State of California
AIR RESOURCES BOARD

Resolution 84-43
September 26, 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; and

WHEREAS, an unsolicited research proposal, Number 1269-108(R), entitled "Effect of Pollutant Exposure-Ambient Air in Childhood and Adulthood", has been submitted by the University of California, Los Angeles 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 1269-108(R), entitled "Effect of Pollutant Exposure-Ambient Air in Childhood and Adulthood", submitted by the University of California, Los Angeles for a total amount not to exceed $113,691.

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 1269-108(R), entitled "Effect of Pollutant Exposure-Ambient Air in Childhood and Adulthood", submitted by the University of California, Los Angeles for a total amount not to exceed $113,691.

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 $113,691.

I hereby certify that the above is a true and correct copy of Resolution 84-43 as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-13-6(b)1
DATE: September 26, 1984

ITEM: Research Proposal No. 1269-108(R) entitled "Effect of Pollutant Exposure-Ambient Air in Childhood and Adulthood".

RECOMMENDATION: Adopt Resolution 84-43 approving Proposal No. 1269-108(R) for funding in an amount not to exceed $113,691.

SUMMARY: The Air Resources Board and several federal agencies have contributed to the support of the Chronic Obstructive Respiratory Diesease (CORD) study, a large, long-term epidemiological study carried out in the Los Angeles area by the University of California at Los Angeles. The study involved the collection of data on pulmonary function and life style for approximately 16,000 residents at intervals over a 12-year period. The objective of the study was to determine the extent to which high concentrations of pollutants affect pulmonary function and other measures of pulmonary condition in residents exposed to these concentrations for extended periods. The investigation was the largest ever conducted on the West Coast and one of the largest in the United States.

The study, as it was orginally conceived, is nearly complete. All data have been collected and coded, and the influence of age, sex and residence location on pulmonary function changes during the study have been analyzed. The annual rates of change in pulmonary function in the least polluted city were compared to the same rates in each of two more polluted cities. Whenever there was a statistically significant difference in the rates, the rate of decline in the more polluted city was found to be steeper. High rates of deterioration of lung function in children and in adults less than 25 years old were also noted.

The current proposal would provide further detailed analysis of the data collected in order to relate individual pulmonary function to detailed estimates of individual exposure, to age at initial residence and to length of residence in the Los Angeles area, for

both the entire sample and for subgroups expected to be sensitive. The proponents expect this analysis to sharpen the conclusions of the CORD study and to identify specific additional features of interest in the existing data.

The CORD study has been a massive, expensive and time consuming research effort which has encountered and overcome many of the problems common to epidemiological studies. This type of study offers a unique opportunity to investigate how people of various ages and states of health respond to long-term exposures to community air pollution. The study, thus far, has indicated disturbing trends in the loss of lung function. The proposed effort would explore these findings. Originally, it was very costly to collect this large data base, but it is relatively cost-efficient to pursue a detailed analysis of these data.

State of California
AIR RESOURCES BOARD

Resolution 84-44
September 26, 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; and

WHEREAS, an unsolicited research proposal, Number 1276-109, entitled "The Role of NO_2 and O_3 in Cancer Metastasis and in Systemic Adverse Effects", has been submitted by the University of Southern California 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 1276-109, entitled "The Role of NO_2 and O_3 in Cancer Metastasis and in Systemic Adverse Effects", submitted by the University of Southern California for a total amount not to exceed $96,981.

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 1276-109, entitled "The Role of NO_2 and O_3 in Cancer Metastasis and in Systemic Adverse Effects", submitted by the University of Southern California for a total amount not to exceed $96,981.

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 $96,981.

I hereby certify that the above is a true and correct copy of Resolution 84-44 as adopted by the Air Resources Board.

Harold Holmes

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-13-6(b)2
DATE: September 26, 1984

ITEM: Research Proposal No. 1276-109 entitled "The Role of NO_2 and O_3 in Cancer Metastasis and in Systemic Adverse Effects"

RECOMMENDATION: Adopt Resolution 84-44 approving Proposal No. 1276-109 for funding in an amount not to exceed $96,981.

SUMMARY: Cancer is characterized by its ability to spread to other tissues and organs. Evidence from the Air Resources Board's research program has shown that nitrogen dioxide (NO_2) inhalation facilitates cancer spread, or metastasis, to the lungs of experimental animals. This project proposes to: (1) investigate this effect in animals exposed to both ozone (O_3) and NO_2; and (2) investigate effects of NO_2 on immune system factors which could enable melanoma cells to survive and grow.

