

State of California
AIR RESOURCES BOARD

Resolution 84-21
May 24, 1984

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;

WHEREAS, a solicited research proposal, Number 1261-107, entitled "Development of Analytical Methods for Ambient Monitoring and Source Testing for Toxic Organic Compounds," has been submitted by the Southern Research Institute to the Air Resources Board; and

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

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


Proposal Number 1261-107 entitled "Development of Analytical Methods for Ambient Monitoring and Source Testing for Toxic Organic Compounds," submitted by the Southern Research Institute for a total amount not to exceed \$263,675.

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 1261-107 entitled "Development of Analytical Methods for Ambient Monitoring and Source Testing for Toxic Organic Compounds," submitted by the Southern Research Institute for a total amount not to exceed \$263,675.

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 \$263,675.

I hereby certify that the above is a true and correct copy of Resolution 84-21 as adopted by the Air Resource Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(1)
DATE: May 24, 1984

- ITEM: Research Proposal No. 1261-107, entitled "Development of Analytical Methods for Ambient Monitoring and Source Testing for Toxic Organic Compounds."
- RECOMMENDATION: Adopt Resolution 84-21 approving Research Proposal No. 1261-107, for funding in an amount not to exceed \$263,675.
- SUMMARY: This proposed project is a part of the Board's program to identify and control toxic pollutants as required under the Health and Safety Code. The Stationary Source and Research Divisions have compiled a list of potential toxic air contaminants classified according to: degree of risk, amount of emissions, persistence in the atmosphere and ambient concentrations. For most of these compounds available air quality measurements are very limited. For a number of these compounds, improved sampling and analytical procedures are needed to measure ambient concentrations in the range of parts per billion or parts per trillion.
- The objectives of this research project are to review published literature on the state of the art of sampling and analytical techniques for certain toxic air pollutants; to identify areas of deficiency; to recommend preferred methods and techniques, including those which may require further development; and to develop and document these methods.
- This project is proposed in accordance with the Board's stated priority for air pollution research into potentially hazardous and toxic air pollutants.
- The sampling and analytical effort encompassing this project is divided into two phases. Phase I involves: a literature search for published methodology specific to the quantification of the listed toxics in the concentration ranges considered; a listing of toxics for which sampling and analytical procedures are either incomplete or non-existent; a recommended priority list of methods to be developed; a selection of surrogate compounds for identifying groups or families of compounds with a common chemical base; and, finally, a discussion by the contractor of validation and quality control/quality assurance procedures.

Phase 2 of the project involves the actual validation of the developed methods using laboratory standards and/or field sampling.

The final report will provide complete descriptions of all methods developed for sampling and assaying the specified toxic compounds in both ambient air and source samples. Confidence limits and other statistical parameters will be estimated for all of the sampling and analytical procedures.

The results of this project will be used by the Air Resources Board staff and others to establish standard procedures for use in regulating and monitoring toxic air contaminants.

B U D G E T S U M M A R Y: Southern Research Institute

"Development of Analytical Methods for Ambient Monitoring
and Source Testing for Toxic Organic Compounds"
(\$263,675 - 15 months)

BUDGET ITEMS:

Salaries*	\$101,379
Employee Benefits	\$ -0-
Supplies & Materials	\$ 13,646
Travel	\$ 15,749
Other Expenses	\$ 1,340
Overhead	\$ 88,605
General & Administrative	\$ 28,031
Fee	\$ 14,925
TOTAL PROJECT COST	\$263,675

* Dollar Amount Includes Employee Benefits

State of California
AIR RESOURCES BOARD

Resolution 84-22
May 24, 1984

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;

WHEREAS, an unsolicited research proposal, Number 1254-107, entitled "Formation and Fate of Toxic Chemicals in California's Atmosphere," has been submitted by the University of California, Riverside to the Air Resources Board; and

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

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

Proposal Number 1254-107 entitled "Formation and Fate of Toxic Chemicals in California's Atmosphere," submitted by the University of California, Riverside for a total amount not to exceed \$195,305.

