State of California
AIR RESOURCES BOARD

Resolution 86-77
September 25, 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, a solicited research proposal, Number 126-18, entitled "Monitoring Program for Estimation of Dry Acidic Gas and Aerosol Deposition in California," has been submitted by Desert Research Institute;

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 126-18, entitled "Monitoring Program for Estimation of Dry Acidic Gas and Aerosol Deposition in California," submitted by Desert Research Institute, for a total amount not to exceed $1,430,606.

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 126-18, entitled "Monitoring Program for Estimation of Dry Acidic Gas and Aerosol Deposition in California," submitted by Desert Research Institute, for a total amount not to exceed $1,430,606.

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 $1,430,606.

I hereby certify that the above is a true and correct copy of Resolution 86-77, as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

ITEM NO.: 86-11-6 (b) (1)
DATE: September 25, 1986

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 126-18 entitled "Monitoring Program for Estimation of Dry Acidic Gas and Aerosol Deposition in California"

RECOMMENDATION: Adopt Resolution 86-77 approving Proposal No. 126-18 for funding in an amount not to exceed $1,430,606.

SUMMARY: The objective of this project is to establish and operate for one year a network of comprehensive meteorological and aerometric measurements to estimate dry deposition throughout California. This network would form the basis for an ongoing, long-term dry deposition monitoring program to be continued by ARB.

The Kapiloff Acid Deposition Act of 1982 requires the Board to establish and operate a statewide, long-term monitoring network to detect and measure levels and effects of acid deposition. Accordingly, the Board established a long-term wet deposition monitoring network in 1983, and this network, now consisting of 35 stations statewide, has been operating successfully for three years. However, in 1982, methods for measuring dry deposition were not sufficiently developed to establish a routine dry deposition monitoring network. Therefore, beginning in 1983 the Board undertook a series of projects to select, test, and, as necessary develop a suitable approach for estimating dry deposition in California. In early 1984, ARB sponsored a workshop on dry deposition to obtain recommendations on the most feasible course to follow for developing a routine monitoring network. Based on the results of that workshop the ARB, with the advice and concurrence of its Scientific Advisory Committee, adopted the approach of measuring atmospheric concentrations of acidic material and inferring the deposition flux using meteorological methods. Subsequent studies sponsored by the Board and by others have focused on the development of methods for measuring nitric acid and other important compounds in the atmosphere, and culminated in the Board's Nitrogen Species Measurement Methods

Comparison Study. Related research sponsored by the Board and carried out simultaneously has included studies of: acidic particles in the atmosphere and using leaf washing as a direct measure of particle deposition, using the virtual dichotomous impactor to measure nitric acid and particle nitrate concentrations, and developing methods for measuring atmospheric concentrations of hydrochloric and sulfuric acids. In part because of the success of these early Board-sponsored development studies, the Board was able to sponsor, beginning in 1986, the establishment of a nine site monitoring network for acid gases and particles in the South Coast Air Basin. That network was set up and is being operated for a period of one year by a research team at Caltech.

The objective of this project is to establish and operate a network designed to provide comprehensive measurements of acidic species and meteorology to estimate the spatial and temporal variability of dry deposition throughout the state for twelve months beginning in July 1987. In addition, the contractor will provide all necessary documentation to support subsequent operation of the network by ARB. The network is designed to represent a wide cross section of California in terms of geographic location and physical characteristics. The attached map indicates the sites included in this project.

The Desert Research Institute would be the prime contractor and would be responsible for overall project management, equipment procurement and testing, site installation, field operations, continuous data processing, and data management. Environmental Research and Technology Inc., as a subcontractor to DRI, would be responsible for substrate preparation, the major amount of sample analysis, and data processing. Dr. John Watson, Associate Research Professor at the Energy and Environmental Center of DRI, will be the program manager. Dr. Kochy Fung from ERT is proposed as laboratory operations manager.

This project will be among the first of its kind in the nation. In addition it will be the first statewide network in California established to provide routine, long-term data on dry acid deposition. Complementary efforts now being planned by the U. S. Environmental Protection Agency and the Electric Power Research Institute provide for nationwide monitoring networks to begin operation in 1987, with several stations located in California.