In the first study, mice will be exposed to a combination of O_3 and NO_2. Then, the lungs and other organs will be examined for development of melanoma nodules. In the second study, the effects of NO_2 on the immune system and capillary cells of the lung, liver, spleen and kidney will be examined.

The South Coast Air Basin is characterized by high concentrations of photochemical oxidants, including O_3 and NO_2. The combined effect of these pollutants upon cancer metastasis is not known but may be sustained.

Recent studies have shown that NO_2 is unusual because it affects other organs besides the lung, especially those of the immune system. Laboratory methods will be developed to measure these effects. Such methods, if developed, would also be useful for future investigations of effects of toxic materials.

State of California
AIR RESOURCES BOARD

Resolution 84-45
September 26, 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; and

WHEREAS, an unsolicited research proposal, Number 1277-109, entitled "Human Physiological Responses to Inhalation of NO_2, O_3 and NO_2 plus O_3 During Heavy, Sustained Exercise", 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 1277-109, entitled "Human Physiological Responses to Inhalation of NO_2, O_3 and NO_2 Plus O_3 During Heavy, Sustained Exercise", submitted by the University of California, Davis for a total amount not to exceed $89,610.

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 1277-109, entitled "Human Physiological Responses to Inhalation of NO_2, O_3 and NO_2 Plus O_3 During Heavy, Sustained Exercise", submitted by the University of California, Davis for a total amount not to exceed $89,610.

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 $89,610.

I hereby certify that the above is a true and correct copy of Resolution 84-45 as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-13-6(b)3
DATE: September 26, 1984

ITEM: Research Proposal No. 1277-109 entitled "Human Physiological Responses to Inhalation of NO_2, O_3 and NO_2 Plus O_3 During Heavy, Sustained Exercise"

RECOMMENDATION: Adopt Resolution 84-45 approving Proposal No. 1277-109 for funding in an amount not to exceed $89,610.

SUMMARY: Health effects of nitrogen dioxide (NO_2) and ozone (O_3) are of concern in California since they are major and persistent components of our oxidant air quality problem. NO_2 often occurs in the presence of O_3 and animal studies have shown that it has the potential to synergize the effects of O_3. This research study would investigate the effects of exercise upon humans exposed to the combination of NO_2 and O_3.

Recent observations have shown that females are more sensitive to O_3 than males. This project would investigate whether females are also more sensitive to NO_2 and NO_2 plus O_3.

In the course of the study, several specific problems related to human exposures would also be addressed. These include:

(1) The sequence of air pollution may be important in NO_2 effects, and pre-exposure to O_3 could enhance NO_2 effects. These problems would be investigated in this project.

(2) Initial O_3 exposures cause the subject to be hypersensitive to consequent exposures. Since the decay of O_3 sensitivity is not known, this information could reduce the cost of subject recruitment, time of experimentation and statistical variability.

(3) Lung airways can be altered during air pollutant inhalation. New detection techniques have been developed in animals to evaluate the alteration. These techniques would be adapted for human use.

BUDGET SUMMARY: UNIVERSITY OF CALIFORNIA, DAVIS

"Human Physiological Responses to Inhalation of NO_2, O_3, and NO_2 Plus O_3 During Heavy, Sustained Exercise"

BUDGET ITEMS:

Salaries	$35,636	
Benefits	$ 992	
Supplies	$ 2,000	
Equipment	$17,500	
Travel	$ 2,000	
Subject Compensation	$ 6,750	
Physician Support	$ 1,500	
Misc. Expenses	$ 3,000	
Total Direct Costs		$69,378
Indirect Cost		$20,232
TOTAL PROJECT COST		$89,610

State of California
AIR RESOURCES BOARD

Resolution 84-46
September 26, 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; and

WHEREAS, an unsolicited research proposal, Number 1275-109, entitled "The Effects of Present and Potential Air Pollution on Important San Joaquin Valley Crops: Thompson Seedless Grapes and Tomatoes", 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 1275-109, entitled "The Effects of Present and Potential Air Pollution on Important San Joaquin Valley Crops: Thompson Seedless Grapes and Tomatoes", submitted by the University of California, Riverside for a total amount not to exceed $127,971.

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 1275-109, entitled "The Effects of Present and Potential Air Pollution on Important San Joaquin Valley Crops: Thompson Seedless Grapes and Tomatoes", submitted by the University of California, Riverside for a total amount not to exceed $127,971.

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 $127,971.

I hereby certify that the above is a true and correct copy of Resolution 84-46 as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-13-6(b)4
DATE: September 26, 1984

ITEM: Research Proposal No. 1275-109 entitled "The Effects of Present and Potential Air Pollution on Important San Joaquin Valley Crops: Thompson Seedless Grapes and Tomatoes"

RECOMMENDATION: Adopt Resolution 84-46 approving Proposal No. 1275-109 for funding in an amount not to exceed $127,971.

