Atmospheric Particles, Sequoia National Park," has been submitted by the University of California, Davis;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

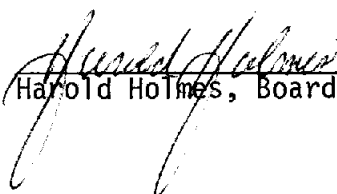
Proposal Number 165-23, entitled "Monitoring of Ozone and Atmospheric Particles, Sequoia National Park," submitted by the University of California, Davis, for a total amount not to exceed \$30,009.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 165-23, entitled "Monitoring of Ozone and Atmospheric Particles, Sequoia National Park," submitted by the University of California, Davis, for a total amount not to exceed \$30,009.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$30,009.

I hereby certify that the above is a true and correct copy of Resolution 87-52, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-52
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 165-23 entitled "Monitoring of Ozone and Atmospheric Particles, Sequoia National Park."

RECOMMENDATION: Adopt Resolution 87-52 approving Proposal No. 165-23 for funding in an amount not to exceed \$30,009.

SUMMARY: UCD will measure the concentrations of ozone and atmospheric particles at Emerald Lake using a solar powered air sampler for 10 weeks beginning in July, 1987, and will continue to measure the concentrations of particles at Giant Forest. The solar unit at Emerald Lake will also be used by ARB's Haagen-Smit Laboratory to power equipment for measuring concentrations of acidic gases. The measurements will be used as input to a model of the watershed and to help elucidate the trajectories of air masses that arrive at higher elevations in Sequoia National Park.

The contractor is University of California, Davis.
Dr. Thomas Cahill is the principal investigator.

State of California
AIR RESOURCES BOARD

Resolution 87-53
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a solicited research proposal, Number 164-23, entitled "Measurement of Atmospheric Dry Deposition at Emerald Lake in Sequoia National Park," submitted by the University of California, Riverside;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

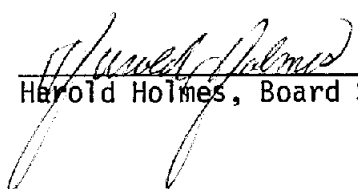
Proposal Number 164-23, entitled "Measurement of Atmospheric Dry Deposition at Emerald Lake in Sequoia National Park," submitted by the University of California, Riverside, for a total amount not to exceed \$21,219.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 164-23, entitled "Measurement of Atmospheric Dry Deposition at Emerald Lake in Sequoia National Park," submitted by the University of California, Riverside, for a total amount not to exceed \$21,219.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$21,219.

I hereby certify that the above is a true and correct copy of Resolution 87-53, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-53
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Research Proposal No. 164-23 entitled "Measurement of Atmospheric Dry Deposition at Emerald Lake in Sequoia National Park"
- RECOMMENDATION: Adopt Resolution 87-53 approving Proposal No. 164-23 for funding in an amount not to exceed \$21,219.
- SUMMARY: This research addresses the quantification of dry deposition at Emerald Lake, the site of the Integrated Watershed Study (IWS). The dry deposition will be measured using natural vegetative surfaces. The determination of cation and anion fluxes due to dry deposition represents an important input for the modeling effort at the IWS. In addition, the research will estimate the degree to which physiologically active vegetation can influence the composition of dry deposition on foliage. Fluxes that will be measured in this study will be compared to fluxes to artificial surfaces (Item 7) in order to obtain the best possible estimate of this important component of acid deposition. These measurements will be used in conjunction with ambient concentration measurements made by the ARB staff for determining deposition velocities.
- The contractor is University of California, Riverside. The principal investigators are Drs. Andrzej Bytnerowicz and David Olszyk.

B U D G E T S U M M A R Y

University of California, Riverside

"Measurement of Atmospheric Dry Deposition
at Emerald Lake in Sequoia National Park"

BUDGET ITEMS:

Salaries	\$4,881	
Benefits	1,324	
Supplies*	8,285	
Travel	4,100	
Other Costs	<u>700</u>	
TOTAL, Direct Costs		\$19,290
TOTAL, Indirect Costs		<u>1,929</u>
	TOTAL PROJECT COST	<u>\$21,219</u>

* Includes chemical analysis (\$7,000) of samples, pH electrode and miscellaneous supplies.

State of California
AIR RESOURCES BOARD

Resolution 87-54
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a request for budget augmentation for Contract Number A6-186-32, entitled "Dry Deposition Measurement During the Southern California Air Quality Study," has been submitted by Carnegie-Mellon University;

WHEREAS, the Research Division staff has reviewed and recommended this augmentation for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding the augmentation:

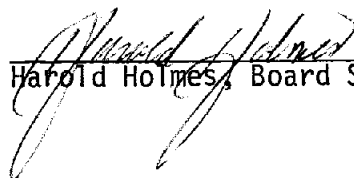
Contract Number A6-186-32, entitled "Dry Deposition Measurement During the Southern California Air Quality Study," submitted by Carnegie-Mellon University, for a total amount not to exceed \$18,775.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Contract Number A6-186-32, entitled "Dry Deposition Measurement During the Southern California Air Quality Study," submitted by Carnegie-Mellon University, for a total amount not to exceed \$18,775.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$18,775.

I hereby certify that the above is a true and correct copy of Resolution 87-54, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-54
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Request for Budget Augmentation of Contract No. A6-186-32 entitled "Dry Deposition Measurement During the Southern California Air Quality Study."
- RECOMMENDATION: Adopt Resolution 87-54 approving a budget augmentation of Contract No. A6-186-32 for an amount not to exceed \$18,775.
- SUMMARY: This proposal is to extend dry deposition work which the contractor will perform during SCAQS to the Emerald Lake Basin after the SCAQS summer sampling is finished. Under this proposal, the contractor will measure dry deposition fluxes to artificial surfaces at a site near the lake. These fluxes to surrogate surfaces will be compared with dry deposition fluxes to natural vegetation (Item 6) in order to provide the best estimate of this important component of acid deposition. The deposition flux data will also be used in conjunction with ambient concentration measurements at the same location to calculate deposition velocities. This information may also be used by the Board to make decisions regarding the effect of acid deposition on forests and high elevation ecosystems.
- The contractor is Carnegie-Mellon University. Dr. Cliff Davidson is the principal investigator.

State of California
AIR RESOURCES BOARD

Resolution 87-55
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 167-23, entitled "Real Time Nitric Acid Measurements During SCAQS," has been submitted by Unisearch Associates, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

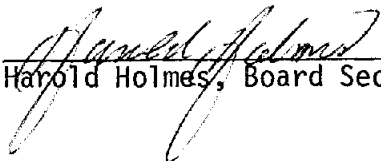
Proposal Number 167-23, entitled "Real Time Nitric Acid Measurements During SCAQS," submitted by Unisearch Associates, Inc., for a total amount not to exceed \$14,678.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 167-23, entitled "Real Time Nitric Acid Measurements During SCAQS," submitted by Unisearch Associates, Inc., for a total amount not to exceed \$14,678.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$14,678.

I hereby certify that the above is a true and correct copy of Resolution 87-55, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-55
DATE: June 12, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 167-23 entitled "Real Time Nitric Acid Measurements During SCAQS."

RECOMMENDATION: Adopt Resolution 87-55 approving Proposal No. 167-23 for funding in an amount not to exceed \$14,678.

SUMMARY: Under a current contract with the Coordinating Research Council, Unisearch will bring to Claremont, California and will operate a state-of-the-art tunable diode laser to measure the concentrations of hydrogen peroxide continuously during the twelve intensive study days of SCAQS. Under this proposal, Unisearch would operate the same equipment to continuously, measure nitric acid throughout the six-week period of the SCAQS summer study, except for a few days of continuous formaldehyde measurements during SCAQS intensive days. The data collected, both for CRC and under this proposal, will become a part of the PM₁₀ and photochemical model data base developed for SCAQS. The nitric acid data will also be used as a standard for a method comparison study to be conducted on non-intensive days. This information will allow the Board to compare the California Dry Deposition sampler with others used throughout the country for other sampling networks.

Under this proposal, the cost of making the nitric acid measurements consists of salary, equipment maintenance and labor overhead only.

The contractor is Unisearch, Inc. Dr. Gervase Mackay is the principal investigator.

State of California
AIR RESOURCES BOARD

Resolution 87-56
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a solicited research proposal, Number 147-23, entitled "Modeling of Cloudwater Chemistry in the South Coast Air Basin," submitted by Bechtel National, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

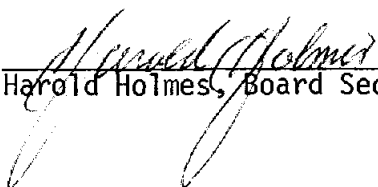
Proposal Number 147-23, entitled "Modeling of Cloudwater Chemistry in the South Coast Air Basin," submitted by Bechtel National, Inc., for a total amount not to exceed \$49,861.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 147-23, entitled "Modeling of Cloudwater Chemistry in the South Coast Air Basin," submitted by Bechtel National, Inc., for a total amount not to exceed \$49,861.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$49,861.

I hereby certify that the above is a true and correct copy of Resolution 87-56, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-56
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 147-23 entitled "Modeling of Cloudwater Chemistry in the South Coast Air Basin"

RECOMMENDATION: Adopt Resolution 87-56 approving Proposal No. 147-23 for an amount not to exceed \$49,861.

SUMMARY: The formation of sulfate and nitrate species in the atmosphere is a topic of great importance in air quality because these species lead to acid deposition, visibility degradation, and increased aerosol concentrations. It has been known for some time that high sulfate concentrations in the South Coast Air Basin (SCAB) are associated with periods of fog or cloud and hence that chemical reactions in water droplets may play an important role in the conversion of sulfur dioxide to sulfate. During the past four years, the Air Resources Board has sponsored experimental field studies in the SCAB to measure the composition of the trace gases, aerosols, and cloudwater to obtain data related to liquid-phase chemical processes.

The purpose of this study is to conduct an analysis of the data collected during the ARB-sponsored cloud sampling program using a cloud chemistry model. The specific objectives are to evaluate the chemistry of sulfate and nitrate formation in clouds, to identify the most important chemical pathways leading to acid formation, and to investigate the relationships between the concentrations of precursors and acid species.

The contractor is Bechtel National, Inc. Dr. Christian Seigneur is the principal investigator.

B U D G E T S U M M A R Y

Bechtel National, Inc.

"Modeling of Cloudwater Chemistry in the
South Coast Air Basin"

BUDGET ITEMS:

Salaries	\$16,461	
Benefits	6,714	
Travel Expenses	120	
Consultants*	13,568	
Other direct cost**	<u>4,562</u>	
TOTAL, Direct Cost		\$41,425
TOTAL, Indirect Cost		<u>8,436</u>
	<u>TOTAL PROJECTED COST</u>	<u>\$49,861</u>

* Dr. Willard Richards (Sonoma Technology, Inc.) and Mr. Pradeep Saxena (Private Consultant)

** Includes San Francisco tax at 1.5% of labor; material, supplies and reproduction; communication; and publications.

State of California
AIR RESOURCES BOARD

Resolution 87-57
June 11, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 166-23, entitled "Development of a State-of-the-Art Acid Deposition Model for the South Coast Air Basin of California," submitted by California Institute of Technology to the ARB; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

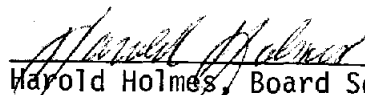
Proposal Number 166-23, entitled "Development of a State-of-the-Art Acid Deposition Model for the South Coast Air Basin of California," submitted by California Institute of Technology, for a total amount not to exceed \$197,050.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 166-23, entitled "Development of a State-of-the-Art Acid Deposition Model for the South Coast Air Basin of California," submitted by California Institute of Technology, for a total amount not to exceed \$197,050.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$197,050.

I hereby certify that the above is a true and correct copy of Resolution 87-57, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-57
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 166-23 entitled "Development of a State-of-the Art Acid Deposition Model for the South Coast Air Basin of California."

RECOMMENDATION: Adopt Resolution 87-57 approving Proposal No. 166-23 for funding in an amount not to exceed \$197,050.

SUMMARY: The objective of this study is to develop a three-dimensional Eulerian model (including sensitivity analysis) capable of predicting the airborne concentrations of gaseous, particulate and aqueous-phase acidic species. This proposal extends the previous effort by the proponent which resulted in a Lagrangian trajectory model for the South Coast Air Basin. The earlier model was capable of predicting, for a given trajectory, the gas and aerosol phase ambient concentrations. This effort will include aqueous-phase chemistry and will develop a Eulerian (grid) model.

The Caltech Airshed Model will be updated to include the most current understanding of gas-phase and aqueous-phase chemistry. A series of sensitivity runs will be carried out to investigate the key features of the model in the following areas: a) role of daytime and nighttime gas-phase chemistry of nitric acid formation; b) degree of hydrocarbon speciation required; c) importance of the aqueous-phase reactions; and d) comparative roles of gas-, aerosol-, and droplet-phase routes for generation of atmospheric acidity.

The proposed model would provide information to help the Board and others understand the quantitative relationships between emissions of acid precursors and dry and wet deposition, the mechanisms of production of fine particles in the atmosphere, and to help evaluation of the effectiveness of potential control strategies for acidic species.

The research contractor is the California Institute of Technology and the principal investigator is Dr. John Seinfeld.

B U D G E T S U M M A R Y

California Institute of Technology

"Development of a State-of-the-Art Acid Deposition
Model for the South Coast Air Basin of California"

BUDGET ITEMS:

Salaries	\$77,000
Benefits	22,715
Supplies	10,000
Other Cost*	14,000
Travel	<u>1,000</u>

TOTAL, Direct Costs	\$124,715
TOTAL, Indirect Costs	<u>72,335</u>

TOTAL PROJECT COST	<u><u>\$197,050</u></u>
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* Other Costs:

Computer time	(\$12,000)
Publication Costs	(\$ 2,000)

State of California
AIR RESOURCES BOARD

Resolution 87-58
June 11, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A5-157-32, entitled "Proposal for the Southern California Air Quality Study (SCAQS) - Program Management," has been submitted by Sonoma Technology, Inc.; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A5-157-32, entitled "Proposal for the Southern California Air Quality Study (SCAQS) - Program Management," submitted by Sonoma Technology, Inc., for a total amount not to exceed \$99,318.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A5-157-32, entitled "Proposal for the Southern California Air Quality Study (SCAQS) - Program Management," submitted By Sonoma Technology, Inc., for a total amount not to exceed \$99,318.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$99,318, for a total amount not to exceed \$388,984.

I hereby certify that the above is a true and correct copy of Resolution 87-58, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-58
DATE: June 11, 1987

State of California
AIR RESOURCES BOARD

ITEM: Augmentation for Contract No. A5-157-32 entitled "Proposal for the Southern California Air Quality Study (SCAQS) - Program Management."

RECOMMENDATION: Adopt Resolution 87-58 approving a budget augmentation of Contract No. A5-157-32 for an amount not to exceed \$99,318.

SUMMARY: This augmentation provides for the continued services of Sonoma Technology, Inc.(STI) as the program coordinator for the fall portion of SCAQS. STI's current contract, which provided only for the program planning and execution of the summer field program, will expire in September 1987.

Under this proposal STI will provide expert assistance in planning, coordinating and executing the winter portion of SCAQS which will occur between November 16, and December 11, 1987. STI's assistance is needed because of the size and complexity of the field program.

As with the current contract, the contractor is STI and the principal investigator is Dr. Donald L. Blumenthal.

State of California
AIR RESOURCES BOARD

Resolution 87-59
July 9, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A5-174-33, entitled "Comparison of Indoor Toxic Air Pollutant Levels in Several Southern California Communities," has been submitted by the Research Triangle Institute; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A5-174-33, entitled "Comparison of Indoor Toxic Air Pollutant Levels in Several Southern California Communities," submitted by the Research Triangle Institute, for a total amount not to exceed \$21,559.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A5-174-33, entitled "Comparison of Indoor Toxic Air Pollutant Levels in Several Southern California Communities," submitted by the Research Triangle Institute, for a total amount not to exceed \$21,559.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$21,559, for a total amount not to exceed \$233,639.

I hereby certify that the above is a true and correct copy of Resolution 87-59, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-10-4(b) 1
DATE: July 9, 1987

State of California
AIR RESOURCES BOARD

ITEM: Augmentation for Contract No. A5-174-33 entitled "Comparison of Indoor Toxic Air Pollutant Levels in Several Southern California Communities."