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 1254-107 entitled "Formation and Fate of Toxic Chemicals in California's Atmosphere," submitted by the University of California, Riverside for a total amount not to exceed \$195,305.

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 \$195,305.

I hereby certify that the above is a true and correct copy of Resolution 84-22 as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(2)
DATE: May 24, 1984

ITEM: Research Proposal No. 1254-107, entitled "Formation and Fate of Toxic Chemicals in California's Atmosphere."

RECOMMENDATION: Adopt Resolution 84-22 approving Research Proposal No. 1254-107, for funding in an amount not to exceed \$195,305.

SUMMARY: Under newly-enacted provisions of the Health and Safety Code, the Board is implementing a program to identify toxic air contaminants and to limit community exposure to these chemicals. The proposed project is an investigation of the chemical transformations that such compounds may undergo in the atmosphere. The atmospheric chemical transformations of these compounds can result in the formation of new compounds which may be more or less toxic than the original compound. However, in view of the many compounds of potential interest, it is not practical to determine the chemical pathways of each compound. Instead, a data base is needed to provide accurate estimates of atmospheric lifetimes, decay mechanism, and reaction products for any species of interest.

In this project the environmental chambers at U.C. Riverside would be used to measure the reaction rates of prototype toxic chemicals under realistic atmospheric conditions. The corresponding atmospheric lifetime and the nature of the decomposition products of the prototype compounds would be determined. From this information it will be possible to predict the atmospheric fate of toxic chemicals similar to those of the prototype compound. It will also be possible to predict whether relatively benign compounds may react to form toxic compounds in the atmosphere and the rate at which toxic materials may be detoxified.

Knowledge of the atmospheric persistence and fate of toxic air contaminants is needed to help assess and, to the extent required, to manage potential risks of exposure. Because the number of individual compounds precludes a detailed study of each compound, this project would substantially increase the Board's capability to assess and manage risks by providing information on classes of chemical prototype compounds. The proposed project addresses, in part, the Board's expressed research priority to investigate toxic air contaminants. The results of this work will permit the Board to establish necessary requirements at a level more fully consistent with its objectives of protection of the public health.

State of California
AIR RESOURCES BOARD

Resolution 84-23
May 24, 1984

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;

WHEREAS, an unsolicited research proposal, Number 1251-107, entitled "Inhalation Uptake of Selected Chemical Vapors at Trace Levels," has been submitted by the University of California, Davis to the Air Resources Board; and

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

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

Proposal Number 1251-107 entitled "Inhalation Uptake of Selected Chemical Vapors at Trace Levels," submitted by the University of California, Davis for a total amount not to exceed \$192,464.

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 1251-107 entitled "Inhalation Uptake of Selected Chemical Vapors at Trace Levels," submitted by the University of California, Davis for a total amount not to exceed \$192,464.

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 \$192,464.

I hereby certify that the above is a true and correct copy of Resolution 84-23 as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(3)
DATE: May 24, 1984

ITEM: Research Proposal No. 1251-107, entitled "Inhalation Uptake of Selected Chemical Vapors at Trace Levels."

RECOMMENDATION: Adopt Resolution 84-23 approving Research Proposal No. 1251-107, for funding in an amount not to exceed \$192,464.

SUMMARY: The Air Resources Board has a broad legislative mandate for identifying and controlling toxic substances. A list of substances for consideration as potentially toxic air contaminants has been compiled by ARB and reviewed by the Department of Health Services. Priorities for Board review have been set based upon criteria established in the Legislative mandate.

In order to make well-informed regulatory decisions about these substances, the Board needs information about the health risks associated with exposure. An important element needed for evaluation of health risks are measurements of retention of these compounds when they are inhaled. Previous research has provided data on uptake and fate of these compounds at unrealistically high concentrations delivered into the stomachs of rodents. No research has been done to investigate the fate of toxic compounds inhaled at the very low ambient concentrations found in polluted atmospheres.