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

Desert Research Institute

"Monitoring Program for Estimation of
Dry Acidic Gas and Aerosol Deposition in California,"

BUDGET ITEMS:

Salaries	$203,352	
Benefits	51,659	
Supplies	65,006	
Other Costs[1]	301,099	
Equipment[2]	322,700	
Travel	35,414	
TOTAL, Direct Costs		$ 979,230
TOTAL, Indirect Cost		451,376
	TOTAL PROJECT COST	$1,430,606

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1 Includes $220,499 for chemical analysis of approximately 28,000 samples, and $35,100 for data processing

2 Includes $135,650 for nine aerosol/gas samplers, $34,565 for meteorological equipment, $27,810 for data loggers, $55,395 for shelters, ozone monitors, and wet/dry bucket samplers, and $31,091 for spare parts

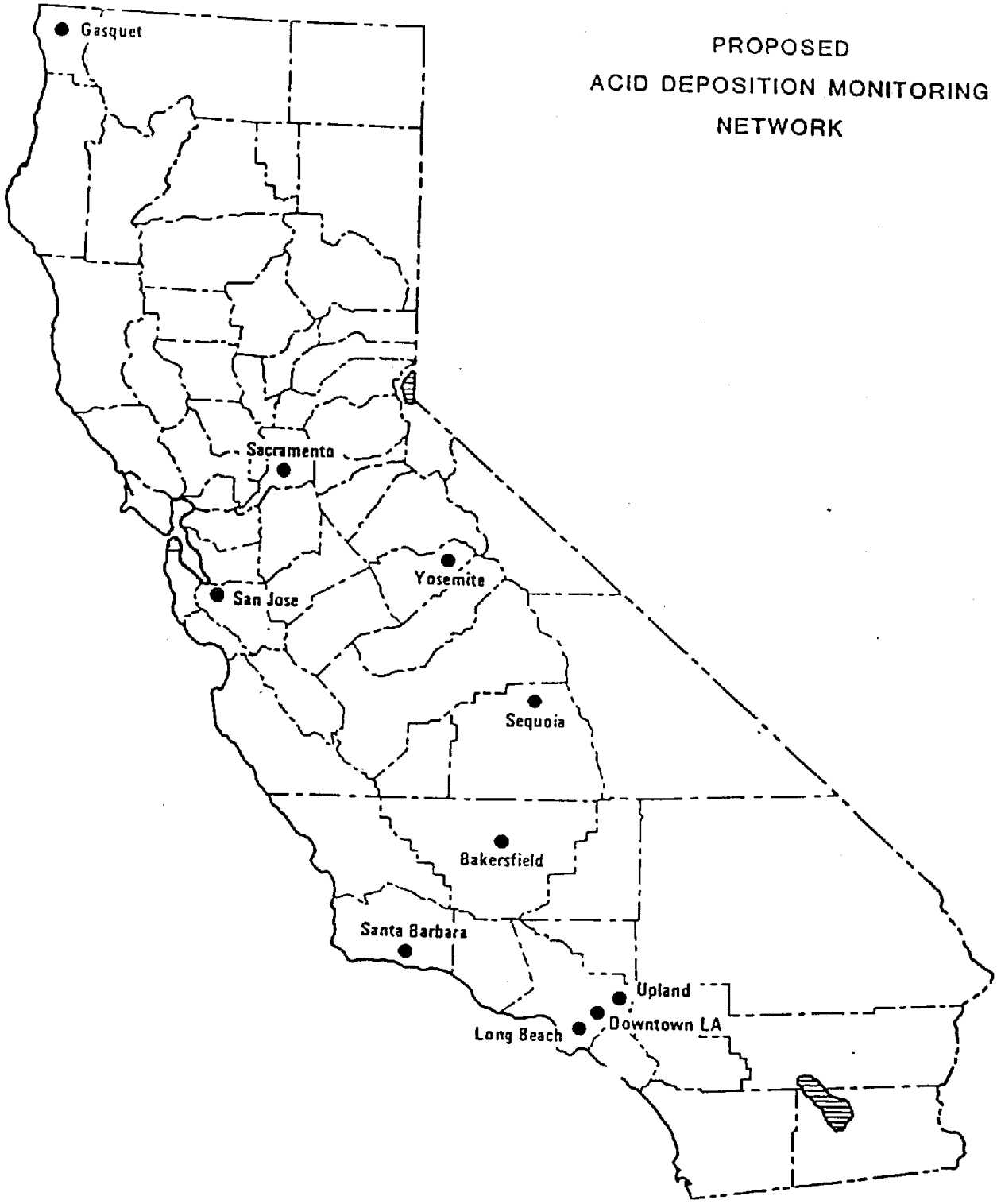

Figure 1 Proposed Locations of CADMP Phase II Sampling Sites in California

State of California
AIR RESOURCES BOARD

Resolution 86-78
September 25, 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, a solicited research proposal, Number 124-18, entitled "South Coast Air Quality Study (SCAQS) Sampler," has been submitted by AeroVironment, 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 124-18, entitled "South Coast Air Quality Study (SCAQS) Sampler," submitted by AeroVironment, Inc. for a total amount not to exceed $198,216.

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 124-18, entitled "South Coast Air Quality Study (SCAQS) Sampler," submitted by AeroVironment, Inc. for a total amount not to exceed $198,216.

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 $198,216.

I hereby certify that the above is a true and correct copy of Resolution 86-78, as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

ITEM: 86-11-6 (b) (2)
DATE: September 25, 1986

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 124-18 entitled "Southern California Air Quality Study Sampler"

RECOMMENDATION: Adopt Resolution 86-78 approving Proposal No. 124-18 for funding in an amount not to exceed $198,216.

SUMMARY: The purpose of this project is to provide for the design, construction and testing of air sampling equipment for ARB's nine intensive (Type B) monitoring stations to be operated as part of the Southern California Air Quality Study.

The Air Resources Board has been planning an intensive study of air quality in the South Coast Air Basin (SoCAB) since late 1984. The overall goal of the Southern California Air Quality Study (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, PM_{10}, fine particles, toxic air contaminants, and acidic species.