RECOMMENDATION: Adopt Resolution 87-59 approving a budget augmentation of Contract No. A5-174-33 by Research Triangle Institute for an amount not to exceed \$21,559.

SUMMARY: Currently, the ARB is participating in a monitoring study, sponsored by the Environmental Protection Agency, to measure human exposure to certain known or suspected toxic air contaminants. Specifically, ARB has provided support for concurrent indoor/outdoor monitoring of concentrations of specific organic chemicals during two seasons, one of which has now been completed.

The requested augmentation will take advantage of this ongoing field study to obtain additional urgently needed data on indoor and outdoor concentrations of certain known or suspected toxic air contaminants. The needed monitoring data requires the scheduled use of a specialized canister-based collection technique which was not provided for in the original study proposal. Fifty canisters would be deployed in the Torrance area to obtain samples of indoor and outdoor air to be analyzed for fourteen volatile organic compounds. The analyses will then be incorporated into the results of the overall study. The initial contract did not allow for these substances to be monitored.

The study addresses an objective for toxic air contaminant research identified in the ARB's Long-Range Research Plan --- to characterize source/receptor relationships.

As with the current contract, the contractor for this project is the Research Triangle Institute and the principal investigator is Dr. E. D. Pellizzari.

State of California
AIR RESOURCES BOARD

Resolution 87-60
July 9, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1548-134, entitled "Estimating Mean Concentrations When Some Data are Below the Detection Limit," has been submitted by the University of California, Davis;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1548-134, entitled "Estimating Mean Concentrations When Some Data are Below the Detection Limit," submitted by the University of California, Davis, for a total amount not to exceed \$16,242.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1548-134, entitled "Estimating Mean Concentrations When Some Data are Below the Detection Limit," submitted by the University of California, Davis, for a total amount not to exceed \$16,242.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$16,242.

I hereby certify that the above is a true and correct copy of Resolution 87-60, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-10-4(b) 2
DATE: July 9, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1548-134 entitled "Estimating Mean Concentrations When Some Data are Below the Detection Limit."

RECOMMENDATION: Adopt Resolution 87-60 approving Proposal No. 1548-134 for funding in an amount not to exceed \$16,242.

SUMMARY: In order to aid in the process of designating toxic air contaminants, the Board requires estimates of general population exposures to candidate substances. Computing average ambient concentrations of these substances and evaluating the accuracy of these averages is not straightforward because there are limited ambient monitoring data and because many observations are below the detection limit of the analytical method. Standard statistical methods perform poorly on such data. This proposal was submitted in response to an RFP designed to address this problem.

The objectives of this study are: to develop improved statistical methods for estimating the average concentrations and for evaluating the accuracy of these averages, to thoroughly assess and document the statistical properties of these methods, and to provide computer programs for calculating the estimates.

The principal investigator for this proposed effort is Robert Shumway of the Statistics Department, University California, Davis.

STATE OF CALIFORNIA
Air Resources Board

Resolution 87-61

July 9, 1987

Agenda Item No.: 87-10-1

WHEREAS, Sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the "Board") to adopt standards, rules and regulations necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, in the Kapiloff Acid Deposition Act (Health and Safety Code Sections 39900-39915), the Legislature declared that acid deposition from anthropogenic sources in California may have significant adverse effects on the environment, on the economy and the public health and directed the Board to design and implement a comprehensive research and monitoring program with regard to acid deposition;

WHEREAS, Section 39910 of the Health and Safety Code authorizes the Board to require districts to impose additional permit and variance fees on nonvehicular sources within their jurisdictions to supplement funds which may be appropriated by the Legislature for acid deposition monitoring and research;

WHEREAS, acid deposition research and monitoring program objectives and priorities have been established and reported to the Governor and the Legislature in December 1983, December 1984, December 1985, and December 1986 in accordance with the Kapiloff Acid Deposition Act;

WHEREAS, in approving the reports to the Governor and the Legislature, the Scientific Advisory Committee on Acid Deposition, appointed pursuant to Section 39905, specified that full implementation of the Board's research and monitoring program will require the maximum level of funding provided for under the Kapiloff Acid Deposition Act;

WHEREAS, the Board has adopted Resolution 85-70, dated July 24, 1986, the provisions of which are incorporated by reference herein, in which it approved a fee program for fiscal year 1986-87 and stated its intention to consider in 1987 the renewal and modification of the fee program;

WHEREAS, the Air Resources Board staff, in consultation with representatives of local air pollution control districts, has developed a proposed fee program for fiscal year 1987-88;

WHEREAS, in accordance with Health and Safety Code Section 39914, the proposed fee program has been designed to provide to the Air Pollution Control Fund net revenues in fiscal year 1987-88 in an amount which is the least of two million dollars (\$2,000,000), or the amount based on the rate of twenty-five one hundredths of one cent (\$.0025) per pound of sulfur or nitrogen oxides emitted from major sources, or the amount appropriated from state funds for acid deposition research and monitoring by the Legislature;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of the Government Code;

WHEREAS, the Board finds that:

The funds to be collected pursuant to the proposed fee program are needed to implement the acid deposition research and monitoring program established pursuant to the Kapiloff Acid Deposition Act;

The proposed regulations are based on the most current data available for annual emissions of sulfur or nitrogen oxides from sources emitting 1,000 tons or more per year of either pollutant; and

The economic impact of the fee program on the affected sources of sulfur or nitrogen oxides will not be significant; and

WHEREAS, the Board has determined, pursuant to the requirements of the California Environmental Quality Act and Air Resources Board regulations, that this regulatory action will have no significant adverse impact on the environment.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves Sections 90616-90619, Title 17, California Administrative Code, as set forth in Attachment A.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt the regulations set forth in Attachment A after making them available to the public for a period of 15 days, provided that the Executive Officer shall consider such written comments as may be submitted during this period, shall make such modifications as he deems appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if he determines that this is warranted.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to forward the adopted regulations to the specified districts for appropriate action, and to the Department of Finance, the Legislative Analyst, and the State Controller, for information and for appropriate action.

I hereby certify that the above is a true and correct copy of Resolution 87-61, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ATTACHMENT A

Adopt Sections 90616-90619, Article 5,
Subchapter 3.5, Chapter 1, Part III, Title 17,
California Administrative Code, to read as follows:

Article 5. Fee Program to be Implemented by Air Pollution
Control Districts and Air Quality Management Districts
for Fiscal Year 1987-1988.

90616. General Requirements.

(a) To provide revenue for acid deposition research and monitoring for
fiscal year 1987-88, each district identified in Section 90617 shall adopt
regulations, with an effective date no later than December 15, 1987, which
provide for the collection of fees from the holders of permits for sources
which emitted 1,000 tons per year or more of either sulfur oxides or nitrogen
oxides during the period from January 1, 1986 through December 31, 1986. The
fees collected shall be in addition to permit and other fees already
authorized to be collected from such sources.

(b) Such fees, including fees collected to cover administrative costs to
the district, shall not exceed twenty-five one-hundredths of one cent
(\$0.0025) per pound of sulfur oxides or nitrogen oxides emitted. With respect
to sources identified on or before June 26, 1987, as emitting 1,000 tons per
year or more of sulfur oxides or nitrogen oxides during the period from
January 1, 1986 through December 31, 1986, the amount of emissions as
determined by the executive officer of the state board on June 26, 1987 shall
be used to determine compliance with this limitation and with the fee

requirements of Section 90617(a). In determining the amount of emissions, the executive officer shall utilize data provided by the districts, where available.

NOTE: Authority cited: Sections 39600, 39601, and 39910, Health and Safety Code. Reference: Sections 39002, 39500, 39600, and 39910-39914, Health and Safety Code.

90617. Fee Revenues.

(a) No later than March 1, 1988, each district specified in this section shall transmit the amount specified below, less an amount equal to the district's best estimate of or actual administrative costs, to the state board for deposit into the Air Pollution Control Fund:

~~(2)~~ (1) South Coast Air Quality Management District: ~~two-hundred-five thousand eight hundred twenty dollars (\$205,820)~~ two hundred five thousand three hundred eighty-five dollars (\$205,385);

~~(1)~~ (2) Bay Area Air Quality Management District: ~~two-hundred-thirteen thousand-eighty-five-dollars-(\$213,085)~~ one hundred eighty-five thousand one hundred fifty-five dollars (\$185,155);

(3) Kern County Air Pollution Control District: ~~one-hundred-seventy-one thousand-nine-hundred-twenty-dollars-(\$171,920)~~ one hundred eighty-one thousand one hundred thirty dollars (\$181,130);

(4) San Bernardino County Air Pollution Control District: ~~ninety thousand-eight-hundred-twenty-dollars-(\$90,820)~~ ninety thousand fifteen dollars (\$90,015);

(5) San Diego County Air Pollution Control District: thirty-one thousand four hundred ten dollars (\$31,410);

(6) San Luis Obispo County Air Pollution Control District: twenty-seven thousand two hundred twenty dollars (\$27,220);

(7) Monterey Bay Unified Air Pollution Control District: ~~twenty-four thousand-three-hundred-seventy-five-dollars-(\$24,375)~~ twenty-four thousand three hundred thirty-five dollars (\$24,335);

(8) San Joaquin County Air Pollution Control District: ~~twelve thousand-eight-hundred-thirty-five-dollars-(\$12,835)~~ thirteen thousand four hundred seventy dollars (\$13,470);

(9) Ventura County Air Pollution Control District: twelve thousand six hundred ninety dollars (\$12,690);

(10) North Coast Unified Air Quality Management District: eight thousand five hundred thirty dollars (\$8,530).

(11) Fresno County Air Pollution Control District: ~~twenty-four thousand-three-hundred-thirty-dollars-(\$24,330)~~ eight thousand dollars (\$8,000);

(12) Stanislaus County Air Pollution Control District: five thousand sixty dollars (\$5,060);

(b) In addition to the fees specified in subsection (a) above, a district shall, no later than March 1, 1988:

(1) For any source identified after June 26, 1987, as having emitted 1,000 tons per year or more of sulfur oxides or nitrogen oxides during the period from January 1, 1986 through December 31, 1986, transmit to the state board for deposit into the Air Pollution Control Fund five dollars (\$5.00) per ton of such pollutant, less an amount equal to the district's best estimate of or actual administrative costs; and

(2) For any source identified after July 14, 1986, as having emitted 1,000 tons per year or more of sulfur oxides or nitrogen oxides during the period from January 1, 1985 through December 31, 1985, for which fees have not been transmitted pursuant to Section 90613(b)(1), transmit to the state board for deposit into the Air Pollution Control Fund five dollars (\$5.00) per ton of such pollutant, less an amount equal to the district's best estimate of or actual administrative costs; and

(3) For any source identified after July 15, 1985, as having emitted 1,000 tons per year or more of sulfur oxides or nitrogen oxides during the period from January 1, 1984 through December 31, 1984, for which fees have not been transmitted pursuant to Section 90609(b)(1) or Section 90613(b)(2),

transmit to the state board for deposit into the Air Pollution Control Fund five dollars (\$5.00) per ton of such pollutant, less an amount equal to the district's best estimate of or actual administrative costs; and

(4) For any source identified after September 1, 1984, as having emitted 1,000 tons per year or more of sulfur oxides or nitrogen oxides during the period from January 1, 1983 through December 31, 1983, for which fees have not been transmitted pursuant to Section 90605(b)(1), Section 90609(b)(2) or Section 90613(b)(3), transmit to the state board for deposit into the Air Pollution Control Fund five dollars (\$5.00) per ton of such pollutant, less an amount equal to the district's best estimate of or actual administrative costs; and

(5) For any source identified after July 29, 1983 as having emitted 1,000 tons per year or more of sulfur oxides or nitrogen oxides during the period from January 1, 1982 through December 31, 1982, for which fees have not been transmitted pursuant to Section 90605(b)(2), Section 90609(b)(3) or Section 90613(b)(4), transmit to the state board for deposit into the Air Pollution Control Fund three dollars and sixty-nine cents (\$3.69) per ton of such pollutant.

NOTE: Authority cited: Sections 39600, 39601, and 39910, Health and Safety Code. Reference: Sections 39002, 39500, 39600, and 39910-39914, Health and Safety Code.

90618. Administrative Costs and Billing Information.

(a) To pay for the administrative costs of collecting the fees required by this article, each district may, in accordance with Section 90617, retain fees in an amount equal to the best estimate of or actual costs incurred by the district in establishing the program, and collecting and transmitting the fees. Each district shall, upon request, submit to the state board within 30 days documentation to substantiate such administrative costs.

(b) Each district shall submit to the state board, within 30 days of request, information relating to the assessed total tons of nitrogen oxides and sulfur oxides, the amount of fees per pollutant collected from each major nonvehicular source, including fees to cover administrative costs, and the net amount of fees transmitted to the state board pursuant to Section 90617.

NOTE: Authority cited: Sections 39600, 39601, and 39910, Health and Safety Code. Reference: Sections 39002, 39500, 39600, and 39910-39914, Health and Safety Code.

90619. Exemption.

In the event that any district is unable to collect the assessed acid deposition fee required by district rules and regulations from any source due to circumstances beyond the control of the district, including but not limited to plant closure or refusal of the source owner or operator to pay despite permit revocation and/or other enforcement action, such district shall notify the executive officer of the state board, and for demonstrated good cause may be relieved, on a prorated basis, from that portion of the fee collection

requirement for the district, as set forth in Section 90617. Nothing herein shall relieve the owner or operator from any legal obligation to pay any fees assessed pursuant to district rules and regulations.

NOTE: Authority cited: Sections 39600, 39601, and 39910, Health and Safety Code. Reference: Sections 39002, 39500, 39600, and 39910-39914, Health and Safety Code.

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Public Hearing to Consider the Adoption of Sections 90616-90619 Title 17, California Administrative Code, Regarding the Acid Deposition Fee Program

Agenda Item No.: 87-10-1

Public Hearing Date: July 9, 1987

Response Date:

Issuing Authority: Air Resources Board

Comment: No comments were received identifying any significant environmental issues pertaining to this item. the staff report identified no adverse environmental effects.

Response: N/A

Certified: Harold Holmer
Board Secretary

Date: November 13, 1987


State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : January 13, 1988

Subject : Filing of Notice
of Decisions of
the Air Resources
Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

ATTACHMENTS

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State of California
AIR RESOURCES BOARD

Resolution 87-62

July 9, 1987
October 8, 1987
November 13, 1987

87-10-2

Agenda Item No.: 87-13-2

Agenda Item No.: 87-15-1

WHEREAS, on January 25, 1985, pursuant to Section 39662 of the Health and Safety Code, the Air Resources Board ("Board") identified benzene as a toxic air contaminant for which there is not sufficient available scientific evidence to support the identification of a threshold exposure level below which no significant adverse health effects are anticipated (see Title 17, California Administrative Code, Section 93000);

WHEREAS, following identification of benzene as a toxic air contaminant, the Executive Officer, with the participation of the local air pollution control districts, is required to prepare a report on the need for and appropriate degree of control of benzene emissions;

WHEREAS, on July 24, 1986, the Board considered the "Benzene Control Plan" ("Plan") as supplemented by the Addendum to the Plan and found it to be an appropriate overall course of action for developing potential benzene control measures;

WHEREAS, the Board directed the staff to work closely with the districts through the Technical Review Group and with affected industry sources to further analyze and assess the nonvehicular control measures identified in the Plan for gasoline marketing and refinery benzene sources, and bring before the Board those measures which warrant further consideration;

WHEREAS, the Technical Review Group formed a Subcommittee to work with the Board staff to further analyze and assess potential nonvehicular measures for gasoline marketing sources of benzene emissions;

WHEREAS, in consideration of the potential benefits of implementing gasoline marketing benzene control measures, the Board staff, with the concurrence of the Subcommittee, decided to give the highest priority to developing a benzene control measure for retail service stations;

WHEREAS, Phase I and II vapor recovery systems are currently required at most retail service stations in areas of California which have not attained the federal ozone standard;

WHEREAS, staff has developed a proposed airborne toxic control measure for benzene emissions which would require the installation and use of Phase I and II vapor recovery systems at most retail service stations in the state, including those areas where Phase I and II systems are not currently required;

WHEREAS, Board staff prepared the "Proposed Airborne Toxic Control Measure for Emissions of Benzene from Retail Service Stations" (staff report) which includes: estimates of benzene emissions, exposure, cancer risk and cancer incidence associated with retail service stations; a discussion of the availability, technological feasibility and costs of an airborne toxic control measure (ATCM) to reduce benzene emissions from retail service stations; the proposed ATCM; a discussion of the anticipated effect of the ATCM on benzene exposure and risk; a discussion of the alternatives to the ATCM; and identification of any potential adverse health, safety or environmental impacts of the ATCM;

WHEREAS, as directed by the Board at its July 9, 1987 hearing, Board staff prepared additional analyses of the costs and benefits of requiring vapor recovery systems on existing retail service stations which sell 480,000 or fewer gallons per year;

WHEREAS, the Staff Report and Technical Support Document on the proposed measure in conjunction with the Plan, Addendum to the Plan, and the Technical Support document for the Plan constitute the report on the need and appropriate degree of regulation for benzene required by Health and Safety Code Section 39665, and in accordance with Health and Safety Code Section 39665(c), this material, as well as all relevant comments received during consultation, were made available for public review and comment 45 days prior to the public hearing to consider the proposed ATCM;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available;

WHEREAS, a public hearing and other administrative proceedings were held in accordance with provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of the Government Code;

WHEREAS, in consideration of the staff report and the written comments and public testimony it has received, the Board finds that:

The added lifetime cancer incidence from exposure to benzene emissions from retail service stations contributes to the statewide and local incidence of cancer and to the overall cancer risk;

The proposed airborne toxic control measure for benzene complies with the requirements of state law for control of sources of toxic air contaminants identified by the Board; and

The proposed airborne toxic control measure would reduce benzene emissions from retail service stations and resulting cancer risk and cancer incidence to the lowest level achievable through application of best available control technology at stations subject to the measure; and

WHEREAS, the Board has determined, pursuant to the requirements of the California Environmental Quality Act and Board regulations, that this regulatory action will have no significant adverse impact on the environment.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves Sections 93100 and 93101, Subchapter 7.5, Chapter 1, Part III, Titles 17 and 26, California Administrative Code, as set forth in Attachment A.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt Sections 93100 and 93101, Titles 17 and 26, California Administrative Code, as set forth in Attachment A after making them available to the public for a period of 15 days, provided that the Executive Officer shall consider such written comments regarding the changes in the regulations as originally proposed as may be submitted during this period, shall make such modifications as may be appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if he determines that this is warranted.