In this proposal, the compounds from the Board's toxic substances list have been grouped into seven categories. The proponents intend to investigate one toxic compound from each category. The compounds to be investigated are benzene, dimethylnitrosamine, chloroform, methyl bromide, trichlorethylene, ethylene oxide and formaldehyde.

The research will consist of three distinct phases: 1) construction of the exposure system; 2) testing, modification and verification of equipment and the protocol; and 3) research on the uptake and retention of the inhaled compounds. Dogs will be used to study all compounds and will not be harmed in any way. The dogs will be exposed for up to two hours to 100-500 ppb of the carbon-14 labelled toxic and then breathe clean air. Urine, feces, blood and exhaled organic compounds will be collected during and up to 24 hours after exposure. These samples will be analyzed to determine the uptake and retention of each toxic compound.

State of California
AIR RESOURCES BOARD

Resolution 84-24
May 24, 1984

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;

WHEREAS, an unsolicited proposed addendum to on-going Research Contract Number A2-047-32, entitled "The Development of Standardized Diagnostic Procedures for Diesel Engine Emission Controls", has been submitted by Energy and Environmental Analyses, Inc. to the Air Resources Board; and

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

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

Addendum to Contract Number A2-047-32, entitled "The Development of Standardized Diagnostic Procedures for Diesel Engine Emission Controls," submitted by Energy and Environmental Analyses, Inc., for an amount not to exceed \$37,070.

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:

Addendum to Contract Number A2-047-32, entitled "The Development of Standardized Diagnostic Procedures for Diesel Engine Emissions Controls," submitted by Energy and Environmental Analyses, Inc., for an amount not to exceed \$37,070.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the addendum proposed herein in an amount not to exceed \$37,070.

I hereby certify that the above is a true and correct copy of Resolution 84-24 as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(4)
DATE: May 24, 1984

ITEM: Research Proposal Addendum to Contract A2-047-32, "The Development of Standardized Diagnostic Procedures for Diesel Engine Emission Controls".

RECOMMENDATION: Adopt Resolution 83-24 approving proposed addendum to Contract A2-047-32, for funding in an amount not to exceed \$37,070.

SUMMARY: The subject proposal is an addendum to the current ARB Contract No. A2-047-32 entitled "Diagnostics of Emission Control Component Malfunctions on Catalyst-Equipped Motor Vehicles". The current contract entails the development and validation of diagnostic procedures for emission control systems in automobiles that are equipped with 3-way catalysts. At the completion of the current program, the contractor will have studied the control systems of fifty-two vehicles wherein specific malfunctions have been deliberately introduced into the control systems in order to validate procedures developed by the contractor to detect and repair such malfunctions. The budget for the original 15-month contract was \$120,725. The contractor now proposes, for \$37,070 to be expended over four months, to add diesel powered vehicles to the list of test cars for the development of diagnostic procedures.

Under the proposed addendum, the contractor would analyze surveillance data compiled by EPA for about 100 light duty diesel cars in order to evaluate the nature and range of in-use, emission-related malperformances. The contractor would supplement these data by interviewing manufacturers' representatives and shop mechanics. The emission impacts of malperformance would be identified by engineering analyses. The contractor would then: develop a list that ranks types of malperformance by their respective contributions to air pollution; survey current and future diagnostic methods for diesel engine emission control systems; develop standardized diagnostic procedures; and validate these procedures using five diesel-powered cars of different makes and models. The successful development and implementation of diesel diagnostic procedures will be especially useful for the statewide vehicle inspection and maintenance program.

The proposed augmentation addresses part of the Board's express concern and research priority relative to particles emitted by diesel engines. The information that would be provided under this proposed augmentation would show how the emissions from diesel-vehicles are affected by specific kinds of malperformance and the ability to detect and mitigate such effects through diagnostic procedures.

B U D G E T S U M M A R Y: Energy and Environmental Analysis, Inc.