SUMMARY:

Grapes are the single most valuable crop grown in California. In 1983, the value of grapes harvested in the state exceeded $1 billion. Processing tomatoes are another economically important annual crop. California accounts for 85 percent of the processing tomatoes produced in the United States.

This proposal would enable the investigators to carry out the second year of a three-year study on the effects of oxidants and sulfur dioxide on Thompson Seedless grapes, as well as to perform a single-year study of these pollutants' effects on tomatoes.

In the study, grape vines are being exposed to oxidants and sulfur dioxide alone and in combination. Effects of these pollutants on the growth of vines, and on grape yield and quality, will be measured.

The one-year study of processing tomatoes will involve exposures to oxidants and sulfur dioxide alone and in combination. Effects on growth, yield and quality of tomatoes will be determined and described relative to commercial standards. At the end of each study, a written report will be prepared presenting the results.

This project will provide information on the losses which may occur to important California crops as a result of exposure to oxidants and sulfur dioxide.

BUDGET SUMMARY: UNIVERSITY OF CALIFORNIA, RIVERSIDE

"The Effects of Present and Potential Air Pollution on Important San Joaquin Valley Crops: Thompson Seedless Grapes and Tomatoes"

BUDGET ITEMS:

Salaries	$51,345	
Benefits	$15,188	
Equipment	$14,650	
Supplies and Expenses	$20,950	
Travel	$ 7,105	
Publications	$ 400	
Total Direct Costs		$109,638
Indirect Cost		$ 18,333
TOTAL PROJECT COST		$127,971

State of California
AIR RESOURCES BOARD

Resolution 84-47
September 26, 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; and

WHEREAS, a program plan proposal, Number 1278-109, entitled "A Program to Assess Crop Loss from Air Pollutants", 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 1278-109, entitled "A Program to Assess Crop Loss from Air Pollutants", submitted by the University of California, Riverside for a total amount not to exceed $98,000.

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:

Proposal Number 1278-109, entitled "A Program to Assess Crop Loss from Air Pollutants", submitted by the University of California, Riverside for a total amount not to exceed $98,000.

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 $98,000.

I hereby certify that the above is a true and correct copy of Resolution 84-47 as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-13-6(b)5
DATE: September 26, 1984

ITEM: Program Plan Proposal No. 1278-109 entitled "A Program to Assess Crop Loss from Air Pollutants"

RECOMMENDATION: Adopt Resolution 84-47 approving Proposal No. 1278-109 for funding in an amount not to exceed $98,000.

SUMMARY: This is a proposed work plan for a newly budgeted crop loss assessment program initiated by ARB. The objective of the program is to evaluate, in the field, crop losses due to air pollution that are occurring in California. The results of these evaluations will be integrated with economic models, to be developed separately, in order to ascertain the economic impact of these crop losses. This proposal requests funds for the first year of a program that is approved by the administration for five years. A specific appropriation to sponsor this work has been included in the ARB's budget for the current year.

The project would be conducted in three phases in order to take into account the complexity of the problem: (1) a phase of identifying needed information about how to perform the field evaluation; (2) a phase of gathering and synthesizing all needed information; and (3) actually performing the evaluation on a continuing basis.

Phase I (year one, current proposal) would focus on identifying knowledge gaps such as how present knowledge derived from chamber studies can be adapted to field evaluations. For example, the effects of key environmental factors such as soil, weather, and cultural practices need to be specified. Also, key physiological processes will need to be understood in order to predict ultimate yield loss from observations during growth season. All pertinent literature would be gathered. The best approaches to obtain needed information would be sought with the help of experts at a special workshop.

In Phase II (years two and three), field evaluation methods would be developed and tested, information from the literature, pilot experiments, and special projects would be applied to the field evaluation

schemes, local agricultural specialists would be contacted and trained in field assessment, and a pilot field survey would be carried out. Input from economists will be sought to ensure that all data necessary for economic modeling are collected.

In Phase III (years four and five), full-scale field investigations would be initiated. Vegetative damage and yield losses would be estimated and air quality would be compared with these injuries.

The field surveys would be carried out by local county and university extension agricultural specialists. These individuals are already highly trained and are familiar with local conditions and agricultural practices. Working with local specialists would also allow more extensive crop loss surveys to be carried out than could be done by a single individual or a small team.