I hereby certify that the above is a true and correct copy of Resolution 87-62, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Notice of Public Hearing to Consider the Adoption of an
Airborne Toxic Control Measure for Benzene Emissions
from Retail Service Stations

Agenda Item No.: 87-10-2
87-13-2

Public Hearing Dates: July 9, 1987 and October 8, 1987

Response Date:

Issuing Authority: Air Resources Board

Comment: No comments were received identifying any
significant environmental issues pertaining to this
item. The staff report identified no adverse
environmental effects.

Response: N/A

Certified: 
Board Secretary

Date: 5/11/88

State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : August 24, 1988

Subject : Filing of Notice of
Decisions of the Air
Resources Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

ATTACHMENTS

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State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : January 13, 1988

Subject : Filing of Notice
of Decisions of
the Air Resources
Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

ATTACHMENTS

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ITEM NO.: 87-11-4 (b)
DATE: August 13, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 172-24 entitled "Cost of Materials Damage Caused by Acid Deposition in the South Coast Air Basin."

RECOMMENDATION: Adopt Resolution 87-63 approving Proposal No. 172-24 for funding in an amount not to exceed \$179,873.

SUMMARY: In accordance with the Kapiloff Acid Deposition Act the objective of this project is to assess the economic impact of acid deposition damage upon materials in the South Coast Air Basin (SoCAB).

The project tasks include conducting a consumer survey of households in the South Coast Air Basin to help assess types, amounts and costs of remedial or preventative action and the type and costs of the remedial or preventative action to avoid or repair damage to materials from acid deposition.

Specific tasks include: conducting a consumer survey of maintenance practices; estimating environmental and meteorological data for grid cells covering the SoCAB; calculating damage rates for building materials located in the grid cells; calculating the amount and type of materials damage; and estimating the cost of the materials damage. The contractor will report damage in physical terms and in dollar terms for the base year 1986.

The project would integrate the data on materials inventory and damage functions currently being developed under other ARB projects and would provide an assessment of materials damage caused by acid deposition in California:

The Contractor is Mathtech, Inc. and the principal investigator is Dr. Robert Horst.

State of California
AIR RESOURCES BOARD

Resolution 87-63
August 13, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California, pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, a solicited research proposal, Number 172-24, entitled "Cost of Materials Damage Caused by Acid Deposition in the South Coast Air Basin," has been submitted by Mathtech, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

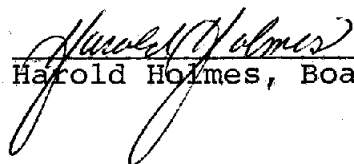
Proposal Number 172-24, entitled "Cost of Materials Damage Caused by Acid Deposition in the South Coast Air Basin," submitted by Mathtech, Inc. for a total amount not to exceed \$179,873.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 172-24, entitled "Cost of Materials Damage Caused by Acid Deposition in the South Coast Air Basin," submitted by Mathtech, Inc. for a total amount not to exceed \$179,873.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$179,873.

I hereby certify that the above is
a true and correct copy of Resolution
87-63, as adopted by the Air Resources
Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-11-4 (b)
DATE: August 13, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 168-24 entitled "Effects of Hydroxymethanesulfonate and Simulated Buffered Acid Fogs on Airway Function in Subjects with Asthma"

RECOMMENDATION: Adopt Resolution 87-64 approving Proposal No. 168-24 for funding in an amount not to exceed \$177,881.

SUMMARY: The investigators plan to address two major issues in this study. First, hydroxymethanesulfonic acid (HMSA), an important organic acid species that has been measured in fogs in California, may have potential to cause health effects in lungs. It is essentially unstudied but is suspected to cause bronchoconstriction in asthmatics. The proposed work will involve studying the bronchoconstrictive effects of HMSA in subjects with asthma. The initial exposures will be performed at rest via a mouthpiece and will establish the preliminary dose-response nature of HMSA. Following that, asthmatics will be exposed in the ARB's newly completed fog chamber to appropriate concentrations of sulfuric acid and HMSA while they perform light exercise.

Second, the investigators have found through previous work that buffered acids are a more potent stimulus to bronchoconstriction in asthmatic subjects than are unbuffered acids. The proposed work will involve studying the effect of ammonium buffering agents in simulated fogs under conditions resembling natural fog exposure and will include exercise as part of the exposure protocol.

Work performed in this study should clarify the nature of the health consequences of inhaling acid fogs and aerosols. Prior studies done by the proponents and others have dealt with fairly simple simulations of the chemicals and fog droplets found in ambient acidity. The proposed work will enhance the realism and applicability of the findings from this project. The use of the newly completed fog chamber will allow the investigators to more closely mimic real fogs than has been possible thus far.

The principal investigator is Dr. Dean Sheppard of the University of California, San Francisco.

State of California
AIR RESOURCES BOARD

Resolution 87-64
August 13, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California, pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 168-24, entitled "Effects of Hydroxymethanesulfonate and Simulated Acid Fogs on Airway Function in Subjects with Asthma," has been submitted by University of California at San Francisco; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

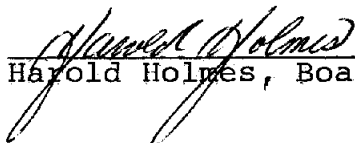
Proposal Number 168-24, entitled "Effects of Hydroxymethanesulfonate and Simulated Acid Fogs on Airway Function in Subjects with Asthma," submitted by the University of California, San Francisco for a total amount not to exceed \$177,881.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 168-24, entitled "Effects of Hydroxymethanesulfonate and Simulated Acid Fogs on Airway Function in Subjects with Asthma," submitted by the University of California, San Francisco for a total amount not to exceed \$177,881.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$177,881.

I hereby certify that the above is a true and correct copy of Resolution 87-64, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

B U D G E T S U M M A R Y

University of California, San Francisco

Effects of Hydroxymethanesulfonate and Simulated
Acid Fogs on Airway Function in Subjects with Asthma"

BUDGET ITEMS:

Salaries	\$78,383	
Benefits	21,378	
Supplies	12,280	
Equipment*	35,480	
Other Costs**	15,014	
Travel	2,400	
TOTAL, Direct Costs		\$164,935
TOTAL, Indirect Costs		12,946
		<u>TOTAL PROJECT COST</u> <u>\$177,881</u>

*Equipment detail:

Ion chromatograph upgrade	\$16,950
Spectrofluorometer	13,900
Impactor	3,450
Demodulators (2)	1,180

**Other Costs detail:

Consultants	6,400
Subject fees	5,500
Office supplies, publication fees	3,114
Chamber repair and maintenance	1,914

ITEM NO.: 87-11-4(b)
DATE: August 13, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 173-24 entitled "Pulmonary Function and Symptomatic Responses of Asthmatics to Ambient Acidic Atmospheres."

RECOMMENDATION: Adopt Resolution 87-65 approving Proposal No. 173-24 for funding in an amount not to exceed \$158,294.

SUMMARY: A Request for Proposals (RFP) was issued in 1985 to solicit proposals to begin a program using different approaches to study possible health effects of acidic species in California air. One of the approaches funded was a pilot epidemiological study to monitor one hundred carefully selected asthmatic subjects. The subjects were to be monitored for one year, with the objective of relating daily symptoms and lung function changes to urban pollution levels. The selection of asthmatics was made because, as a group, they represent a significant part of the population who are sensitive to the effects of air pollution. Subjects were selected from the Irvine/Costa Mesa area of Orange County, which exhibits moderate air pollution, including acidic components and their precursors.

Several problems were encountered with the initial study plan. The most important problem was recruiting satisfactory and reliable subjects. Delays in delivery of data from ambient HNO_3 monitoring performed by another investigator are also not yet available. The investigators have extended the field assessment of the subjects to increase the merit of the study.

This proposal would extend and increase the scope of this field epidemiology study. Changes that are proposed from the initial effort include expansion of air quality monitoring, increasing the cohort size, and completing the statistical analysis of both existing and new data.

The principal investigator is Dr. Steven Colome of the University of California, Irvine.

State of California
AIR RESOURCES BOARD

Resolution 87-65
August 13, 1987

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive program of research and monitoring of acid deposition in California, pursuant to Health and Safety Code Sections 39900 through 39915; and

WHEREAS, an unsolicited research proposal, Number 173-24, entitled "Pulmonary Function and Symptomatic Responses of Asthmatics to Ambient Acidic Atmospheres," has been submitted by the University of California, Irvine;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

Proposal Number 173-24, entitled "Pulmonary Function and Symptomatic Responses of Asthmatics to Ambient Acidic Atmospheres," submitted by the University of California, Irvine for a total amount not to exceed \$158,294;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39906, hereby accepts the recommendation of the Scientific Advisory Committee on Acid Deposition and approves the following:

Proposal Number 173-24, entitled "Pulmonary Function and Symptomatic Responses of Asthmatics to Ambient Acidic Atmospheres," submitted by the University of California, Irvine for a total amount not to exceed \$158,294.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$158,294.

I hereby certify that the above is a true and correct copy of Resolution 87-65, as adopted by the Air Resource Board.


Harold Holmes, Board Secretary

B U D G E T S U M M A R Y

University of California, Irvine

"Pulmonary Function and Symptomatic Responses
of Asthmatics to Ambient Acidic Atmospheres"

BUDGET ITEMS:

Salaries	\$92,432	
Benefits	13,928	
Supplies	1,700	
Equipment*	5,000	
Other Costs**	26,504	
Travel	4,794	
TOTAL, Direct Costs		\$144,358
TOTAL, Indirect Costs		13,936
		<u>TOTAL PROJECT COST</u> <u>\$158,294</u>

*Equipment Detail:

Acid Aerosol Sampler	\$ 3,800
Peak Flow meters (24)	1,200

**Other Costs Detail:

Operating Expenses and Diaries	4,054
Consultants	12,750
Maintenance for Sulfate Monitor	1,250
Allergy testing	4,000
Data acquisition	700
Computer time	2,000
Publication costs	1,750

State of California
AIR RESOURCES BOARD

Resolution 87-66

August 13, 1987

Agenda Item No.: 87-11-2

WHEREAS, Sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the "Board") to adopt standards, rules and regulations necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, Health and Safety Code Section 43831 provides that the Board shall establish, by regulation, maximum standards for the degree of unsaturation at a bromine number 30 as established by the American Society for Testing and Materials ("ASTM") Test Method D 1159-66, or by an appropriate test determined by the Board, for gasoline sold in the South Coast Air Basin designated by the Board;

WHEREAS, Health and Safety Code Section 43831 further provides that in adopting the regulations the Board shall give full consideration to climatic conditions and may provide that the maximum standards are applicable only during those periods of time which the Board determines are necessary in order to carry out the purposes of Division 26 of the Health and Safety Code;

WHEREAS, the Board has adopted Title 13, California Administrative Code, Section 2250 which limits the degree of unsaturation of gasoline sold in the South Coast Air Basin as a fuel for motor vehicles to that indicated by a bromine number of 30 as determined by ASTM Test Method D 1159-77, and defines "gasoline" as any petroleum distillate having a Reid vapor pressure of more than four pounds as defined by the applicable ASTM method;

WHEREAS, ASTM Test Method D 1159-77 contains a provision stating that the method is not generally applicable to gasoline when blending agents such as alcohols, ethers, ketones, and amines are present;

WHEREAS, ethanol, methanol, and tert-butyl alcohol ("TBA") blending components have been used to some extent in California gasoline for several years, and ARCO Chemical Company has indicated an intent to make available methyl tert-butyl ether ("MTBE") as a gasoline blending component in California;

WHEREAS, the Board staff has prepared a report recommending that the Board adopt and incorporate in Title 13, California Administrative Code, Section 2250 an updated version of the current bromine number test method with a provision explicitly stating that the method applies to blends of gasoline containing ethanol, methanol, TBA and MTBE, and revise the definition of gasoline;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as proposed if feasible alternatives or mitigation measures are available;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of the Government Code; and

WHEREAS, the Board finds that:

Applying the bromine number ASTM test method techniques to blends of gasoline containing ethanol, methanol, TBA and MTBE yields valid bromine number results for such blends;

The test method set forth in Attachment B is identical in all material respects to ASTM Test Method D 1159-84 except that its scope clearly applies to determining the bromine number of gasoline containing methanol, ethanol, TBA or MTBE, and ASTM Test Method D 1159-84 is in turn substantively identical to ASTM Test Method D 1159-77;

The amendments adopted herein, including the revision of the definition of gasoline, are necessary to help ensure that the bromine number limitation is enforceable with reference to gasoline blends containing methanol, ethanol, TBA and MTBE; and

The amendments adopted herein will have no significant adverse environmental impacts.

NOW, THEREFORE BE IT RESOLVED, that the Board adopts the amendments to Title 13, California Administrative Code, Section 2250, as set forth in Attachment A.

BE IT FURTHER RESOLVED, that the Board adopts the proposed test method for determining the bromine number of gasoline as set forth in Attachment B.

I hereby certify that the above is a true and correct copy of Resolution 87-66, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

Amend § 2250, Title 13, California Administrative Code, to read as follows:

2250. Degree of Unsaturation for Gasolines.

(a) No person shall ~~after April 1, 1971,~~ sell or supply within the South Coast Air Basin (as defined on January 1, 1976) as a fuel for motor vehicles as defined by the Vehicle Code of the State of California, a gasoline having a degree of unsaturation greater than that indicated by a Bromine Number of 30 as determined ~~by ASTM Test Method D-1159-77~~ according to the "Test Method for Determining Bromine Number of Gasoline," as adopted by the Air Resources Board on [insert date of adoption] and incorporated herein by reference.

(b) For the purpose of this rule, the term "gasoline" means any ~~petroleum distillate having a Reid Vapor Pressure of more than four pounds as defined by ASTM Method D-323-58~~ fuel which is commonly or commercially known or sold as gasoline, or any fuel sold to power a vehicle certified by the state board as a gasoline-powered vehicle without modifying the vehicle.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43101 and 43831, Health and Safety Code. Reference: Sections 39000-39003, 39500, 39606, 43000, 43013, 43101 and 43831, Health and Safety Code; and Western Oil and Gas Association v. Orange County APCD, 14 Cal.3d 411, 121 Cal.Rptr. 249 (1975).