Under this proposal, AeroVironment (AV) would build air samplers for ARB's nine "Type B" monitoring sites, with modules to collect gases, fine particles (<2.0 micrometers diameter), and inhalable particles (<10 micrometers diameter). AV would first construct two prototype samplers and test them to evaluate accuracy and precision. After the prototypes are accepted by ARB, seven more samplers would be constructed. AV would conduct side-by-side tests of all samplers to ensure that they operate in an equivalent manner. The nine samplers would then be operated at the Type B sites by AV personnel under an existing ARB contract with AeroVironment.

The proposed work is a part of the ARB's core program for SCAQS. The sampler design, construction, and testing are currently on the critical path in the overall SCAQS plan. The research results from SCAQS will aid the Board in making decisions related to control strategies in the SoCAB.

The principal investigator for this project is Mr. David Wilbur, and the contractor is AeroVironment.

State of California
AIR RESOURCES BOARD

Resolution 86-79
September 25, 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, a solicited research proposal, Number 122-18, entitled "Evaluation of Methods for Measurement of Snowfall and Collection of Snow for Chemical Analysis," has been submitted by the U. S. Department of Agriculture, Forest Service;

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 122-18, entitled "Evaluation of Methods for Measurement of Snowfall and Collection of Snow for Chemical Analysis," submitted by the U. S. Department of Agriculture, Forest Service for a total amount not to exceed $113,000.

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 122-18, entitled "Evaluation of Methods for Measurement of Snowfall and Collection of Snow for Chemical Analysis," submitted by the U. S. Department of Agriculture, Forest Service for a total amount not to exceed $113,000.

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 $113,000.

I hereby certify that the above is a true and correct copy of Resolution 86-79, as adopted by the Air Resources Board.

Harold Holmes

Harold Holmes, Board Secretary

ITEM NO.: 86-11-6 (b) (3)
DATE: September 4, 1986

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 122-18 entitled "Evaluation of Methods for Measurement of Snowfall and Collection of Snow for Chemical Analysis."

RECOMMENDATION: Adopt Resolution 86-79 approving Proposal No. 122-18 for funding in an amount not to exceed $113,000.