This program would provide much better crop loss information than is now available, including documentation of actual damage occurring in the field. This information is needed to develop more realistic estimates of the economic impacts of air pollution on agriculture, both at current and future levels. The program would also be both a driving and guiding force for the ARB extramural research program on vegetation effects. In particular, the identification of major knowledge gaps and the extensive first-year planning effort would help to ensure the most cost-effective and thorough long-term research program to assess air pollution damage to crops.

State of California
AIR RESOURCES BOARD

Resolution 84-48
September 26, 1984

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive research program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Section 39903; and

WHEREAS, an unsolicited research proposal, Number 042-6, entitled "Fog, Cloud and Dew Chemistry", has been submitted by the California Institute of Technology 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 042-6, entitled "Fog, Cloud and Dew Chemistry", submitted by the California Institute of Technology for a total amount not to exceed $400,548.

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 042-6, entitled "Fog, Cloud and Dew Chemistry", submitted by the California Institute of Technology for a total amount not to exceed $400,648.

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 $400,648.

I hereby certify that the above is a true and correct copy of Resolution 84-48 as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-13-6(b)6
DATE: September 26, 1984

ITEM: Research Proposal No. 042-6 entitled "Fog, Cloud and Dew Chemistry"

RECOMMENDATION: Adopt Resolution 84-48 approving Proposal No. 042-6 for funding in an amount not to exceed $400,648.

SUMMARY:

Over the last three years, the proponents have determined the chemical composition of fog-, cloud-, and rainwater in various areas of California. The results established that fog- and cloudwater in Southern California are regularly acidic (pH 1.7 to 4.0), and provide an environment for the accumulation in water droplets of nitric and sulfuric acids. High acidity was common not only in Los Angeles, but also in the southern San Joaquin Valley and in some nonurban coastal areas. It has been hypothesized that the potential for environmental insult may be highest during foggy conditions when dilution and cleansing processes cannot effectively limit deposition of acid on plants and exposed surfaces.

The proposed two-year research effort is a continuation of an on-going study of the chemistry, rate of formation and occurrence of acid fogs in the State. Specific objectives are: 1) to construct and optimize an automatic fogwater collector; 2) to conduct multiple site sampling to determine temporal and spatial variations of fogwater chemistry; 3) to characterize the flux of acids and acid precursors to dew-wetted surfaces; 4) to determine variations in fogwater composition with droplet size; and 5) to correlate fog- and cloudwater data with air quality and meteorological data.

With the aid of automated collectors, the proponents would determine the spatial and temporal variation of fog/cloud chemistry in the following areas: 1) along the coastal areas of Los Angeles; 2) Riverside and San Bernardino; 3) mountain ranges around the Los Angeles basin; 4) Santa Barbara channel; and 5) southern San Joaquin Valley. The objectives of the extensive sampling program along the coastal areas of Los Angeles will be to determine the sources

and the chemical variations in acidic fogwater. The tendency of atmospheric ammonia to neutralize fogwater acidity will be of particular interest in the Riverside/San Bernardino area. Simultaneous sampling at a number of mountain sites in the Los Angeles basin is proposed to obtain a better understanding of transport, vertical mixing and chemistry of the marine layer. The primary purpose for the proposed Santa Barbara channel monitoring is to predict, with the help of aqueous-phase models, the impact of increased offshore emissions associated with oil lease sites on the onshore aerosol composition. Finally, the parameters controlling pollutant build-up in the southern San Joaquin Valley during a stagnation episode and fate of the aerosols will be determined with the aid of tracer studies.

Dew will be collected with dew plates at sites that are representative of: 1) marine proximity; 2) industrial plume impacts; 3) intense secondary smog exposure; and 4) remote, unpolluted atmospheres.

Sampling sites will be located at or near air quality monitoring sites so that deposition data can be analyzed and compared to ambient pollutant concentrations, wind speed, and temperature. In addition, all of the fogwater data collected in this study will be combined with standard air quality and meteorological data to search for statistical correlations that would aid in prediction of extreme acid events from routine air monitoring data. This study is needed to improve our understanding of the relationships between emission sources and the evolution and extent of acid fogs in California.

Under current plans, the two-year research study would be funded in the following manner: Year 1 - $202,202 - FY 84-85; Year 2 - $198,446 - FY 85-86; for a total of $400,648.