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item : Public Hearing to Consider Amendments to Regulation
Regarding the Degree of Unsaturation of Gasoline Sold as
Motor Vehicle Fuel in the South Coast Air Basin

Agenda Item No.: 87-11-2

Public Hearing Date: August 13, 1987

Response Date: August 13, 1987

Issuing Authority: Air Resources Board

Comment: No comments were received identifying any significant
environmental issues pertaining to this item. The
staff report identified no adverse environmental
effects.

Response: N/A

Certified:


Board Secretary

Date:

August 24, 1987

State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : January 13, 1988

Subject : Filing of Notice
of Decisions of
the Air Resources
Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

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State of California
Air Resources Board

Resolution 87-67

August 13, 1987

Agenda Item No.: 87-11-1

WHEREAS, the Congress is considering amendments to the Clean Air Act;

WHEREAS, the current Act contains attainment deadlines that cannot realistically be met and needs substantial revision;

WHEREAS, current Environmental Protection Agency (EPA) policies implementing the Act may result in the imposition in California of sanctions which will not further efforts toward attaining air quality standards;

WHEREAS, air pollution levels in California are creating extensive public health problems and economic damage;

WHEREAS, ambient air quality standards should be attained as expeditiously as practicable;

WHEREAS, California has implemented the most extensive and effective air pollution control program in the country;

WHEREAS, California's unique geographical and meteorological features demand a particularly low rate of emissions per capita in order to attain standards and thus greatly increase the difficulty of attaining national ambient air quality standards;

WHEREAS, despite substantial progress, California continues to have the most serious ozone air quality problem in the country;

WHEREAS, continued progress toward attainment will require innovative advances in control technology and the development of non-traditional approaches to reduce emissions from transportation and non-industrial sources;

WHEREAS, such future control activities will require more time and resources to develop and implement than more traditional controls required in the past; and

WHEREAS, implementation of sufficient measures to attain standards will result in substantial costs to California business and the public.

NOW, THEREFORE, BE IT RESOLVED that the Board urges the Congress to promptly amend the Clean Air Act to:

1. Provide California with a realistic timetable for attaining ambient air quality standards in all areas of the state as expeditiously as practicable;

2. Prescribe a schedule for emissions reductions and other control requirements that recognizes California's past accomplishments and the time and difficulty involved in developing non-traditional means of achieving additional emissions reductions;
3. Specify an equitable system of incentives and sanctions to fairly encourage full compliance with provisions of the law;
4. Maintain California's authority to regulate vehicles and fuels; and
5. Provide timely and effective federal policy support and adequate financial assistance to implement new requirements of the Act.

I hereby certify that the above is a true and correct copy of Resolution 87-67, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

State of California
Air Resources Board

Resolution 87-68

August 13, 1987

WHEREAS, Health and Safety Code Sections 39700, 39701, and 39703 authorize the Air Resources Board (the "Board") to coordinate and collect research data on air pollution and to administer and coordinate all air pollution research funded in whole or in part by state funds;

WHEREAS, in February 1987 the Board approved a long-range research plan recommended by the Research Screening Committee which includes a large scale coordinated field study known as the Southern California Air Quality Study or "SCAQS." The purpose of the SCAQS is to develop a comprehensive air quality data base for the South Coast Air Basin which can be used to improve air quality models;

WHEREAS, the Board approved the funding of the SCAQS core program of research projects as described in the Board's long-range research plan;

WHEREAS, abnormal meteorological conditions have resulted in lower than expected levels of ozone, preventing the collection of data critical to the SCAQS data base during the summer study period;

WHEREAS, it is necessary to act promptly to modify the SCAQS plan in order to accomplish all of the study objectives with respect to data collection during the summer study period by providing for funding of six additional intensive sampling days between August 18 and September 10, 1987;

WHEREAS, it is therefore necessary to make limited amendments or augmentations to existing contracts or to initiate new contracts to obtain the additional summer sampling data; and

WHEREAS, any additional funding of the existing contracts needed to accomplish the additional summer sampling will be substantially offset by the redirection of resources from planned fall studies that have already been funded by the Board, and is not expected to exceed \$50,000.00.

NOW, THEREFORE, BE IT RESOLVED, that the Executive Officer is hereby directed and authorized to initiate administrative procedures and execute all necessary documents and contracts to augment or, as necessary, to initiate such contracts as may be required to complete the summer sampling portion of the SCAQS for a total amount, exclusive of redirection of the fall study portion of SCAQS, not to exceed \$50,000.00.

I hereby certify that the above
is a true and correct copy of
Resolution 87-68, as adopted by
the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-69
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A5-196-32, entitled "Southern California Air Quality Study: Installation and Operation of Type B Stations," has been submitted by AeroVironment; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A5-196-32, entitled "Southern California Air Quality Study: Installation and Operation of Type B Stations," submitted by AeroVironment for a total amount not to exceed \$123,038.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A5-196-32, entitled "Southern California Air Quality Study: Installation and Operation of Type B Stations," submitted by AeroVironment for a total amount not to exceed \$123,038.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$123,038 for a total amount not to exceed \$711,947.

I hereby certify that the above is a true and correct copy of Resolution 87-69, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-70
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A6-099-32, entitled "Southern California Air Quality Study: Measurement of Pexoryacetyl Nitrate (PAN)," has been submitted by Daniel Grosjean and Associates; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A6-099-32, entitled "Southern California Air Quality Study: Measurement of Pexoryacetyl Nitrate (PAN)," submitted by Daniel Grosjean and Associates for a total amount not to exceed \$21,930.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A6-099-32, entitled "Southern California Air Quality Study: Measurement of Pexoryacetyl Nitrate (PAN)," submitted by Daniel Grosjean and Associates for a total amount not to exceed \$21,930.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$21,930 for a total amount not to exceed \$61,151.

I hereby certify that the above
is a true and correct copy of
Resolution 87-70, as adopted by
the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-71
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A6-112-32, entitled "Acidic Aerosol Size Distribution During SCAQS," has been submitted by the California Public Health Foundation; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A6-112-32, entitled "Acidic Aerosol Size Distribution During SCAQS," submitted by the California Public Health Foundation for a total amount not to exceed \$5,303.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A6-112-32, entitled "Acidic Aerosol Size Distribution During SCAQS," submitted by the California Public Health Foundation for a total amount not to exceed \$5,303.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$5,303 for a total amount not to exceed \$238,252.

I hereby certify that the above
is a true and correct copy of
Resolution 87-71, as adopted by
the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-72
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A4-186-32, entitled "Southern California Air Quality Study: Sample Analyses and Reporting," has been submitted by Environmental Monitoring Services, Inc.; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A5-186-32, entitled "Southern California Air Quality Study: Sample Analyses and Reporting," submitted by Environmental Monitoring Services, Inc. for a total amount not to exceed \$41,200.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A5-186-32, entitled "Southern California Air Quality Study: Sample Analyses and Reporting," submitted by Environmental Monitoring Services, Inc. for a total amount not to exceed \$41,200.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$41,200 for a total amount not to exceed \$426,544.

I hereby certify that the above
is a true and correct copy of
Resolution 87-72, as adopted by
the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-73
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A5-157-32, entitled "Southern California Air Quality Study: Program Management," has been submitted by Sonoma Technology, Inc.; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A5-157-32, entitled "Southern California Air Quality Study: Program Management," submitted by Sonoma Technology, Inc., for a total amount not to exceed \$105,862.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A5-157-32, entitled "Southern California Air Quality Study: Program Management," submitted by Sonoma Technology, Inc. for a total amount not to exceed \$105,862.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$105,862 for a total amount not to exceed \$494,846.

I hereby certify that the above is a true and correct copy of Resolution 87-73, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-74
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A6-098-32, entitled "Southern California Air Quality Study: Aircraft Measurements," has been submitted by Sonoma Technology, Inc.; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A6-098-32, entitled "Southern California Air Quality Study: Aircraft Measurements," submitted by Sonoma Technology, Inc. for a total amount not to exceed \$59,978.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A6-098-32, entitled "Southern California Air Quality Study: Aircraft Measurements," submitted by Sonoma Technology, Inc. for a total amount not to exceed \$59,978.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$59,978 for a total amount not to exceed \$334,878.

I hereby certify that the above
is a true and correct copy of
Resolution 87-74, as adopted by
the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-75
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A6-097-32, entitled "Meteorological Support Program," has been submitted by Technical and Business Systems; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A6-097-32, entitled "Meteorological Support Program," submitted by Technical and Business Systems for a total amount not to exceed \$73,397.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A6-097-32, entitled "Meteorological Support Program," submitted by Technical and Business Systems for a total amount not to exceed \$73,397.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$73,397 for a total amount not to exceed \$402,543.

I hereby certify that the above is a true and correct copy of Resolution 87-75, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-76
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a request for budget augmentation for Contract Number A6-146-32, entitled "Measurement of Nitrous Acid, Nitrate Radical, and Formaldehyde," has been submitted by the University of California, Riverside; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Augmentation to Contract Number A6-146-32, entitled "Measurement of Nitrous Acid, Nitrate Radical, and Formaldehyde," submitted by the University of California, Riverside for a total amount not to exceed \$13,204.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Augmentation to Contract Number A6-146-32, entitled "Measurement of Nitrous Acid, Nitrate Radical, and Formaldehyde," submitted by the University of California, Riverside for a total amount not to exceed \$13,204.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts to augment the research effort referred to herein by \$13,204 for a total amount not to exceed \$173,020.

I hereby certify that the above is a true and correct copy of Resolution 87-76, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-77
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1554-135, entitled "Southern California Air Quality Study: Continuous Particulate Organic Carbon Measurements," has been submitted by the Oregon Graduate Center;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1554-135, entitled "Southern California Air Quality Study: Continuous Particulate Organic Carbon Measurements," submitted by the Oregon Graduate Center for a total amount not to exceed \$22,735.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1554-135, entitled "Southern California Air Quality Study: Continuous Particulate Organic Carbon Measurements," submitted by the Oregon Graduate Center for a total amount not to exceed \$22,735.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$22,735.

I hereby certify that the above is a true and correct copy of Resolution 87-77, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-78
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1555-135, entitled "Southern California Air Quality Study: Tunable Diode Laser Absorption Spectrometer Measurements of Peroxide," has been submitted by Unisearch Associates, Inc.;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1555-135, entitled "Southern California Air Quality Study: Tunable Diode Laser Absorption Spectrometer Measurements of Peroxide," submitted by Unisearch Associates, Inc. for a total amount not to exceed \$39,663.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1555-135, entitled "Southern California Air Quality Study: Tunable Diode Laser Absorption Spectrometer Measurements of Peroxide," submitted by Unisearch Associates, Inc. for a total amount not to exceed \$39,663.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$39,663.

I hereby certify that the above is a true and correct copy of Resolution 87-78, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-79
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1556-135, entitled "Southern California Air Quality Study: Size-Resolved Particle Composition," has been submitted by the University of California, Davis;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1556-135, entitled "Southern California Air Quality Study: Size-Resolved Particle Composition," submitted by the University of California, Davis for a total amount not to exceed \$22,055.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1555-135, entitled "Southern California Air Quality Study: Size-Resolved Particle Composition," submitted by the University of California, Davis for a total amount not to exceed \$22,055.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$22,055.

I hereby certify that the above is a true and correct copy of Resolution 87-79, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-80
September 10, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1557-135, entitled "Southern California Air Quality Study: Size-Resolved Aerosol Carbon," has been submitted by the University of Minnesota;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1557-135, entitled "Southern California Air Quality Study: Size-Resolved Aerosol Carbon," submitted by the University of Minnesota, for a total amount not to exceed \$12,384.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1555-135, entitled "Southern California Air Quality Study: Size-Resolved Aerosol Carbon," submitted by the University of Minnesota, for a total amount not to exceed \$12,384.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$12,384.

I hereby certify that the above is a true and correct copy of Resolution 87-80, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87- 82

September 10, 1987

Agenda Item No.: 87-12-1

WHEREAS, Sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the "Board") to do such acts and to adopt such regulations as may be necessary for the proper execution of the powers and duties granted to, and imposed upon, the Board by law;

WHEREAS, Chapter 3.5 (commencing with Section 39650) of Part 2 of Division 26 of the Health and Safety Code establishes procedures for the identification of toxic air contaminants by the Board;

WHEREAS, Section 39655 of the Health and Safety Code defines a "toxic air contaminant" as an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health;

WHEREAS, Section 39662 of the Health and Safety Code directs the Board to list, by regulation, substances determined to be toxic air contaminants, and to specify for each substance listed a threshold exposure level, if any, below which no significant adverse health effects are anticipated;

WHEREAS, in California, carbon tetrachloride (CCl₄ and tetrachloromethane, hereinafter "carbon tetrachloride") has been measured in the atmosphere and is emitted from many activities including the manufacture of carbon tetrachloride, the production of fluorocarbons, the agricultural application of carbon tetrachloride as a grain fumigant, the production of chlorinated paraffin wax, and the use of carbon tetrachloride as an industrial solvent;

WHEREAS, pursuant to the request of the Board, the Department of Health Services (DHS) evaluated the health effects of carbon tetrachloride in accordance with Section 39660 of the Health and Safety Code;

WHEREAS, DHS concluded in its evaluation that carbon tetrachloride is an animal carcinogen and a potential human carcinogen; that health effects other than cancer are not expected to occur at existing or expected ambient levels of carbon tetrachloride; and that the maximum excess lifetime cancer risk from carbon tetrachloride exposure is estimated to range from 10 to 42 cases per million people exposed per 0.16 parts per billion (1 microgram per cubic meter);

WHEREAS, for the reasons set forth in its evaluation, DHS concluded that in the absence of strong positive evidence that carbon tetrachloride acts only through mechanisms which ought to have a threshold, carbon tetrachloride

should be treated as acting without a threshold, and DHS has determined that there is not sufficient available scientific evidence at this time to support the identification of a carbon tetrachloride exposure level below which carcinogenic effects would not have some probability of occurring;

WHEREAS, upon receipt of the DHS evaluation, staff of the Board prepared a report including and in consideration of the DHS evaluation and recommendations and in the form required by Section 39661 of the Health and Safety Code and, in accordance with the provisions of that section, made the report available to the public and submitted it for review to the Scientific Review Panel (SRP) established pursuant to Section 39670 of the Health and Safety Code;

WHEREAS, in accordance with Section 39661 of the Health and Safety Code, the SRP reviewed the staff report, including the scientific procedures and methods used to support the data in the report, the data itself, and the conclusions and assessments on which the report was based, considered the public comments received regarding the report, and on June 3, 1987, adopted for submittal to the Board findings which included the following:

- "1. Carbon tetrachloride has been identified as an animal carcinogen and recommends that it be regarded as a potential human carcinogen.
2. Carbon tetrachloride is emitted into the air by a variety of sources in California, and its presence has been documented in the ambient air around the state.
3. Adverse health effects other than cancer are not expected to occur at measured or predicted carbon tetrachloride concentrations in the ambient air.
4. Based on available scientific information, a carbon tetrachloride exposure level below which carcinogenic effects are not expected to occur cannot be identified.
5. Based on an interpretation of available scientific evidence by DHS staff, the range of lifetime excess cancer risk from exposure to 0.16 ppb (1 ug/m³) of atmospheric carbon tetrachloride based on the best estimate of risk and the upper 95% confidence limit is estimated to be 10 to 42 cases per million people exposed. These upper-bound excess lifetime risks are health conservative estimates; the actual risk is likely to be below these values.
6. It should be noted that the animal carcinogenesis data used for risk assessment are not completely satisfactory and therefore the estimates of risk need to be viewed with caution until more reliable data are available."

WHEREAS, the SRP found the staff report to be without serious deficiency, and the SRP agreed that carbon tetrachloride should be listed by the Air Resources Board as a toxic air contaminant, and that based on available

scientific information, a carbon tetrachloride exposure level below which carcinogenic effects are not expected to occur cannot be identified;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of the Government Code;

WHEREAS, in consideration of the staff report, including DHS' evaluation and recommendations, the available evidence, the findings of the SRP, and the written comments and public testimony it has received, the Board finds that:

Carbon tetrachloride is an animal carcinogen and a potential human carcinogen;

Health effects other than cancer are not anticipated at existing ambient carbon tetrachloride exposure levels;

There is not sufficient available scientific evidence to support the identification of a threshold exposure level for carbon tetrachloride; and

Carbon tetrachloride is an air pollutant which, because of its carcinogenicity, may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health; and

WHEREAS, the Board has determined, pursuant to the requirements of the California Environmental Quality Act and Board regulations, that this regulatory action will have no significant adverse impact on the environment.

NOW, THEREFORE BE IT RESOLVED, that the Board adopts the proposed regulatory amendment to Section 93000, Titles 17 and 26, California Administrative Code, as set forth in Attachment A.