SUMMARY: The purpose of this study is to evaluate methods for the collection of snow samples for chemical analysis and measurement of snowfall volume for use in routine monitoring of atmospheric deposition at a high elevation site.

The Sierra Nevada range is of particular interest due to the sensitivity of Sierra lakes to the effects of acid deposition. Snow accounts for up to 95% of the total precipitation at these sites and is the major pathway for acidic deposition. The standard wet/dry buckets which are currently used in most deposition monitoring networks are ill-suited for collecting snow. The large amounts of snowfall in some areas of California can cause frequent overflows of the collection buckets and collected snow can be blown out of the wet bucket or into the "dry" bucket by strong winds. Additionally, the resistance grid sensors can fail to activate during cold windy events. In addition to difficulties in collecting representative snow samples, large errors can exist in measurements of snowfall by standard rain gauges, particularly in areas subject to high winds.

A field study will be conducted in the winter of 1986-87 by the U.S. Forest Service and the University of California, Santa Barbara to evaluate the performance of precipitation gauging systems. The study will be conducted at the research facilities located at the Central Sierra Snow Laboratory in Soda Springs and at the Mammoth Mountain site. Snowfall will be measured by various methods and relative collection rates of different methods will be determined. The effect of various sampling periods (event, weekly, etc.) and sample storage and handling procedures upon the accuracy and precision of the snowfall measurements and chemical analyses will investigated. Evaluated methods would be used

by the ARB in the existing statewide, long-term monitoring network to determine the temporal and spatial variability of acid (snow) deposition. In addition, replicate snow core samples of the annual snowpack will be collected in late winter at about ten sites in the Sierra Nevada and the San Bernardino Mountains in order to determine the spatial distribution of snow chemistry.

The research contractor is U. S. Department of Agriculture, Forest Service. The Principal Investigator is Dr. Neil Berg.

BUDGET SUMMARY

U.S. Department of Agriculture, Forest Service

"Evaluation of Methods for Measurement of Snowfall and Collection of Snow for Chemical Analysis"

BUDGET ITEMS:

Salaries	$44,403	
Benefits	9,459	
Supplies[1]	10,405	
Other Costs[2]	8,700	
Travel[3]	10,200	
Equipment[4]	25,800	
TOTAL, Direct Costs		$108,967
TOTAL, Indirect Cost		4,033
	TOTAL PROJECT COST	$113,000

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1 Includes $4,200 for field and office supplies and $5,705 for chemical supplies.

2 Includes $7,200 for computer use

3 Includes travel cost of $9,000 for the field study

4 Includes $12,000 for five precipitation gauges, $6,150 for three data recording systems and $4,750 for three sets of meteorological instruments

State of California
AIR RESOURCES BOARD

Resolution 86-80
September 25, 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, a solicited research proposal, Number 120-18, entitled "Development of an Inventory of Materials Potentially Sensitive to Ambient Atmospheric Acidity 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 Scientific Advisory Committee on Acid Deposition has reviewed and recommends for funding:

> Proposal Number 120-18, entitled "Development of an Inventory of Materials Potentially Sensitive to Ambient Atmospheric Acidity in the South Coast Air Basin," submitted by Valley Research Institute, for a total amount not to exceed $248,624.

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 120-18, entitled "Development of an Inventory of Materials Potentially Sensitive to Ambient Atmospheric Acidity in the South Coast Air Basin," submitted by Valley Research Institute, for a total amount not to exceed $248,624.

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 $248,624.

I hereby certify that the above is a true and correct copy of Resolution 86-80, as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

ITEM NO.: 86-11-6 (b) (4)
DATE: September 25, 1986

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 120-18 entitled "Development of an Inventory of Materials Potentially Sensitive to Ambient Atmospheric Acidity in the South Coast Air Basin."

RECOMMENDATION: Adopt Resolution 86-80 approving Proposal No. 120-18 for funding in an amount not to exceed $248,624.

SUMMARY: The purpose of this study is to develop a comprehensive inventory of exposed materials that are potentially sensitive to acid deposition for the South Coast Air Basin (SoCAB).