"The Development of Standardized Diagnostic Procedures
for Diesel Engine Emission Controls"
(Original \$120,725 - 15 months)
(Addendum \$37,070 - 4 months)

BUDGET ITEMS:

	<u>PROPOSED ADDENDUM</u>	
Salaries	\$9418.00	
Employee Benefits	\$ -0-	
Supplies & Materials	\$ -0-	
Travel	\$ 5,101	
Other Expenses	\$ 1,000	
Labor Overhead	\$ 9,211	
Consultants	\$ 4,000	
General and Administrative	\$ 4,970	
Fee	\$ 3,370	
TOTAL FOR PROPOSED ADDENDUM		\$ 37,070
ORIGINAL CONTRACT		<u>\$120,725</u>
TOTAL FOR CONTRACT WITH PROPOSED ADDENDUM		\$157,795

State of California
AIR RESOURCES BOARD

Resolution 84-25
May 24, 1984

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;

WHEREAS, an unsolicited research proposal, Number 1255-107, entitled "Effects of Methanol Substitution on Multi-day Air Pollution Episodes," has been submitted by the University of California, Riverside to the Air Resources Board; and

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

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

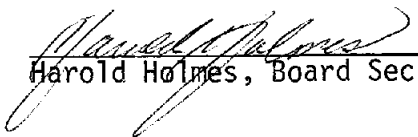
Proposal Number 1255-107 entitled "Effects of Methanol Substitution on Multi-day Air Pollution Episodes," submitted by the University of California, Riverside for a total amount not to exceed \$165,888.

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 1255-107 entitled "Effects of Methanol Substitution on Multi-day Air Pollution Episodes," submitted by the University of California, Riverside for a total amount not to exceed \$165,888.

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 \$165,888.

I hereby certify that the above is a true and correct copy of Resolution 84-25 as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(5)
DATE: May 24, 1984

ITEM: Research Proposal Number 1255-107 entitled "Effects of Methanol Substitution on Multi-Day Air Pollution Episodes."

RECOMMENDATION: Adopt Resolution 84-25 approving Research Proposal No. 1255-107 for an amount not to exceed \$165,888.

SUMMARY: Methanol has become increasingly attractive as an alternative to petroleum-based fuels because it is available domestically, can be manufactured from renewable resources, may be competitively priced with gasoline, and can be used with existing motor vehicles with relatively minor modification of the engine and fuel system. Because vehicular emissions account for approximately 50 percent of the total emissions of reactive organic in the South Coast Air Basin, large scale substitution of methanol for gasoline could have a significant impact on the composition of the urban atmosphere. In general, it appears that both methanol and combustion products of methanol are less reactive than petroleum-based motor fuels and their combustion products. This has been ascertained in single-day tests which indicate that ozone concentrations would be reduced by substitution of methanol for gasoline.

However, the worst air pollution episodes in California are multi-day in nature. Both tracer releases and modeling studies have shown that pollution carried over from the previous day(s) plays an important role in the second and subsequent days of an episode. Because of the resulting build-up, it is uncertain how the later days of a multi-day episode would be affected by methanol substitution.

Under this project, the investigators would carry out a series of multi-day irradiations in both indoor and outdoor smog chambers to compare the effects of replacing one-third of a hydrocarbon surrogate mixture, which represents current emissions, with a surrogate that is designed to represent both evaporative and tailpipe emissions from methanol-fueled vehicles. Experiments would also be carried out at a variety of initial hydrocarbon surrogate and NOx concentrations to obtain the data required to assess how the effects of methanol substitution depend on these two important parameters. These irradiations would be carried out for a period of two to four days each. In several of the exposures, subsequent injections of NOx would be made in order to assess maximum ozone formation potentials under conditions where NOx availability is not the limiting factor.