I hereby certify that the above is a true and correct copy of the Resolution 87-82, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

Amend Titles 17 and 26, California Administrative Code, Section 93000 to read as follows:

93000. Substances Identified As Toxic Air Contaminants. Each substance identified in this section has been determined by the state board to be a toxic air contaminant as defined in Health and Safety Code Section 39655. If the state board has found there to be a threshold exposure level below which no significant adverse health effects are anticipated from exposure to the identified substance, that level is specified as the threshold determination. If the board has found there to be no threshold exposure level below which no significant adverse health effects are anticipated from exposure to the identified substance, a determination of "no threshold" is specified. If the board has found that there is not sufficient available scientific evidence to support the identification of a threshold exposure level, the "Threshold" column specifies "None identified."

<u>Substance</u>	<u>Threshold Determination</u>
Benzene (C ₆ H ₆)	None identified
Ethylene Dibromide (BrCH ₂ CH ₂ Br; 1,2-dibromoethane)	None identified
Ethylene Dichloride (ClCH ₂ CH ₂ Cl; 1,2-dichloroethane)	None identified
Hexavalent Chromium (Cr(VI))	None identified
Asbestos [asbestiform varieties of serpentine (chrysotile) riebeckite (crocidolite) cummingtonite-grunerite (amosite), tremolite, actinolite, and anthophyllite]	None identified
Dibenzo-p-dioxins and Dibenzofurans chlorinated in the 2,3,7 and 8 positions and containing 4,5,6 or 7 chlorine atoms	None identified
Cadmium (metallic cadmium and cadmium compounds)*	None identified
<u>Carbon tetrachloride</u> <u>(CCl₄; tetrachloromethane)</u>	<u>None identified</u>

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Notice of Public Hearing to Consider the Adoption of a
Regulatory Amendment Identifying Carbon Tetrachloride as a
Toxic Air Contaminant

Agenda Item No.: 87-12-1

Public Hearing Date: September 10, 1987


Response Date:

Issuing Authority: Air Resources Board

Comment: No comments were received identifying any significant
environmental issues pertaining to this item. the
staff report identified no adverse environmental
effects.

Response: N/A

Certified: _____


Board Secretary

Date: _____

2/9/88

APR 1988

APR 1988

APR 1988


State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : August 24, 1988

Subject : Filing of Notice of
Decisions of the Air
Resources Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

ATTACHMENTS

87-30
87-62
87-82
87-83
87-90
87-91
87-92
87-95
88-9
88-41

State of California
AIR RESOURCES BOARD

RESOLUTION 87-83

September 10, 1987

Agenda Item No.: 87-12-2

WHEREAS, Health and Safety Code Sections 39600 and 39601 authorize the Air Resources Board (the "Board") to adopt standards, rules and regulations necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, in Section 43000 of the Health and Safety Code, the Legislature has declared that the emission of air pollutants from motor vehicles is the primary cause of air pollution in the state and, in Section 39002 and 39003 of the Health and Safety Code, has charged the Air Resources Board with the responsibility for systematically attacking the serious air pollution problem caused by motor vehicles;

WHEREAS, Sections 43013 and 43101 of the Health and Safety Code authorize the Board to adopt and implement emissions standards for the control of air pollution caused by motor vehicles which standards the Board has found to be necessary and technologically feasible;

WHEREAS, Section 43104 of the Health and Safety Code authorizes the Board to adopt test procedures for determining whether new motor vehicles and new motor vehicle engines are in compliance with vehicular emission standards adopted by the Board, and provides that the Board shall base its test procedures on federal test procedures or on driving patterns typical in the urban areas of California;

WHEREAS, Section 43100 of the Health and Safety Code authorizes the Board to certify new motor vehicles, and Section 43102 provides that no new motor vehicle shall be certified unless it meets the emission standards and test procedures adopted by the Board;

WHEREAS, Section 43008 of the Health and Safety Code provides that all non-California-certified motor vehicles which are required by federal standards and test procedures to be equipped with motor vehicle pollution control devices, shall be equipped with such devices;

WHEREAS, the Board's existing new motor vehicle and new motor vehicle engine exhaust emission certification requirements incorporate vehicle labeling requirements which parallel those of EPA with exceptions necessary to meet the special needs of this state;

WHEREAS, California Administrative Code, Title 13, Section 1965 and the incorporated "California Motor Vehicle Tune-Up Label Specifications" adopted on March 1, 1978, and last amended on April 23, 1986, set forth the labeling specifications for motor vehicle labels required by ARB's exhaust emission certification requirements;

WHEREAS, in Sections 44000 et seq. of the Health and Safety Code, the Legislature created the state inspection and maintenance program ("Smog Check Program") to ensure that all emission control devices and systems required by state and federal law are installed and functioning correctly and that vehicles comply with applicable motor vehicle emission requirements;

WHEREAS, the Review Committee created by the Legislature to analyze the effect of the Smog Check Program on vehicle emissions and air quality has included in its recommendations to improve the performance of the program, as set out in the committee's "Evaluation of the California Smog Check Program" dated April 1987, a recommendation that bar code-equipped tune-up labels be required on all new cars and trucks as soon as possible;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having any significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available which would substantially reduce or avoid such impacts;

WHEREAS, the Board finds that:

The application of machine-readable label formats for vehicle emission control labeling purposes for 1990 and subsequent model year vehicles is technologically feasible;

The use of machine-readable labels will improve the identification and repair of motor vehicles subject to the California Smog Check Program;

The use of machine-readable labels will eliminate the improper selection of idle emission standards which are less stringent than the applicable standards directly resulting in an emissions reduction, and will also contribute to the elimination of tampering related problems which contribute approximately 140 tons per day of hydrocarbons, 960 tons per day of carbon monoxide, and 30 tons per day of oxides of nitrogen for the combined Smog Check Program areas;

The use of machine-readable labels will result in an overall cost savings to the California consumer due to the reduced labor costs associated with the more efficient inspection and repair by Smog Check mechanics;

The other proposed amendments to the California labeling specifications will streamline and clarify the labeling requirements for manufacturers by more closely aligning the California requirements with federal regulations; and

The proposed amendments will not result in any significant adverse environmental impacts.

NOW, THEREFORE, BE IT RESOLVED that the Board approves the amendments to Title 13, California Administrative Code, Sections 1965, as set forth in Attachment A hereto, and the amendments to the incorporated "California Motor Vehicle Emission Control Label Specifications" as set forth in Attachment B hereto.

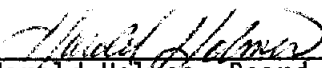
BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt the amendments as set forth in Attachment A, and further directs the Executive Officer to adopt the amendments as set forth in Attachment B after SAE issues the final standards J1877 and J1892, provided that the final standards are the same or substantially the same as the version approved herein. If the final standards are not the same or substantially the same as the version approved herein the regulations shall be presented to the Board for further consideration.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt the amendments as set forth in Attachments A and B with additional modifications as provided for herein, after making them available to the public for a period of at least 15 days, provided that the Executive Officer shall consider such written comments as may be submitted during this period, shall make such modifications as may be appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if he determines that this is warranted.

BE IT FURTHER RESOLVED that the Board hereby determines that the amendments approved herein will not cause the California emission standards, in the aggregate, to be less protective of public health and welfare than applicable federal standards, will not cause the California requirements to be inconsistent with Section 202(a) of the Clean Air Act, and raise no new issues affecting previous waiver determinations of the Administrator of the EPA pursuant to Section 209(b) of the Clean Air Act.

BE IT FURTHER RESOLVED that the Executive Officer shall forward the amended regulations to the EPA with a request for confirmation that the amendments are within the scope of existing waivers pursuant to Section 209(b)(1) of the Clean Air Act.

I hereby certify that the above is a true and correct copy of the Resolution 87-83, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Public Hearing to Consider Amendments to Regulations Regarding
Certification Labeling Requirements Applicable to New California
Motor Vehicles

Agenda Item No.: 87-12-2

Public Hearing Date: September 10, 1987

Response Date: N/A

Issuing Authority: Air Resources Board

Comment: No comments were received identifying any significant
environmental issues pertaining to this item. The staff report
identified no adverse environmental effects.

Response: N/A

Certified:



Board Secretary

Date:



7/20/88

ATTACHMENT A

Amend Title 13, California Administrative Code, Section 1965, to read as follows:

1965. Tune-Up Labels - 1979 and Subsequent Model Year Motor Vehicles.

In addition to all other requirements, tune-up emission control labels required by California certification procedures shall conform to the "California Motor Vehicle Tune-Up Emission Control Label Specifications," adopted March 1, 1978, as last amended April-26, 1986 _____.

NOTE: Authority cited: Sections 39600 and 39601, Health and Safety Code.
Reference: Sections 39002, 39003, 43000, 43013, 43100, 43101, 43102, 43104, and 43107 and 43200, Health and Safety Code.

000000 100000

ATTACHMENT B

PROPOSED

State of California
AIR RESOURCES BOARD

~~TUNE-UP~~ CALIFORNIA MOTOR VEHICLE
EMISSION CONTROL LABEL SPECIFICATIONS

Adopted: March 1, 1978
Amended: June 16, 1982
Amended: April 26, 1984
Amended: April 8, 1985
Amended: April 25, 1986
Amended:

NOTE: These procedures are printed in a style to indicate the proposed changes. New text is underlined, and deleted portions are noted by strike-out. Proposed changes as a result of the September 10, 1987, public hearing are indicated by double underline for additions and slashout for deleted portions.

State of California
AIR RESOURCES BOARD

California Motor Vehicle ~~Tune-Up~~ Emission Control
Label Specifications

1. Purpose. The Air Resources Board recognizes that certain emissions-critical or emissions-related parts must be properly adjusted-identified and maintained in order for vehicles and engines to meet the applicable emission standards. The purpose of these specifications is to require motor vehicle or motor vehicle engine manufacturers to affix a label (or labels) on each production vehicle in order to provide the vehicle owner and service mechanic with information necessary for the proper adjustment maintenance of these parts in customer use.
2. Applicability. These specifications shall apply to each new 1979 and subsequent model-year passenger car, light-duty truck, medium-duty vehicle, heavy-duty gasoline-fueled powered engine, and heavy-duty diesel-fueled powered engine, and to each new 1982 and subsequent model year motorcycle sold or offered for sale in California. Any vehicles or classes of vehicles exempt from exhaust emission standards pursuant to Article 2, Chapter 3, Title 13 of the California Administrative Code shall also be exempt from the requirements of these specifications. The responsibility for compliance with these specifications shall rest with the motorcycle, light-duty vehicle, medium-duty vehicle, or heavy-duty engine manufacturer who certified such vehicles or engines.
3. Label Content and Location. (a) A plastic or metal tune-up label, and a paper, plastic or metal machine-readable vehicle emission configuration (VEC) bar code label in accordance with Section 3b, shall be welded, riveted or otherwise permanently attached to an area within the engine compartment (if any) or to the engine in such a way

that it will be readily visible to the average person after installation of the engine in a vehicle. A paper, plastic or metal machine-readable vehicle identification number (VIN) bar code label in accordance with Section 3b shall be affixed in a readily visible location on the vehicle's body/pillar on the operator's side to either the hinge pillar, door latch post, the door edge that meets the door-latch post, next to the drivers seating position, or the instrument panel in a location clearly visible through the lower left corner of the windshield.

In selecting an acceptable location, the manufacturer shall consider the possibility of accidental damage (e.g., possibility of tools or sharp instruments coming in contact with the label) and accessibility to a bar-code reading wand, as applicable. The Each label shall be affixed in such a manner that it cannot be removed without destroying or defacing the label, and shall not be affixed to any part which is likely to be replaced during the vehicle's useful life. For motorcycles, passenger cars, light-duty trucks, and medium-duty vehicles, the label(s) shall not be affixed to any equipment which is easily detached from the vehicle.

(a)(b)The tune-up label shall contain the following information lettered in the English language in block letters and numerals which shall be of a color that contrasts with the background of the label:

- i. The label heading shall read:

"Vehicle Emission Control Information" for passenger cars and motorcycles;

"Important Vehicle Information" for light-duty and medium-duty trucks; and

"Important Engine Information" for heavy-duty engines.

- ii. Full corporate name and trademark of the manufacturer.
- iii. Engine family identification, model designation (for heavy-duty diesels), and engine displacement (in cubic inches, cubic centimeters or liters), and the statement, "OBD Exempt" for all 1989 and subsequent model-year passenger cars, light-duty trucks, and medium-duty vehicles which do not have an Air Resources Board approved on-board diagnostic system.
- iv. Identification of the Exhaust Emission Control System:
 Initials may be used such as and shall consist of the following nomenclatures: EM---engine-modification; AI---air-injection; FI---fuel-injection
OC - Oxidation Catalyst Only;
TWC - Three-Way Catalyst;
TWC + OC - Three-Way Catalyst with Oxidation Catalyst;
AIP - Air Injection Pump;
AIV - Air Injection Valve (Pulse Air Injection);
DI - Diesel Direct Injection (Diesel);
PC - Prechamber (Diesel);
EBB//EXHAUST/GAS/SENSOR//OR/OXYGEN/SENSOR//
OS - Oxygen Sensor; HOS - Heated Oxygen Sensor;
EGR - Exhaust Gas Recirculation;
EM - Engine Modification;
FI - Fuel Injection (Gasoline); and
TR - Thermal Reactor.
- v. For gasoline-powered Engines the tune-up specifications and adjustments as recommended by the manufacturer, including but

~~not-limited-to~~, if applicable: valve lash, ignition-dwell,
ignition timing, idle air fuel mixture setting procedure and
value (e.g., idle CO, idle speed drop), and high idle speed.
~~and-for~~ For diesels-powered engines the specifications and
adjustments recommended by the manufacturer, including if
applicable: initial injection timing, advertised-horsepower,
and fuel rate (in mm³/stroke) at advertised horsepower ~~(all~~
~~as-applicable).~~ For the specifications listed above, which
are not recommended by the manufacturer for adjustment, the
manufacturer shall include in lieu of the "specifications"
the single statement "no other adjustments needed".

These specifications shall indicate the proper transmission
position during tune-up and what accessories, if any (e.g. air
conditioner), should be in operation, and what systems, if any
(e.g. vacuum advance, air pump), should be disconnected during
the tune-up. For gasoline-fueled-powered vehicles, the
instructions for tune-up adjustments shall be sufficiently
clear on the label so as to preclude the need for a mechanic
or vehicle owner to refer to another document in order to
correctly perform the adjustments.

vii.vi. For motorcycles only, any specific fuel or engine
lubricant requirements (e.g., lead content, research octane
number, engine lubricant type).

vii.vii. For heavy-duty engines, the date of engine manufacture
(month and year). A manufacturer may, in lieu of printing the
month of manufacture on the engine label, maintain a record of

the month of engine manufacture. The manufacturer shall submit this record to the Executive Officer upon request.

ix-viii. An unconditional statement of compliance with the appropriate model year California regulations; for example, "This vehicle (or engine, as applicable) conforms to California regulations applicable to _____ model-year new _____ (specify motorcycles, passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty gasoline-powered engines, or heavy-duty diesel-powered engines, as applicable)." For federally certified vehicles certified for sale in California the statement must include the phrase "conforms to federal regulations and is certified for sale in California". For Class III motorcycles for sale in California, the statement must include the phrase "is certified to _____ HC engine family exhaust emission standard in California." For incomplete light-duty truck and incomplete medium-duty vehicles the label shall contain the following statement in lieu of the above:

"This vehicle conforms to California regulations applicable to _____ model-year new vehicles when completed at a maximum curb weight of _____ pounds and a maximum frontal area of _____ square feet."

ix. For 1985 and subsequent model year heavy-duty diesel-powered engines and 1987 and subsequent model year heavy-duty gasoline-powered engines, if the manufacturer is provided an alternate useful life period under the provisions of 40 CFR 86.085-21(f), the prominent statement: "This vehicle has been

certified to meet California standards for a useful life period of ___ years or _____ miles of operation, whichever occurs first. This vehicle's actual life may vary depending on its service application." The manufacturer may alter this statement only to express the assigned alternate useful life in terms other than years or miles (e.g., hours, or miles only).

xix. For 1985 and subsequent model year heavy-duty diesel-powered engines, the prominent statement: "This engine has a primary intended service application as a _____ heavy-duty diesel-powered engine." (The primary intended service applications are light, medium, and heavy, as defined in 40 CFR 86.085-2.)

xxi. For 1987 and subsequent model year heavy-duty gasoline-powered engines, one of the following prominent statements as applicable:

- (1) For engines certified to the emission standards under 40 CFR 86.087-10(a)(1)(1) the statement: "This engine is certified for use in all heavy-duty vehicles."
- (2) For engines certified under the provisions of 40 CFR 86.087-10(a)(3)(1), the statement, "This engine is certified for use in all heavy-duty vehicles. It is certified to the emission standards applicable to heavy-duty vehicles with a gross vehicle weight rating above 14,000 lbs."
- (3) For engines certified to the emission standards under 40 CFR 86.087-10(a)(1)(11), the statement: "This engine is

certified for use only in heavy-duty vehicles with a gross vehicle weight rating above 14,000 lbs."