The Kapiloff Acid Deposition Act requires the Air Resources Board to assess the economic impact of acid deposition upon materials as a part of a comprehensive research program to determine the nature, extent, and potential effects of acid deposition in California. This study, together with others sponsored by the Board, the Electric Power Research Institute, and the National Acid Precipitation Assessment Program (NAPAP), should provide the necessary information to prepare an overall economic assessment of the damages to materials in the SoCAB as a result of acid deposition.

Under this proposal Valley Research Corporation (VRC) will develop an inventory of exposed materials for residential and non-residential buildings and for non-building materials. The inventory of the residential buildings will be developed by conducting telephone surveys of 1,500 households and field surveys of 200 households. The inventory of multi-family residential buildings and non-residential buildings will be conducted using aerial photo analysis. The inventory of non-building materials (infrastructure) would be developed by conducting a limited survey and by using engineering calculations. VRC proposes to extrapolate the inventory to the entire SCAB using the building count-method recommended by NAPAP.

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

Valley Research Corporation

"Development of an Inventory of Materials
Potentially Sensitive to Ambient Atmospheric
Acidity in the South Coast Air Basin"

BUDGET ITEMS:

Salaries	$118,564	
Benefits	39,294	
Supplies	1,100	
Other Cost[1]	22,500	
Travel	9,510	
TOTAL, Direct Costs		$190,968
TOTAL, Indirect Cost		57,656
	TOTAL PROJECT COST	$248,624

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1 Includes aerial photography, computer time, word processing, reproduction

State of California
AIR RESOURCES BOARD

Resolution 86-81
September 25, 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, a solicited research proposal, Number 114-18, entitled "Conference to Develop Recommendations for a Plan for Research to Determine the Effects of Acid Deposition and Other Air Pollutants on California Forests," has been submitted by Humboldt State University 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 114-18, entitled "Conference to Develop Recommendations for a Plan for Research to Determine the Effects of Acid Deposition and Other Air Pollutants on California Forests" submitted by Humboldt State University Foundation, for a total amount not to exceed $35,000.

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 114-18, entitled "Conference to Develop Recommendations for a Plan for Research to Determine the Effects of Acid Deposition and Other Air Pollutants on California Forests" submitted by Humboldt State University Foundation, for a total amount not to exceed $35,000.

BE IT FURTHER RESOLVED, that the Executive Office is hereby authorized to initiate administrative procedures and execute all necessary documents and contrats for the research effort proposed herein in an amount not to exceed $35,000.

I hereby certify that the above is a true and correct copy of Resolution 86-81, as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

ITEM NO.: 86-11-6 (b) (5)
DATE: September 25, 1986

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 114-18 entitled "Conference to Develop Recommendations for a Plan for Research to Determine the Effects of Acid Deposition and Other Air Pollutants on California Forests"

RECOMMENDATION: Adopt Resolution 86-81 approving Proposal No. 114-18 for funding in an amount not to exceed $35,000.

SUMMARY: The objectives of this study are : (1) to review the literature and summarize what is known about the effects of atmospheric deposition on forests, (2) to identify and summarize ongoing research in this area, and (3) to provide expert assistance in designing a study plan for California that would allow for an assessment of the impact of acidic deposition and other air pollutants on forests in the state.

To meet these objectives the proponents plan to convene a workshop to include experts in the fields of forest ecology and air pollution and acid deposition effects. The proponents will synthesize a research plan based on review papers provided by the workshop participants and on focused discussion during the two-day session.

The contractor is Humboldt State University Foundation and the principal investigator is Dr. Susan Bicknell.

BUDGET SUMMARY

Humboldt State University Foundation

"Conference to Develop Recommendations for a Plan for Research to Determine the Effects of Acid Deposition and Other Air Pollutants on California Forests"

BUDGET ITEMS:

Salaries	$ 9,898	
Benefits	2,734	
Supplies & Expenses	4,500	
Travel[1]	10,303	
Other Costs[2]	3,000	
TOTAL, Direct Costs		$30,435
TOTAL, Indirect Cost		4,565
	TOTAL PROJECT COST	$35,000

1 Includes travel and per diem for symposium participants
2 Honoraria for symposium participants

State of California
AIR RESOURCES BOARD

Resolution 86-82
September 25, 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 130-18, entitled "Vegetation Process Studies," has been submitted by the University of California, Los Angeles;

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 130-18, entitled "Vegetation Process Studies," submitted by the University of California, Los Angeles, for a total amount not to exceed $190,031.