BUDGET SUMMARY: CALIFORNIA INSTITUTE OF TECHNOLOGY

"Fog, Cloud and Dew Chemistry"

BUDGET ITEMS:

	First Year	Second Year	Total
Salaries	$ 68,870	$ 74,160	$143,030
Benefits	$ 17,348	$ 18,713	$ 36,061
Supplies	$ 17,600	$ 16,500	$ 34,100
Equipment	$ 25,000	$ 12,000	$ 37,000
Travel	$ 12,000	$ 12,480	$ 24,480
Total Direct Costs	$140,818	$133,853	$274,671
Indirect Cost	$ 61,384	$ 64,593	$125,977
TOTAL PROJECT COST	$202,202	$198,446	$400,648

State of California
AIR RESOURCES BOARD

Resolution 84-49
September 26, 1984

WHEREAS, the Air Resources Board has been directed to design and implement a comprehensive research program of research and monitoring of acid deposition in California pursuant to Health and Safety Code Section 39903; and

WHEREAS, an unsolicited research proposal, Number 041-6, entitled "Determination of Acidity in Ambient Air-Phase II", has been submitted by the California 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 Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

> Proposal Number 041-6, entitled "Determination of Acidity in Ambient Air - Phase II", submitted by the California Department of Health Services for a total amount not to exceed $279,291.

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 041-6, entitled "Determination of Acidity in Ambient Air - Phase II", submitted by the California Department of Health Services for a total amount not to exceed $279,291.

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 $279,291.

I hereby certify that the above is a true and correct copy of Resolution 84-49 as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-13-6(b)7
DATE: September 26, 1984

ITEM: Research Proposal No. 041-6 entitled "Determination of Acidity in Ambient Air - Phase II"

RECOMMENDATION: Adopt Resolution 84-49 approving Proposal No. 041-6 for funding in an amount not to exceed $279,291.

SUMMARY:

Atmospheric acidity in the form of sulfuric, nitric and hydrochloric acids is important because of: its potential as a health-related inhalation hazard and its role as a precursor of visibility-degrading atmospheric particles; and as a contributor to the acidity of suspended particles, rain-, cloud- and fogwater. Nitric acid may also act as a nitrating agent in forming nitro-PAH compounds of greatly increased mutagenicity compared to the parent hydrocarbon.

Despite their significant role in atmosphere chemistry, measurements of atmospheric acids have been limited, mainly because no analytical technique has been found to be fully satisfactory for determining their concentrations.

Measurements of atmospheric acidity which are based upon filter collection are labor intensive, involve expensive sample analysis, and are subject to an assortment of negative errors due to neutralization by ammonia (NH_3) during handling and analysis, and by reaction with aerosol constituents.

The proposed two-year research effort is a continuation of an on-going, multi-year program to evaluate techniques for measurement of atmospheric acidity. An automated, semi real-time monitor for measurement of both nitric acid and ammonia was constructed during Phase I, employing the tungstic acid (chemical absorption) technique and compared with filter techniques. In addition, a filter technique for measurement of hydrochloric acid was evaluated and alternative methods for semi real-time measurement of sulfuric acid were considered.

In Phase II, the sulfuric acid monitor will be constructed and validated. An additional automated nitric acid-ammonia analyzer and portable calibration system will be constructed for field sampling and for dry deposition flux monitoring. A manual denuder for measurement of hydrochloric acid will also be assembled and compared to the dual filter techniques. Following the construction and evaluation of the aforementioned analyzers, a field study will be conducted at downtown Los Angeles and Riverside during the summer of 1985 to measure atmospheric concentrations of sulfuric acid, gaseous nitric and hydrochloric acids and total particulate acidity.

The major purpose of this study is to overcome many of the limitations that are inherent in the techniques which are now used for measurement of atmospheric ammonia and sulfuric, nitric and hydrochloric acids. The proposed work should produce reliable and nearly real-time analytical capability for measuring these compounds and improve our ability to determine possible effects of atmospheric acidity upon human health, visibility, materials and aquatic and terrestrial ecosystems.

Under current plans, the two-year research study would be funded in the following manner: Year 1 - $138,943 - FY 84-85; Year 2 - $140,348 - FY 85-86; for a total of $279,291.

BUDGET SUMMARY: CALIFORNIA DEPARTMENT OF HEALTH SERVICES
AIR AND INDUSTRIAL HYGIENE LABORATORY

"Determination of Acidity In Ambient Air--Phase II"

BUDGET ITEMS:

	First Year	Second Year	Total
Salaries	$ 59,145	$ 70,263	$129,408
Benefits	$ 18,406	$ 21,866	$ 40,272
Supplies	$ 5,822	$ 5,000	$ 10,822
Equipment	$ 21,228	$ --	$ 21,228
Rent	$ 3,410	$ 3,410	$ 6,820
Travel	$ 1,500	$ 5,210	$ 6,710
General Expenses	$ 2,754	$ 2,907	$ 5,661
Total Direct Costs	$112,265	$108,656	$220,921
Indirect Cost	$ 26,678	$ 31,692	$ 58,370
TOTAL PROJECT COST	$138,943	$140,348	$279,291