State of California
AIR RESOURCES BOARD

Resolution 84-26
May 24, 1984

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;

WHEREAS, an proposal to augment contract, Number A2-054-32, entitled "Economic Assessment of the Effects of Air Pollution on Agricultural Crops in the San Joaquin Valley," has been submitted by Energy and Resources Consultants, Inc. to the Air Resources Board; and

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

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

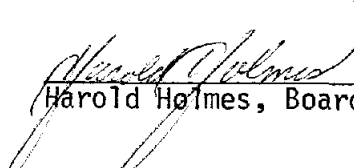
Addendum to Contract Number A2-054-32, entitled "Economic Assessment of the Effects of Air Pollution on Agricultural Crops in the San Joaquin Valley," submitted by Energy and Resources Consultants, Inc., for an amount not to exceed \$9,940.

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:

Addendum to Contract Number A2-054-32, entitled "Economic Assessment of the Effects of Air Pollution on Agricultural Crops in the San Joaquin Valley," submitted by Energy and Resources Consultants, Inc., for an amount not to exceed \$9,940.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the addendum proposed herein in an amount not to exceed \$9,940.

I hereby certify that the above
is a true and correct copy of
Resolution 84-26 as adopted by
the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(6)
DATE: May 24, 1984

- ITEM: Proposal to augment Contract Number A2-054-32 entitled "Economic Assessment of Pollution on Agricultural Crops in the San Joaquin Valley."
- RECOMMENDATION: Adopt Resolution Number 84-26 approving Proposed Augmentation of Contract No. A2-054-32 for an amount not to exceed \$9,940.
- SUMMARY: This proposal is a request for an augmentation of a nearly completed ARB funded study to assess the economic costs of air pollution damage to crops grown in the San Joaquin Valley. The preliminary report for the current study indicates that losses attributable to ozone damage to crops in the San Joaquin Valley amount to approximately 100 million dollars per year. The proposed augmentation would provide needed additional detail as to who among the various producers and consumers, bears these added costs.
- The current study and this proposed augmentation address one of the Board's stated research priorities, assessment of the effects of air pollution on agriculture. The results would be used by state and local officials responsible for establishing and implementing cost-effective air quality strategies for ozone.

State of California
AIR RESOURCES BOARD

Resolution 84-27
May 24, 1984

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;

WHEREAS, an unsolicited proposal addendum to on-going Research contract, Number A2-117-33, entitled "Effects of Ozone and SO₂ on Crop Physiology and Productivity," has been submitted by the University of California, Davis to the Air Resources Board; and

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

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

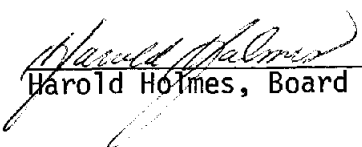
Addendum to Contract Number A2-117-33, entitled "Effects of Ozone and SO₂ on Crop Physiology and Productivity," submitted by the University of California, Davis for an amount not to exceed \$10,000.

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 Research Screening Committee and approves the following:

Addendum to Contract Number A2-117-33, entitled "Effects of Ozone and SO₂ on Crop Physiology and Productivity," submitted by the University of California, Davis for an amount not to exceed \$10,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the addendum proposed herein in an amount not to exceed \$10,000.

I hereby certify that the above
is a true and correct copy of
Resolution 84-27 as adopted by
the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(7)
DATE: May 24, 1984

ITEM: Research proposal addendum to Contract Number A2-117-33, entitled "Effects of Ozone and SO₂ on Crop Physiology and Productivity."

RECOMMENDATION: Adopt Resolution Number 84-27 approving proposed addendum to Contract No. A2-117-33 for funding in an amount not to exceed \$10,000.

SUMMARY: This proposal requests an augmentation to a study already in progress, to develop a new approach to assessing the effects of air pollution on crops. The budget for the original 18-month contract is \$129,698. Completion of this additional phase study for \$10,000 will provide information on how physiological responses of plants studied in the laboratory are related to yield losses observed in the field. This will enable us to assess pollution induced crop loss more efficiently in the future.

The proponents are attempting to identify, in the laboratory, physiological responses which can be measured in the field as indicators of air pollution induced changes in yield. Several such responses have been identified and will be employed by the proponents. The proponents will compare bean plants grown in controlled environmental chambers with those grown in open-top field chambers and with those grown in the field. Plants will be fumigated with ozone, and physiological variables will be measured and related to plant growth, yield and nutrient status. The proposed augmentation will be used to provide the technical assistance needed to carry out the field portion of this study.