Such statements shall not be used on labels placed on vehicles or engines which, in fact, do not comply with all applicable California regulations, including assembly-line test requirements, if any.

- (b) The machine-readable VEC bar code and the machine-readable VIN bar code shall be designed in accordance with ~~SAE~~ SAE standards J1892 (~~MAY/1987~~) and SAE J1877 (~~MAY/1987~~). These labeling requirements shall be applicable to ~~1989/1990~~ and subsequent model-year passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty gasoline-powered trucks. The Executive Officer may, as necessary, specify new character codes for the VEC label (as part of the "ECS Component Combination" table, Section 4.1.3., SAE J1892) to designate new emission control systems ~~and/or~~ components as they are introduced for use in motor vehicles subject to the label requirements.

For label identification, the VEC and VIN labels shall include ~~THE~~ the heading: "VEC LABEL" ~~FOR/VE/VEC LABEL~~, and "VIN LABEL" respectively, above the bar coded information, ~~FOR/VE/VIN/LABEL~~ If the VEC or VIN label is incorporated as part of the tune-up label and the federal certification label required pursuant to the Federal Motor Vehicle Safety Regulation No. 567, respectively, no heading shall be required. The heading shall be printed in block letters in the English language and printed pursuant to Section 5 of these procedures.

THE/VRC/MACHINE/READABLE/BAR/CODES/MAY/BE/INCORPORATED/ON/THE
 REQUIRED/TUNE-UP/LABEL//HOWEVER//IT/A/SEPARATE/LABEL/IS/USED
 FOR/THE/VRC/MACHINE/READABLE/BAR/CODES//IT/SHALL/BE/LOCATED//IN
 AN/UNDERTHOOD/LOCATION/AS/PREScribed//IN/SECTION/D/

- v4-(c) The tune-up label shall include a vacuum hose routing diagram label showing all emissions-related and emissions-critical parts that are actuated by vacuum and the correct routing of vacuum hoses shall be required if one or more vacuum hoses are employed. This diagram shall contain no more than two different vacuum hose routing patterns; however, if there are two routings on a single diagram each routing must be easily understandable. The hose diagram may be separated from the "Emission-Control-Information" tune-up label provided that the vacuum hose diagram is placed in a visible and accessible position as provided in SECTION/D this section. If a separate label is used, it shall of a permanent type; however the destruction limits provision in SECTION/D this section do not apply.

4. The provisions of these specifications shall not prevent a manufacturer from also reciting on the label that such vehicle or engine conforms to any applicable federal emission standards for new motor vehicles or new motor vehicle engines or any other information that such manufacturer deems necessary for, or useful to, the proper operation and satisfactory maintenance of the vehicle or engine.
5. As used in these specifications, readily visible to the average person shall mean that the label shall be readable from a distance of eighteen

inches (46 centimeters) without any obstructions from vehicle or engine parts (including all manufacturer available optional equipment) except for flexible parts (e.g., vacuum hoses, ignition wires) that can be moved out of the way without disconnection. Alternatively, information required by these specifications to be printed on the label shall be no smaller than 8 point type size provided that no vehicle or engine parts, (including all manufacturer available optional equipment), except for flexible parts, obstruct the label. For the VEC and VIN labels, sufficient clearance shall be provided to use a non-contact bar-code reading wand.

6. For the tune-up label and vacuum hose routing diagram label, the labels and any adhesives used shall be designed to withstand for the vehicle's total expected life, typical vehicle environmental conditions in the area where the label is attached. Typical vehicle environmental conditions shall include, but are not limited to, exposure to engine lubricants and coolants (e.g. gasoline, motor oil, brake fluids, water, ethylene glycol), underhood temperatures, steam cleaning, and paints or paint solvents. The manufacturer shall submit, with its certification application, a statement attesting that its labels comply with this requirement.

For the VEC and VIN machine-readable labels, the applicable functional test specifications are contained in ~~SAE~~ SAE standards J1892 and J1877.

7. The manufacturer shall obtain approval from the Executive Officer for all label formats and locations prior to use. Approval of the specific tune-up settings is not required; however, the format for all such settings and tolerances, if any, is subject to review. If the Executive Officer finds that the information on the label is vague or subject to

misinterpretation, or that the location does not comply with these specifications, he or she may require that the label or its location be modified accordingly.

8. Samples of all actual production labels used within an engine family shall be submitted to the Executive Officer within thirty days after the start of production.
9. ~~(a) The Executive Officer may, upon request, waive or modify any part of the requirements of these specifications for the 1979 model year if a vehicle or engine manufacturer does not have adequate lead time to comply with the aforementioned requirements.~~
(b) The Executive Officer may approve alternate label locations or may, upon request, waive or modify the label content requirements provided that the intent of these specifications are is met.
10. If the Executive Officer finds any motor vehicle or motor vehicle engine manufacturer using labels which are different from those approved or which do not substantially comply with the readability or durability requirements set forth in these specifications, the Executive Officer may invoke Section 2109, Article 2, Subchapter 2, Chapter 3, Title 13, California Administrative Code.

State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : August 24, 1988

Subject : Filing of Notice of
Decisions of the Air
Resources Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

ATTACHMENTS

87-30
87-62
87-82
87-83
87-90
87-91
87-92
87-95
88-9
88-41

State of California
AIR RESOURCES BOARD

Resolution 87-84

September 10, 1987

Agenda Item No.: 87-12-3

WHEREAS, the Air Resources Board (Board) and/or the federal Environmental Protection Agency have adopted ambient air quality standards for ozone (oxidant), nitrogen dioxide, particulate matter, and visibility, and these standards are exceeded in the State's air basins;

WHEREAS, Health and Safety Code Sections 39003, 39500, 39602, and 41500 authorize the Board to coordinate, encourage, and review efforts to attain and maintain state and national ambient air quality standards;

WHEREAS, Health and Safety Code Sections 39600 and 39605 authorize the Board to act as may be necessary to execute the powers and duties granted to and imposed upon the Board and to assist the local air pollution control districts;

WHEREAS, the statewide Technical Review Group for Suggested Control Measure Development (TRG) has approved a proposed Suggested Control Measure for the Control of Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (the "Suggested Control Measure") and has forwarded the Suggested Control Measure to the Board for consideration;

WHEREAS, at least one district is considering the control of oxides of nitrogen emissions from industrial boilers and steam generators as an air quality improvement strategy;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as proposed if feasible alternatives or mitigation measures are available;

WHEREAS, the Board has held a duly noticed public meeting to consider approval of the Suggested Control Measure and has heard and considered the -

comments presented by representatives of the Board, TRG, districts, affected industries, and other interested persons and agencies; and

WHEREAS, the Board finds:

That emissions of oxides of nitrogen from boilers, steam generators, and process heaters contribute to ambient concentrations of ozone, oxidant, nitrogen dioxide, sub-10 micron particulate matter (PM₁₀), and visibility reducing particles, and that those concentrations frequently exceed ambient air quality standards in several air basins;

That emissions of oxides of nitrogen from boilers, steam generators, and process heaters contribute to wet and dry acid deposition;

That the South Coast Air Quality Management District's air quality management plan for the South Coast Air Basin has identified the control of oxides of nitrogen emissions from industrial boilers and steam generators as a cost-effective measure necessary to achieve the state nitrogen dioxide standard, and that other districts may find that the control of oxides of nitrogen emissions from boilers, steam generators, and process heaters is needed to achieve compliance with the ambient air quality standards;

That it is technically feasible and economically reasonable to reduce oxides of nitrogen emissions from industrial, institutional, and commercial boilers, steam generators, and process heaters and that it is reasonable to require that these combustion units operate at conditions that optimize combustion efficiency and minimize emissions;

That implementation of the Suggested Control Measure would reduce oxides of nitrogen emissions from industrial, institutional, and commercial boilers, steam generators, and process heaters by approximately 40 to 45 percent with an average cost-effectiveness of about \$1.00 to \$3.00 per pound of oxides of nitrogen removed; and

That there is the potential for minor increases in CO and particulate emissions with the use of some NOx emission control technologies which may be used to comply with the SCM which can be prevented or minimized by proper operation of the control equipment;

That there is the potential for local ozone increases, in the vicinity of the NOx sources to be controlled, which varies from location-to-location throughout the state and will have to be weighed by the local districts individually when considering implementation of the SCM;

That no feasible mitigation measures or alternatives have been identified which would substantially reduce any of the potential adverse impacts and that the significant health benefit resulting from the decrease in NOx emissions and concomitant decreases in nitrogen dioxide, particulate matter, visibility reducing particles, and ozone, far outweighs the potential adverse impacts;

That the severe air quality problems in the South Coast Air Basin necessitate extraordinary measures to reduce emissions of the pollutants, including oxides of nitrogen, that contribute to those problems;

NOW, THEREFORE, BE IT RESOLVED that the Board approves the Suggested Control Measure for the control of emissions of oxides of nitrogen from industrial, institutional, and commercial boilers, steam generators, and process heaters, as set forth in Attachment A to this resolution.

BE IT FURTHER RESOLVED that the Executive Officer is directed to forward the Suggested Control Measure to air pollution control and air quality management districts with the recommendation that they consider adopting the measure or a similar measure to the extent that such districts need further reductions in emissions of oxides of nitrogen to attain or maintain ambient air quality standards.

BE IT FURTHER RESOLVED that the Executive Officer is directed to provide assistance to any district requesting assistance in adopting, interpreting, or implementing the Suggested Control Measure.

BE IT FURTHER RESOLVED that the Board recommends that districts with severe air quality problems such as the South Coast Air Quality Management District, in their development of a regulation to control oxides of nitrogen emissions from boilers, process heaters, and steam generators, consider the application of selective catalytic reduction or other advanced control technology to reduce emissions to a greater extent than would be reduced by implementation of the Suggested Control Measure.

I hereby certify that the above is a true and correct copy of the Resolution 87-84, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 87-86
October 8, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1549-135, entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Purposes," has been submitted by the University of California, Riverside;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

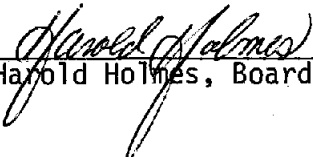
Proposal Number 1549-135, entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Purposes," submitted by the University of California, Riverside, for a total amount not to exceed \$37,454.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1549-135, entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Purposes," submitted by the University of California, Riverside, for a total amount not to exceed \$37,454.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$37,454.

I hereby certify that the above is a true and correct copy of Resolution 87-86, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-13-3(b) 1
DATE: October 8, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1549-135 entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Purposes."

RECOMMENDATION: Adopt Resolution 87-86 approving Proposal No. 1549-135 for funding in an amount not to exceed \$37,454.

SUMMARY: In order to foster research on the effects of air pollution on California vegetation, ARB contracted with the University of California, Riverside to build, operate, and maintain an open-top air pollution exposure facility for plant study. For the past several years, the facility has been in almost continuous use by ARB researchers (see, for example, the following item herein). Since its original construction the facility has been expanded to include additional chambers and capabilities for humidification and for acidic fog treatment. The current proposal would continue the operation, maintenance, and upgrading of the chamber facility for one year.

The activities for which the contractor would be responsible include: maintain and repair as needed the plant exposure chambers which have been built with ARB funds; ensure proper operation and periodic calibration of pollutant dispensing equipment, monitoring equipment, and automated data collection systems; perform necessary weed control and soil preparation between experiments; provide instruction, supervision, and day-to-day assistance to facility users; arrange pollutant delivery and sampling systems in accordance with user needs; and maintain necessary facilities that are shared by persons using the site.

It is necessary to retain persons with technical expertise to operate and maintain the ARB fumigation facility for plant scientists unfamiliar with its use. This ensures that maintenance and exposures are uniformly and correctly performed and the funds committed to experimental work in the chambers are most efficiently spent.

B U D G E T S U M M A R Y

University of California, Riverside

"Maintain and Operate California Air Resources Board
Field Fumigation Facility for Experimental Purposes"

BUDGET ITEMS:

Salaries	\$14,496
Benefits	4,146
Supplies*	11,500
Equipment	3,250
Other Costs	<u>657</u>

TOTAL, Direct Costs	\$34,049
TOTAL, Indirect Costs	<u>3,405</u>

TOTAL PROJECT COST \$37,454
=====

*Supplies:

Plastic coverings for 20 chambers	\$3,000
Dust Filters	3,000
Mist Bed Heating Coils	500
Analyzer Overhauls and Repair	3,000
Gases, fertilizers, pots, misc. supplies	2,000

State of California
AIR RESOURCES BOARD

Resolution 87-87
October 8, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1552-135R, entitled "Mechanistic Basis for the Growth and Yield Effects of Ambient Ozone on Valencia Oranges (*Citrus sinensis*)," has been submitted by the University of California, Riverside, to the Air Resources Board; and

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

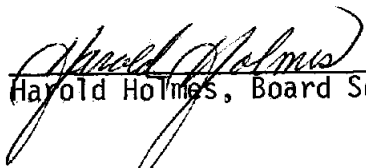
Proposal Number 1552-135R, entitled "Mechanistic Basis for the Growth and Yield Effects of Ambient Ozone on Valencia Oranges (*Citrus sinensis*)," submitted by the University of California, Riverside, for a total amount not to exceed \$58,308.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1552-135R, entitled "Mechanistic Basis for the Growth and Yield Effects of Ambient Ozone on Valencia Oranges (*Citrus sinensis*)," submitted by the University of California, Riverside, for a total amount not to exceed \$58,308.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$58,308.

I hereby certify that the above is a true and correct copy of Resolution 87-87, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-13-3(b) 2
DATE: October 8, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1552-135R entitled "Mechanistic Basis for the Growth and Yield Effects of Ambient Oxidants of Valencia Oranges (Citrus Sinensis)."

RECOMMENDATION: Adopt Resolution 87-87 approving Proposal No. 1552-135R for funding in an amount not to exceed \$58,308.

SUMMARY: In 1983, ARB funded a multi-year study to determine the effects of photochemical oxidants or sulfur dioxide on oranges. Forty-two two-year-old Valencia orange trees were planted at the Statewide Air Pollution Research Center. Large clear plastic chambers were erected over the trees. Air pollutant exposures, physiological and growth measurements, and environmental monitoring began in May of 1984. The investigator harvested the first crop in 1986 and a second crop in 1987. Exposure to ambient oxidants caused a yield loss, compared to exposure to filtered air. Sulfur dioxide at a concentration of 0.10 ppm in filtered air also caused a yield reduction.

This proposal would extend all current activities except sulfur dioxide exposure through the summer of 1988 so that a third crop could be harvested. The investigator would continue environmental monitoring to determine if environmental differences between the chambers and outside environments may affect plant response. The investigator would have to make physiological and growth measurements, determine fruit yield and quality, and collect and analyze leaves for starch content.

Yield information from a third harvest is important for two reasons. First, it would improve the reliability of the ozone dose - yield response equation developed from this study. Yields of perennial crops vary from year to year, and experience with grapes has shown that several years of harvest data are needed to take this variability into account. Second, the additional harvest would determine whether the differences between plants in

State of California
AIR RESOURCES BOARD

Resolution 87-88
October 8, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an unsolicited research proposal, Number 1551-135R, entitled "Field Assessment of the Effects of Ambient Ozone on Cotton (*Gossypium hirsutum*) in the San Joaquin Valley," has been submitted by the University of California, Riverside, to the Air Resources Board;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

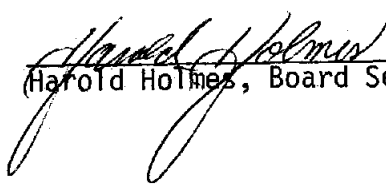
Proposal Number 1551-135R, entitled "Field Assessment of the Effects of Ambient Ozone on Cotton (*Gossypium hirsutum*) in the San Joaquin Valley," submitted by the University of California, Riverside, for a total amount not to exceed \$188,218.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1551-135R, entitled "Field Assessment of the Effects of Ambient Ozone on Cotton (*Gossypium hirsutum*) in the San Joaquin Valley," submitted by the University of California, Riverside, for a total amount not to exceed \$188,218.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$188,218.