State of California
AIR RESOURCES BOARD

Resolution 84-28
May 24, 1984

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

WHEREAS, a unsolicited research proposal, Number 1257-107, entitled "The Air and Industrial Hygiene Laboratory/Air Resources Board Center for Automated Particle Analysis - Phase II," has been submitted by the State Department of Health Services to the Air Resources Board; and

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

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

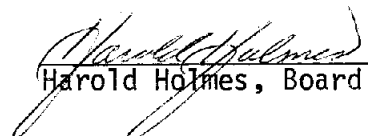
Proposal Number 1257-107 entitled "The Air and Industrial Hygiene Laboratory/Air Resources Board Center for Automated Particle Analysis - Phase II," submitted by the State Department of Health Services to the Air Resources Board, for a total amount not to exceed \$ 87,822.

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 1257-107 entitled "The Air and Industrial Hygiene Laboratory/Air Resources Board Center for Automated Particle Analysis - Phase II," submitted by the State Department of Health Services to the Air Resources Board, for a total amount not to exceed \$ 87,822.

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 \$87,822.

I hereby certify that the above is a true and correct copy of Resolution 84-28 as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(8)
DATE: May 24, 1984

ITEM: Research Proposal No. 1257-107 entitled, "The AIHL/ARB Center for Automated Particle Analysis - Phase II."

RECOMMENDATION: Adopt Resolution Number 84-28 approving Proposal No. 1257-107, for funding in an amount not to exceed \$87,822.

SUMMARY: In order to develop cost-effective strategies to achieve and maintain state and federal ambient air quality standards for inhalable particles, a thorough understanding of their multiple origins is necessary. This can be done by measurement and chemical analysis of particulate matter and precursors at sources and correspondingly detailed analysis of samples from receptor locations.

Most attempts at receptor modeling of airborne particles have considered only the bulk chemical properties of particulate samples, and, as a result, have provided relatively poor discrimination of particulate sources having similar bulk chemical composition despite very significant differences in the sizes, structure and likely effects of the respective particles and sources. Recent advances in technology and computer-controlled image analyzers, accurate and rapid scanning electron microscopy (SEM) techniques make single particle analyses feasible and, potentially, a practical technique to aid in the development of more detailed source receptor models.

This one-year proposal is the second in a series which is intended for identifying pollution sources of airborne particulate matter using morphological and elemental analysis of a single particle by an automated particle system. The analysis of samples would be performed using existing equipment operated by the Air and Industrial Hygiene Laboratory of the California Department of Health Services.

The specific objectives of this study are to: 1) develop computer capabilities for mathematical analysis of analytical results; 2) compile particle source signatures from source and ambient samples by SEM automated particle analysis; 3) perform source apportionment of collected

State of California
AIR RESOURCES BOARD

Resolution 84-29
May 24, 1984

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;

WHEREAS, a solicited research proposal, Number 1265-107, entitled "Development of Synthetic Acid Fogs and Aerosols for Chamber Exposures," has been submitted by Environmental Research and Technology, Inc. to the Air Resources Board; and

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

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

Proposal Number 1265-107, entitled "Development of Synthetic Acid Fogs and Aerosols for Chamber Exposures," submitted by Environmental Research and Technology, Inc. for a total amount not to exceed \$67,698.

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 1265-107, entitled "Development of Synthetic Acid Fogs and Aerosols for Chamber Exposures," submitted by Environmental Research and Technology, Inc. for a total amount not to exceed \$67,698.

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 \$67,698.

I certify that the above is
a true and correct copy of
Resolution 84-29 as passed by
the Air Resources Board.



Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

Resolution 84-30
May 24, 1984

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 39700 through 39705;

WHEREAS, a solicited research proposal, Number 038-5, entitled "Characterization of Reactants, Mechanisms, and Species in South Coast Air Basin Cloudwater," has been submitted by Sonoma Technology Incorporated to the Air Resources Board; and

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

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

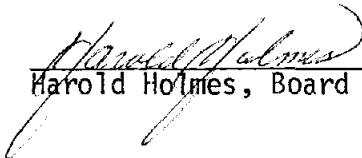
Proposal Number 038-5, entitled "Characterization of Reactants, Mechanisms, and Species in South Coast Air Basin Cloudwater," submitted by Sonoma Technology, Incorporated, for a total amount not to exceed \$100,000.

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

Proposal Number 038-5, entitled "Characterization of Reactants, Mechanisms, and Species in South Coast Air Basin Cloudwater," submitted by Sonoma Technology, Incorporated, 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 84-30 as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(10)
DATE: May 24, 1984

ITEM: Proposal No. 038-5 entitled "Characterization of Reactants, Mechanisms, and Species in South Coast Air Basin Cloudwater."

RECOMMENDATION: Adopt Resolution Number 84-30 approving Research Proposal No. 038-5 for an amount not to exceed \$100,000.

SUMMARY: High concentrations of sulfates and nitrates occur frequently in the Los Angeles Basin and cause visibility degradation, material damage, and potential adverse ecological and health effects. Prior work strongly suggests that a significant fraction of this sulfate and nitrate is formed in clouds and fog, resulting in highly acidic fog and cloudwater. In spite of the potential importance and great current interest in the formation of acid species in clouds and fogs, there is almost no unambiguous field data for the rate of these formation species.

The first objective of this study is to measure the rate of conversion of sulfur dioxide to sulfate and nitrogen oxides to nitrate in stratus clouds in the Los Angeles Basin. A second objective is to characterize the chemical composition of the air masses in which these rates are measured to obtain information on the dominant chemical reaction pathways and to provide inputs for computer models which simulate cloud chemistry.

Six cloud sampling flights will be made by an instrumented aircraft in the Los Angeles Basin in May and June of 1985. This is the most favorable time of the year for encountering stratus clouds containing air pollution. Four of the flights will follow air parcels in the Chino-Ontario area to measure chemical reaction rates. Two of the flights will measure the spatial distribution of the acidic species in clouds in and upwind of the Los Angeles Basin.

This study is necessary in order to better understand the relationships between sources of acid precursor emissions and observed concentrations of acidic species in downwind receptor locations.

Memorandum

Gordon Van Vleck
Secretary
Resources Agency

Date : June 8, 1984

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 decision and response to environmental comments raised during the comment period.

ATTACHMENTS

84-10
84-11
84-20
~~84-31~~
84-32

FILED AND POSTED BY
OFFICE OF THE SECRETARY

JUN 8 1984

Resources Agency of California

~~lead-or-phosphorus-content-of-gasoline-may-be-used-after-the-executive-officer reasonably-determines-that-such-test-method-provides-equivalent-results-to-the test-method-designated-in-this-paragraph.~~

NOTE: Authority cited: Sections 39600, 39601, 43013 and 43101, Health and Safety Code; Western Oil and Gas Ass'n v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal.Rptr. 249 (1975). Reference: Sections 39000-39003, 39500, 39515, 39516, 41511, 43000, 43013, 43016 and 43101, Health and Safety Code; Western Oil and Gas Ass'n v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal.Rptr. 249 (1975).

State of California
AIR RESOURCES BOARD

Resolution 84-33
May 24, 1984

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;

WHEREAS, a solicited research proposal, Number 030-4, entitled "Study of the Influence of Sediments in Buffering Aquatic Systems and Development of a Model of the Acidification Process", has been submitted by the University of California, Berkeley; and

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

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

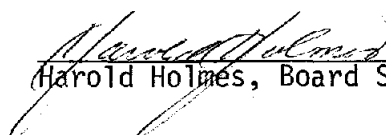
Proposal Number 030-4, entitled "Study of the Influence of Sediments in Buffering Aquatic Systems and Development of a Model of the Acidification Process", submitted by the University of California, Berkeley, for a total amount not to exceed \$210,670.