I hereby certify that the above is a true and correct copy of Resolution 87-88, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-13-3(b) 3
DATE: October 8, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1551-135R entitled "Field Assessment of the Effects of Ambient Ozone on Cotton (Gossypium hirsutum) in the San Joaquin Valley"

RECOMMENDATION: Adopt Resolution 87-88 approving Proposal No. 1551-135R for funding in an amount not to exceed \$188,218.

SUMMARY: This study addresses two problems in estimating yield losses in crops due to ozone exposure: whether or not losses actually occur in the field at levels predicted by the yield reduction equations obtained in previous experiments; and whether significant errors in the yield loss estimates may result because of differences in ozone sensitivity of crop varieties. Cotton, California's most valuable annual crop, will be the experimental species.

The proposed study would use three different, but coordinated, techniques to address the problems identified above. Under the first approach, test plots of cotton grown in chambers would be established to measure the effects on yield of filtered air compared with ambient air at four widely separated sites with four different levels of ambient oxidants in the San Joaquin Valley. The results will provide yield loss data over a range of ambient oxidant concentrations comparable to previous field chamber research. The second approach would be to establish plots of ozone-sensitive and ozone tolerant cotton varieties in the field at these four locations and several additional locations with no chambers. The results will provide yield loss data associated with different cultivars.

The third approach would be to treat cotton plants with an antioxidant chemical. Research indicates that antioxidant chemicals can protect plants from ozone induced injury or yield loss. The results are expected to show smaller yield losses in the treated plants.

The combined evidence from these three techniques will serve to confirm if estimated yield losses are in fact occurring, and that these estimated losses are not attributable either to "chamber effects" or to some unique characteristic of previous experimental locations. The results will also indicate the range of sensitivity to ozone of important cotton varieties.

The study will take advantage of extensive air quality monitoring in ARB's San Joaquin Valley air quality study, expected to begin next spring, by coordinating the selection of cotton study sites with monitoring sites for the San Joaquin Valley study. The study will be a cooperative one involving county agricultural and private grower participants and the University of California. It will increase the agricultural community's awareness of the effects of air pollution on agriculture and will provide a mechanism for its active participation in the research and data gathering process. Ultimately, this study will provide a firmer scientific foundation for setting ambient air quality standards to protect crops and native vegetation.

The contractor will be the University of California, Riverside, and the principal investigator will be Dr. David M. Olszyk.

B U D G E T S U M M A R Y

University of California, Riverside

"Field Assessment of the Effects of Ambient Ozone on
Cotton (*Gossypium hirsutum*) In the San Joaquin Valley"

BUDGET ITEMS:

Salaries	\$78,291
Benefits	23,278
Supplies	6,200
Equipment	24,608
Other Costs	26,515
Travel	14,452
Equipment *	24,608

TOTAL, Direct Costs	\$173,344
TOTAL, Indirect Costs	<u>14,874</u>

TOTAL PROJECT COST \$188,218

* Fabrication of six open top field chambers	\$ 6,000
3 Dasibi Ozone Analyzers	12,900
3 Sultec Recorders	<u>5,708</u>
Total Equipment	\$24,608

State of California
AIR RESOURCES BOARD

Resolution 87-89
October 8, 1987

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, a solicited research proposal, Number 1448-129R, entitled "Southern California Air Quality Study - Fall Study," has been submitted by the California Public Health Foundation;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

Proposal Number 1448-129R, entitled "Southern California Air Quality Study - Fall Study," submitted by the California Public Health Foundation, for a total amount not to exceed \$44,677.

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1448-129R, entitled "Southern California Air Quality Study - Fall Study," submitted by the California Public Health Foundation for a total amount not to exceed \$44,677.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$44,677.

I hereby certify that the above is a true and correct copy of Resolution 87-89, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-13-3(b) 4
DATE: October 8, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Research Proposal No. 1448-129R entitled
"Southern California Air Quality Study - Fall Study."
- RECOMMENDATION: Adopt Resolution 87-89 approving Proposal No. 1448-129R
for funding in an amount not to exceed
\$44,677.
- SUMMARY: The objective of this project is to support the
Department of Health Services' participation in the fall
portion of the Southern California Air Quality Study
(SCAQS). Inasmuch as much of the fall effort will be
devoted toward the study of nitrogen oxides, the
principal investigator will measure nitrogen dioxide by
the standard chemiluminescence monitoring technique in a
variety of experimental configurations. This task will
allow an assessment of the accuracy of routine monitoring
methods for nitrogen dioxide.
- The second task of the study is to measure nitric,
nitrous and hydrochloric acids and ammonia with the
annular denuder technique, in order to evaluate the
accuracy of the SCAQS sampler for these species.
- The objectives outlined in this proposal will help ensure
that the general SCAQS objectives are met. The principal
investigator for the project will be Dr. Bruce Appel.

State of California
AIR RESOURCES BOARD

Resolution 87-90

November 13, 1987

Agenda Item: 87-15-3

WHEREAS, Section 39601 of the Health and Safety Code authorizes the Air Resources Board ("Board") to adopt standards, rules, and regulations necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, Section 39607(d) of the Health and Safety Code requires the Board to adopt test procedures to measure compliance with its nonvehicular emission standards and those of the air pollution control and air quality management districts ("districts");

WHEREAS, in the past the Board has adopted into Title 17, California Administrative Code, Sections 94100-94137, which establish 37 test methods for determining whether a nonvehicular (stationary) source is in compliance with the district emission standards;

WHEREAS, the Board's staff has now developed three new test methods for gathering emissions data and determining compliance with district nonvehicular emission standards;

WHEREAS, the new test methods have been thoroughly evaluated by the Board's staff;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as proposed if feasible alternatives or mitigation measures are available which would substantially reduce such adverse impacts;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of the Administrative Procedure Act (Government Code, Title 2, Division 3, Part 1, Chapter 3.5); and

WHEREAS, the Board finds that:

Adoption of the three new test methods set forth in Attachment B, and adoption of the regulations set forth in Attachment A incorporating the test methods, are necessary and appropriate to satisfy the requirements of Section 39607(d) of the Health and Safety Code and may simplify the identification, adoption and enforcement of nonvehicular emission standards; and

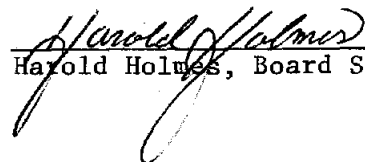
The adoption of the test methods and regulations set forth in Attachments A and B will have no significant adverse environmental impacts.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves the adoption of Sections 94138 through 94140, Title 17, California Administrative Code, as set forth in Attachment A hereto.

BE IT FURTHER RESOLVED that the Board hereby approves the three new test methods for determining compliance with district nonvehicular emission standards set forth in Attachment B.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt the regulatory changes set forth in Attachments A and B, after making them available to the public for a period of 15 days, and with such minor modifications as may be appropriate in light of written comments submitted during this period, provided that the Executive Officer shall present the regulations to the Board for further consideration if he determines that this is warranted in light of the written comments received.

I hereby certify that the above is a true and correct copy of Resolution 87-90, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Public Hearing to Consider Adoption of Regulations
Regarding Test Methods for Determining Emissions from
Nonvehicular Sources

Agenda Item No.: 87-15-3

Public Hearing Date: November 13, 1987

Response Date: December 29, 1987

Issuing Authority: Air Resources Board

Comment: No comments were received identifying any significant
environmental issues pertaining to this item. The
staff report identified no adverse environmental
effects.

Response: N/A

Certified: _____

Ray Allison
Board Secretary

Date: _____

3/21/89

State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : August 24, 1988

Subject : Filing of Notice of
Decisions of the Air
Resources Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

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State of California
AIR RESOURCES BOARD

Resolution 87-91

November 12, 1987

Agenda Item No.: 87-14-1

WHEREAS, Sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the "Board") to do such acts and to adopt such regulations as may be necessary for the proper execution of the powers and duties granted to, and imposed upon, the Board by law;

WHEREAS, Chapter 3.5 (commencing with Section 39650) of Part 2 of Division 26 of the Health and Safety Code establishes procedures for the identification of toxic air contaminants by the Board;

WHEREAS, Section 39655 of the Health and Safety Code defines a "toxic air contaminant" as an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health;

WHEREAS, Section 39662 of the Health and Safety Code directs the Board to list, by regulation, substances determined to be toxic air contaminants, and to specify for each substance listed a threshold exposure level, if any, below which no significant adverse health effects are anticipated;

WHEREAS, in California, ethylene oxide (1,2-epoxyethane, hereinafter "ethylene oxide") is emitted from many activities including sterilization of medical products, fumigation of spices, production of surfactants, and distribution of ethylene oxide;

WHEREAS, ethylene oxide will not break down in the atmosphere at a rate that would significantly reduce the resulting public exposure;

WHEREAS, pursuant to the request of the Board, the Department of Health Services (DHS) evaluated the health effects of ethylene oxide in accordance with Section 39660 of the Health and Safety Code;

WHEREAS, DHS concluded in its evaluation that ethylene oxide is an animal carcinogen and a probable human carcinogen; that health effects other than cancer are not expected to occur at current ambient levels of ethylene oxide; and that the maximum excess lifetime cancer risk from ethylene oxide exposure is estimated to range from 61 to 88 cases per million people exposed per 0.56 parts per billion (1 microgram per cubic meter);

WHEREAS, because there is compelling evidence of genotoxicity for ethylene oxide and there is experimental evidence for ethylene oxide acting as an initiator of tumorigenesis, DHS considers ethylene oxide-induced carcinogenesis to be a nonthreshold phenomenon;

WHEREAS, upon receipt of the DHS evaluation, staff of the Board prepared a report including and in consideration of the DHS evaluation and recommendations and in the form required by Section 39661 of the Health and Safety Code and, in accordance with the provisions of that section, made the report available to the public and submitted it for review to the Scientific Review Panel (SRP) established pursuant to Section 39670 of the Health and Safety Code;

WHEREAS, in accordance with Section 39661 of the Health and Safety Code, the SRP reviewed the staff report, including the scientific procedures and methods used to support the data in the report, the data itself, and the conclusions and assessments on which the report was based, considered the public comments received regarding the report, and on July 7, 1987, adopted for submittal to the Board findings which included the following:

- "1. Ethylene oxide has been identified as an animal carcinogen and should be regarded as a potential human carcinogen.
2. Ethylene oxide is emitted into the air by a variety of stationary sources in California. Dispersion modeling of emissions from all known sources within an area of Los Angeles County indicates that nearly 7 million people were exposed to an estimated population-weighted annual mean concentration of 50 parts per trillion (ppt) (0.09 ug/m^3) of ethylene oxide in 1985. The maximum annual average concentration to which people were exposed was estimated to be 20,000 ppt (36 ug/m^3) near a large commercial emission source.
3. Based solely on its gas-phase reactivity, ethylene oxide has an atmospheric lifetime of approximately 200 days. Although possible reaction in solution or on surfaces could shorten this lifetime, based on available scientific evidence, ethylene oxide would still have an atmospheric lifetime of days to weeks.
4. Adverse health effects other than cancer are not known to occur at predicted concentrations of ethylene oxide in ambient outdoor air.
5. Based on available scientific information, an ethylene oxide exposure level below which carcinogenic effects are not expected to occur cannot be identified.

6. Based on an interpretation of available scientific evidence by DHS staff, the range of lifetime excess cancer risk from exposure to 0.56 ppb (1 ug/m³) of atmospheric ethylene oxide based on the best animal estimate of risk and the upper 95% confidence limit is estimated to be 61 to 88 cases per million people exposed. These upper bound excess lifetime risks are health-protective estimates; the actual risk is likely to be below these values."

WHEREAS, the SRP found the ARB and DHS staff reports to be without serious deficiency, and the SRP agreed with the ARB staff recommendation that ethylene oxide be listed by the Air Resources Board as a toxic air contaminant, and found that based on available scientific information, an ethylene oxide exposure level below which carcinogenic effects are not expected to occur cannot be identified;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of the Government Code;

WHEREAS, in consideration of the staff report, including DHS' evaluation and recommendations, the available evidence, the findings of the SRP, and the written comments and public testimony it has received, the Board finds that:

Ethylene oxide is an animal carcinogen and a probable human carcinogen;

Health effects other than cancer are not anticipated at existing ethylene oxide exposure levels in ambient outdoor air;

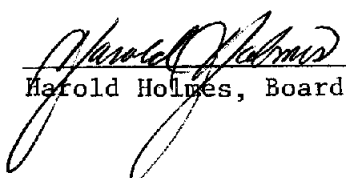
There is not sufficient available scientific evidence to support the identification of a threshold exposure level for ethylene oxide; and

Ethylene oxide is an air pollutant which, because of its carcinogenicity, may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health; and

WHEREAS, the Board has determined, pursuant to the requirements of the California Environmental Quality Act and Board regulations, that this regulatory action will have no significant adverse impact on the environment.

NOW, THEREFORE BE IT RESOLVED, that the Board adopts the proposed regulatory amendment to Section 93000, Titles 17 and 26, California Administrative Code, as set forth in Attachment A.

I hereby certify that the above is a true and correct copy of Resolution 87-91, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Notice of Public Hearing to Consider the Adoption of a
Regulatory Amendment Identifying Ethylene Oxide as a Toxic
Air Contaminant

Agenda Item No.: 87-14-1

Public Hearing Date: November 12, 1987

Response Date: N/A

Issuing Authority: Air Resources Board

Comment: No comments were received identifying any significant
environmental issues pertaining to this item. The
staff report identified no adverse environmental
effects.

Response: N/A

Certified: _____

Lowy Alkerson
Board Secretary

Date: _____

6/17/88

Attachment A

Amend Titles 17 and 26, California Administrative Code, Section 93000 to read as follows:

93000. Substances Identified As Toxic Air Contaminants. Each substance identified in this section has been determined by the state board to be a toxic air contaminant as defined in Health and Safety Code Section 39655. If the state board has found there to be a threshold exposure level below which no significant adverse health effects are anticipated from exposure to the identified substance, that level is specified as the threshold determination. If the board has found there to be no threshold exposure level below which no significant adverse health effects are anticipated from exposure to the identified substance, a determination of "no threshold" is specified. If the board has found that there is not sufficient available scientific evidence to support the identification of a threshold exposure level, the "Threshold" column specifies "None identified."

<u>Substance</u>	<u>Threshold Determination</u>
Benzene (C ₆ H ₆)	None identified
Ethylene Dibromide (BrCH ₂ CH ₂ Br; 1,2-dibromoethane)	None identified
Ethylene Dichloride (ClCH ₂ CH ₂ Cl; 1,2-dichloroethane)	None identified
Hexavalent Chromium (Cr(VI))	None identified
Asbestos [asbestiform varieties of serpentine (chrysotile) riebeckite (crocidolite) cummingtonite-grunerite (amosite), tremolite, actinolite, and anthophyllite]	None identified
Dibenzo-p-dioxins and Dibenzofurans chlorinated in the 2,3,7 and 8 positions and containing 4,5,6 or 7 chlorine atoms	None identified
Cadmium (metallic cadmium and cadmium compounds)	None identified
Carbon tetrachloride* (CCl ₄ ; tetrachloromethane)	None identified
<u>Ethylene oxide</u> <u>(1,2-epoxyethane)</u>	<u>None identified</u>

State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : August 24, 1988

Subject : Filing of Notice of
Decisions of the Air
Resources Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

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State of California
AIR RESOURCES BOARD

Resolution 87-92

November 12, 1987

Agenda Item No. : 87-14-2

WHEREAS, Health and Safety Code Sections 39600 and 39601 require the Air Resources Board (the "Board") to adopt rules and regulations necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, Health and Safety Code Section 39606(b) requires the Board to adopt standards of ambient air quality in consideration of the public health, safety and welfare, including but not limited to health, illness, irritation to the senses, aesthetic value, interference with visibility, and effects on the economy;

WHEREAS, Health and Safety Code Section 39606(b) provides that standards relating to health effects shall be based upon the recommendation of the State Department of Health Services;

WHEREAS, the Board periodically reviews existing state ambient air quality standards to ensure that they reflect current scientific knowledge;

WHEREAS, the existing state ambient air quality standard for oxidant (as ozone) of 0.10 parts per million (ppm) (not to be equalled or exceeded), averaged over one hour, was adopted in 1974 and is based upon evidence of aggravation of respiratory disease in humans;

WHEREAS, pursuant to Sections 108 and 109 of the federal Clean Air Act, the Environmental Protection Agency has adopted national ambient air quality standards for ozone based on health and welfare effects; both the primary standard (health protection) and the secondary standard (welfare protection) are 0.12 ppm (not to be exceeded), averaged over one hour;

WHEREAS, the Board has received and considered a recommendation from the Department of Health Services dated September 18, 1987 to replace the existing state ambient air quality standard for oxidant with an ambient air quality standard for ozone of 0.08 ppm (not to be exceeded), averaged over one hour;

WHEREAS, it is Board policy, when reviewing an ambient air quality standard, to revise the definition of compliance with the standard such that the standard is violated when concentrations "exceed" rather than "equal or

exceed" the level of the standard; under this revised definition, the existing 0.10 ppm standard would be approximately equivalent to a 0.09 ppm standard;

WHEREAS, the Board has received and considered a substantial body of evidence both written and oral, presented to it by staff, the Department of Health Services, other scientists, industry representatives, and other members of the public relating to the proposed amendment of the standard;

WHEREAS, the California Environmental Quality Act and Board regulations require that action not be taken as proposed if feasible mitigation measures or alternatives exist which would substantially reduce or avoid any significant adverse environmental effects of the proposed action;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of the Government Code;

WHEREAS, the Board finds that:

Information from controlled human exposure studies, epidemiological studies and animal exposure studies indicates that an ozone standard is necessary to protect public health and that the principal harmful effects of ozone exposure to humans are to the respiratory tract and include pulmonary function decrements and localized lung edema;

An ozone concentration level of 0.12 ppm is the lowest observed level of effects to humans, based upon controlled laboratory studies of short-term exposures;

In view of the uncertainties in scientific knowledge which exist as to the precise level at which adverse human health effects occur, a margin of safety is necessary and appropriate to protect the public health;

The Department of Health Services cited epidemiological studies which suggest a relationship between adverse effects and peak ozone concentrations in a range of concentrations that included 0.10 ppm and below for one hour, and animal studies which found decreased disease resistance in mice at levels down to 0.08 ppm. Additional animal studies cited by the Department of Health Services have found significant biochemical and cellular alterations in the respiratory tract from short and long-term ozone exposures in a range including 0.10 ppm and below that, while observed in animals, are suggestive of adverse health effects in both normal and sensitive individuals. However, the epidemiological studies were susceptible to influence by pollutants other than ozone and by other environmental variables, and the animal studies do not necessarily provide direct quantitative concentrations for similar effects in humans;

Based on the Department of Health Services recommendation and in consideration of all the other evidence presented to the Board, an ozone standard of 0.09 ppm (not to be exceeded), averaged over one hour, is necessary and includes an adequate margin of safety to

prevent substantial risk of harm to human health as a result of short-term exposures and to provide protection against probable effects of long-term exposures;

Information from crop loss assessment and economic analysis indicates that an ozone standard of 0.09 ppm (not to be exceeded), averaged over one hour, serves to provide an acceptable limit on injury and yield loss in important crops and consequently limit economic loss to growers and consumers as well as a limit on injury and damage to forests, native plant communities and ornamental plants and damage to materials;

Although other photochemical oxidants can cause harm to human health and vegetation, since the available evidence indicates that ozone is primarily responsible for adverse health and vegetation effects in California and ozone is currently measured to indicate compliance with the oxidant standard, the oxidant (as ozone) standard should be changed to an ozone standard;

WHEREAS, the Board further finds that amendment of the regulations set forth in Attachment A will not have a significant adverse environmental impact;

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves the amendments of Sections 70100 and 70200, Title 17, California Administrative Code, as set forth in Attachment A;

BE IT FURTHER RESOLVED, that the Board directs the Executive Officer to adopt the regulatory changes set forth in Attachment A, after making them available to the public for a period of 15 days, and with such minor modifications as may be appropriate in light of written comments submitted during this period, provided that the Executive Officer shall present the regulations to the Board for further consideration if he determines that this is warranted in light of the written comments received.

BE IT FURTHER RESOLVED that, in determining what control strategies and measures are necessary to attain and maintain the one-hour ozone standard, local districts may, in consultation with the Board, take into account whether an exceedance of the standard is caused by a rare and localized meteorological event such as an atmospheric intrusion of stratospheric ozone that may be anticipated to occur only at long intervals. Districts shall not be required to adopt generally applicable control measures to address an exceedance which is caused by such exceptional circumstances.

I hereby certify that the above is a true and correct copy of Resolution 87-92, as adopted by the Air Resources Board.


Cary Allison, Board Secretary

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Public Hearing to Consider Amendment to Regulations
Regarding the State Ambient Air Quality Standard for Oxidant

Agenda Item No.: 87-14-2

Public Hearing Date: November 12, 1987

Response Date: N/A

Issuing Authority: Air Resources Board

Comment: No comments were received identifying any significant
environmental issues pertaining to this item. The staff report
identified no adverse environmental effects.

Response: N/A

Certified: _____
Board Secretary

Ray DeWain

Date: _____
5/17/88

State of California

MEMORANDUM

To : Gordon Van Vleck
Secretary
Resources Agency

Date : August 24, 1988

Subject : Filing of Notice of
Decisions of the Air
Resources Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

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State of California
AIR RESOURCES BOARD

Resolution 87-93

November 13, 1987

WHEREAS, Harold Holmes has diligently and enthusiastically served as Board Secretary to the Air Resources Board from January 1982 through November 1987; and

WHEREAS, Harold has helped immeasurably to guide the members of both the Air Resources Board and the Scientific Review Panel through the vast administrative maze which underlies all official actions; and

WHEREAS, Harold's extensive knowledge of ARB programs and their historical and documentary underpinnings has helped staff researching current issues; and

WHEREAS, he has been called upon for speeches, letters, and memoranda highlighting key ARB programs and policies, enlightening Board members, ARB staff, and numerous constituencies interested in ARB activities; and

WHEREAS, his Guidebook on Gray Market Vehicles is a compendious and intelligible reference for those involved in this complex regulatory area and has aided the enforcement efforts of the ARB and other agencies; and

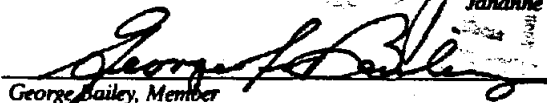
WHEREAS, Harold is a pleasure to work with, and his energy, good humor, and unfailing willingness to help have brightened Board meetings and endeared him to one and all; and

WHEREAS, Harold is leaving his position as Board Secretary to serve as Air Pollution Specialist with the New Source Analysis Section.

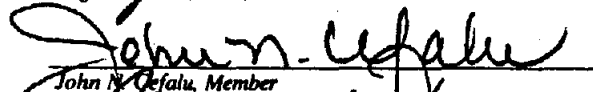
NOW, THEREFORE, BE IT RESOLVED that Harold will be sorely missed but not forgotten in his previous position and that the ARB expresses its sincere thanks for Harold's unstinting efforts and reassuring presence.

BE IT FURTHER RESOLVED that the Board's reluctance to release Harold as Board Secretary is tempered by the cheering news that he will remain within the ARB and will bring his vitality and enthusiasm to the Board's new source review program.

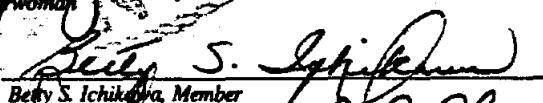

Jananne Sharpless, Chairwoman


George Bailey, Member

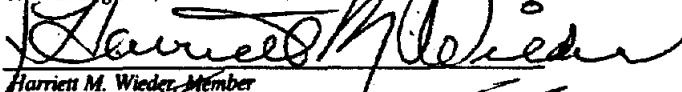

Eugene Boston, M.D., Member



John N. Cefalu, Member


Roberta H. Hughan, Member


Betty S. Ichikawa, Member


John S. Logarias, Member


Harriet M. Wieder, Member


Andrew Wortman, Ph.D., Member

87-94
Missing
Resolution

State of California
AIR RESOURCES BOARD

Resolution 87-95
December 3, 1987

Agenda Item No.: 87-16-2

WHEREAS, Sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the Board) to adopt standards, rules and regulations necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, Sections 43013, 43101, and 43104 of the Health and Safety Code authorize the Board to adopt emission standards and test procedures to control air pollution caused by motor vehicles;

WHEREAS, Section 1956.8, Title 13, California Administrative Code, establishes the California exhaust emission standards and test procedures for 1985 and subsequent model heavy-duty diesel-powered engines and vehicles and for 1987 and subsequent model heavy-duty gasoline-powered engines and vehicles, which are generally aligned with the corresponding federal regulations;

WHEREAS, in 1985 the Environmental Protection Agency (EPA) amended the federal heavy-duty engine and vehicle emission regulations to incorporate nonconformance penalty (NCP) provisions which allow manufacturers with engines that lack the advanced technology necessary to conform with new emission standards to certify some engines for sale when a monetary penalty is paid;

WHEREAS, until this year the Board has lacked the authority to adopt a heavy-duty engine NCP program for California;

WHEREAS, in 1986 the California Legislature enacted Health and Safety Code Section 43103 (Stats 1986, ch. 511; AB 3683) which, effective January 1, 1987, authorizes the Board to adopt an NCP program for those heavy-duty engines for which the Board has adopted emission standards and test procedures that are identical to the corresponding federal ones;

WHEREAS, Section 43103 provides that any California NCP regulations shall be identical to the federal nonconformance requirements, procedures and fees, and the state NCP program shall not be implemented until it is established that payment of NCP fees in California may be substituted for payment of fees to EPA;

WHEREAS, the staff initially proposed amendments to the Board's heavy-duty engine regulations which would incorporate the applicable federal NCP

regulations and make NCPs available in California for the 1988 and subsequent model 1.1 gram per brake horsepower-hour (g/bhp-hr) hydrocarbon (HC) and 14.4.g/bhp-hr carbon monoxide (CO) emission standards for gasoline engines installed in "light" heavy-duty engines up to 14,000 pounds gross vehicle weight rating (GVWR), and for the 1988 through 1990 model year 0.60 g/bhp-hr particulate standard for heavy-duty diesel engines;

WHEREAS, the California Environmental Quality Act and Board regulations require that an action not be adopted as proposed where it will have significant adverse environmental impacts and alternatives or feasible mitigation measures to the proposed action are available which would substantially reduce such impacts;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the California Administrative Procedure Act, Title 2, Division 3, Part 1, Chapter 3.5 (commencing with Section 11340) of the Government Code;

WHEREAS, the Board finds that:

Some heavy-duty engines will likely not comply with the 1988 and subsequent model year California hydrocarbon and carbon monoxide emission standards for gasoline-powered gasoline engines used in 8,500 to 14,000 pound GVWR vehicles;

The amendments approved herein, which make NCPs available only for heavy-duty gasoline engines in California for the 1988 model year, will reduce the substantial economic hardship to secondary vehicle manufacturers which would result from an inability to obtain California-certified 1988 model year gasoline engines;

For the 1989 and subsequent model years, most or all secondary vehicle manufacturers will likely be able to use either originally-planned heavy-duty gasoline engines which are certified to the 1989 California emission standards, or appropriate substitute California certified engines;

NCPs are not necessary in California for the 1988 to 1990 model year 0.60 g/bhp-hr diesel particulate standard because it appears that most heavy-duty diesel engines will be able to comply with the particulate emission standard for those years and there are comparable complying engines available as substitutes;

NCPs are not necessary in California for the 1990 model year 6.0 g/bhp-hr oxides of nitrogen (NOx) heavy-duty diesel emission standard because manufacturers have demonstrated the ability to meet a 6.0 g/bhp-hr NOx standard in the state since 1984;

The amendments approved herein include revisions to the "California Motor Vehicle Tune-Up Label Specifications" to require that tune-up labels include the NCP compliance emission level and a statement that a monetary penalty was paid, and are consistent with the corresponding federal requirements;

The amendments approved herein are consistent with the requirements of Health and Safety Code Section 43103;

The amendments approved herein will likely result in a significant adverse environmental impact, in that emissions are expected to increase by one ton per day (tpd) CO and less than one-twentieth tpd HC statewide by the end of 1990;

The amendments approved herein include partial mitigation measures which reduce the potential adverse emission impact that would otherwise occur, including not allowing NCPs for diesel engines or for gasoline engines in the 1989 and subsequent model years, incorporating the federal NCP provisions which limit the availability and scope of the program, requiring the payment of NCP fees to the Air Pollution Control Fund, which may be used to fund programs which would partially mitigate the adverse emission impacts; there are no other feasible mitigation measures or alternatives available for adoption at the present time which would substantially reduce the remaining adverse impacts while assuring increased model availability;

The need to avoid substantial economic hardship to secondary vehicle manufacturers which would result from an inability to use 1988 model year "light" heavy-duty gasoline engines that cannot be certified to meet the applicable standards, particularly those engines used in recreational vehicles, outweighs the relatively small but significant remaining adverse environmental impact which cannot otherwise presently be mitigated in the program;

The payment of NCP fees by manufacturers should not cause the price of heavy-duty engines and vehicles to increase, since the penalty is intended to be equivalent to the cost of complying with the emission standards;

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves the amendments to Sections 1956.8 and 1965, Title 13, California Administrative Code, and the incorporated "California Exhaust Emission and Test Procedures for 1987 and Subsequent Model Year Heavy-duty Gasoline-Powered Engines and Vehicles," and "California Motor Vehicle Tuneup Label Specifications," as set forth in Attachment A hereto, with changes to make NCPs available only for heavy-duty gasoline engines for the 1988 model year.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt the amendments approved herein, after making them available to the public for a period of 15 days, and with such minor modifications as may be appropriate in light of written comments submitted during this period, provided that the Executive Officer shall present the regulations to the Board for further consideration if he determines that this is warranted in light of the written comments received.

BE IT FURTHER RESOLVED that the Board hereby determines that the amendments approved herein will not cause the California emission standards, in the aggregate, to be less protective of public health and welfare than applicable federal standards, will not cause the California requirements to be inconsistent with Section 202(a) of the Clean Air Act, and raise no new issues affecting previous waiver determinations of the Administrator of the Environmental Protection Agency pursuant to Section 209(b) of the Clean Air Act.

BE IT FURTHER RESOLVED that the Executive Officer shall forward the amended regulations to the Environmental Protection Agency with a request either for confirmation that the amendments are within the scope of an existing waiver or for issuance of a new waiver, pursuant to Section 209(b)(1) of the Clean Air Act.

I hereby certify that the above
is a true and correct copy of
Resolution 87-95, as adopted by
the Air Resources Board.



Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Public Hearing to Consider Amendments to Regulations to Establish a Nonconformance Penalty Program for Heavy-duty Engines and Vehicles

Agenda Item No.: 87-5-2

Public Hearing Date: December 3, 1987

Response Date: January 8, 1988

Issuing Authority: Air Resources Board

Comment: The Staff Report, Final Statement of Reasons, and Resolution 87-95 are incorporated by reference.

The Staff Report identified significant adverse environmental impacts resulting from the amendments initially proposed by staff (See particularly pp. 20-22.) The Staff estimated that the initial proposal would result in a statewide emission increase of less than one tenth ton per day (tpd) of hydrocarbons (HC), 4.6 tpd of carbon monoxide (CO), and less than one tenth tpd of particulate by 1990. To place the emissions in perspective, the 1991 emissions inventory in an April, 1986 Staff Report was estimated to be to be 49 tpd of HC and 1300 tpd of CO for heavy-duty gasoline engines, and 67 tpd of particulate for heavy-duty diesel engines.

The Board received public comments identifying environmental issues pertaining to this item. These comments are summarized and responded to in the Final Statement of Reasons.

Response: In order to reduce the adverse environmental impacts to the extent feasible, The Board modified the original proposal to provide that nonconformance penalties (NCPs) are available only for 1988 model-year heavy-duty gasoline engines. With the limitation to a one year program, emissions are expected to increase by less than one-twentieth tpd

State of California

M E M O R A N D U M

To : Gordon Van Vleck
Secretary
Resources Agency

Date : August 24, 1988

Subject : Filing of Notice of
Decisions of the Air
Resources Board


Cary Allison
Board Secretary

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under Section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decisions and response to environmental comments raised during the comment period.

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