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 030-4, entitled "Study of the Influence of Sediments in Buffering Aquatic Systems and Development of a Model of the Acidification Process", submitted by the University of California, Berkeley, for a total amount not to exceed \$210,670.

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 \$210,670.

I hereby certify that the above is a true and correct copy of Resolution 84-33 as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-9-6b(11)
DATE: May 24, 1984

- ITEM: Research Proposal No. 030-4, entitled "Study of the Influence of Sediments in Buffering Aquatic Systems and Development of a Model of the Acidification Process".
- RECOMMENDATION: Adopt Resolution Number 84-33 approving Research Proposal No. 030-4, for funding in an amount not to exceed \$210,670.
- SUMMARY: The Kafiloff Acid Deposition Act requires the Air Resources Board to design and implement a research and monitoring program to determine the nature, extent and potential effects of acid deposition in the State. Research is particularly crucial in areas known or suspected to be sensitive to acid inputs. Among the most sensitive systems in California are small headwater lakes of the Sierra Nevada. These lake basins are characterized by granitic bedrock geology, thin soils and low-alkalinity surface waters.
- In the absence of significant soil development in these watersheds, buffering of acid precipitation may occur principally in the lakes' water column and may reflect the neutralization capacity of lake sediments. By experimentally measuring the ability of different lake sediments in sensitive areas to buffer acid inputs, it may be possible to predict future changes in lake pH under specified conditions of acid deposition in these basins.
- The objective of this study is to investigate the capacity of typical Sierra lake sediments to neutralize acid deposition. Field data would be combined with microcosm acidification studies performed in the laboratory in an attempt to model the effects of acidity upon sensitive lakes.
- Different lakes with varying types of sediments would be selected for an investigation of buffering processes. One of these lakes will be Emerald Lake, selected for the Integrated Watershed Study. For two of these lakes, detailed field measurements would be made of surface water chemistry through time. Replicate microcosm experiments would be run in situ at these two lakes. Microcosm

experiments also would be conducted in the laboratory, where system pH would be lowered to 5 and changes in biological and chemical variables would be determined. Sediment buffering capacity at all six lakes would be evaluated by collecting replicate sediment cores and performing analyses to determine cation exchange capacity, base saturation, particle size distribution, organic matter, total nitrogen, mineralogy and other chemical characteristics.

Additional microcosm studies would be carried out in the second and third years of the project period to determine alkalinity regeneration rates in lakes with different sediment types; the lakes for this work would be chosen based on the findings from the initial year.

The results of the field and laboratory experiments would be used to assess the time scale of acidification of headwater lakes of the Sierra Nevada. The model, consisting of coupled, first order, difference equations, would allow prediction of the time-evaluation of annually-averaged lake water pH and alkalinity over a period of up to several decades.

B U D G E T S U M M A R Y: University of California, Berkeley

"Study of the Influence of Sediments in Buffering
Aquatic Systems and Development of a Model of
the Acidification Process"
(\$210,670 - 30 months)

BUDGET ITEMS:	Year 1 July 1, 1984 <u>June 30, 1984</u>	Year 2 July 1, 1985 <u>June 30, 1985</u>	Year 3 July 1, 1986 <u>Dec. 31, 1986</u>
Salaries	\$50,967	\$48,192	\$26,472
Employee Benefits	\$ 6,569	\$ 6,563	\$ 3,755
Equipment	-0-	-0-	-0-
Supplies & Materials	\$ 2,250	\$ 2,125	\$ 1,125
Travel	\$ 3,583	\$ 3,935	\$ 2,169
Other Expenses	\$ 1,200	\$ 2,000	\$ 1,900
Total Direct Costs	\$64,569	\$62,815	\$35,421
Indirect Costs	\$18,983	\$18,468	\$10,414
TOTAL PROJECT COST	\$83,552	\$81,283	\$45,835