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 130-18, entitled "Vegetation Process Studies," submitted by the University of California, Los Angeles, for a total amount not to exceed $190,031.

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 $219,398.

I hereby certify that the above is a true and correct copy of Resolution 86-82, as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

ITEM NO.: 86-11-6 (b) (6)
DATE: September 25, 1986

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 130-18 entitled "Vegetation Process Studies"

RECOMMENDATION: Adopt Resolution 86-82 approving Proposal No. 130-18 for funding in an amount not to exceed ~~$219,398~~. 190,031

SUMMARY: This project is a continuation of work started in 1984 as part of the Board's Integrated Watershed Study at Sequoia National Park. The project includes both field and laboratory research to assess and document the potential for damage to vegetation due to acid deposition in the Sierra Nevada.

Under this proposal, current studies would be continued at two sites in the Park: Emerald Lake (9200') and Log Meadow (6500'). The specific tasks to be completed as part of this study are: (1) determination of biomass and productivity of major vegetation types; (2) determination of pools and fluxes of nitrogen, phosphorus, sulfur and aluminum in vegetation; (3) investigation of vegetation response to aluminum toxicity (potentially caused by acid deposition) through a series of lab experiments; and (4) integration of four years of field data at these two sites.

The investigators will also participate in a modeling exercise to include the vegetation data in a biogeochemical analysis of the Emerald Lake Watershed to try to assess response of the whole ecosystem to potential changes in acid deposition.

The contractor will be the University of California at Los Angeles and the principal investigator will be Dr. Phillip Rundel.

State of California
AIR RESOURCES BOARD

Resolution 86-83
September 25, 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 131-18, entitled "Analysis and Interpretation of the 1985 ARB Projects in Sequoia National Park," has been submitted by Dr. Leonard O. Myrup;

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 131-18, entitled " Analysis and Interpretation of the 1985 ARB Projects in Sequoia National Park," submitted by Dr. Leonard O. Myrup, for a total amount not to exceed $8,000.

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 131-18, entitled "Analysis and Interpretation of the 1985 ARB Projects in Sequoia National Park," submitted by Dr. Leonard O. Myrup for a total amount not to exceed $8,000.

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 $8,000.

I hereby certify that the above is a true and correct copy of Resolution 86-83, as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

ITEM: 86-11-6 (b) (7)
DATE: September 25, 1986

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 131-18 entitled "Analysis and Interpretation of the 1985 ARB Projects at Sequoia National Park"

RECOMMENDATION: Adopt Resolution 86-83 approving Proposal No. 131-18 for funding in an amount not to exceed $8,000.

SUMMARY: The purpose of this study is to integrate and assess the results from coordinated air quality studies carried out in Sequoia National Park.

In 1985 the ARB funded four atmospheric transport and deposition studies at Sequoia National Park. Preliminary results of these studies were presented at a workshop at Sequoia National Park in January, 1986 and at a second workshop organized by ARB staff in March, 1986. Through discussions at these workshops, it has become clear that a need exists to integrate the results of the four studies before further research approaches can be formulated. This proposal is in response to that need.

The proponents will review the four reports submitted by the individual contractors, integrate the data from the four studies, and then interpret the integrated data set. They will identify and document similarities and differences in the data between any of the four studies, and will attempt to resolve any areas of apparent disagreement. They will prepare a report describing their findings, and will prepare a list of recommended research needed to fill gaps or resolve areas of conflict between results from different researchers.

The principal investigators and contractors are Drs. Leonard Myrup and Robert Flocchini.

State of California
AIR RESOURCES BOARD

Resolution 86-84
September 25, 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 augmentation proposal, Number 030-4A, entitled "A 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;

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 030-4A, entitled "A 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 $39,760.

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 030-4A, entitled "A 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 $39,760.

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 $46,591.

I hereby certify that the above is a true and correct copy of Resolution 86-84, as adopted by the Air Resources Board.

Harold Holmes, Board Secretary

ITEM NO.: 86-11-6 (b) (8)
DATE: September 25, 1986

State of California
AIR RESOURCES BOARD

ITEM: Augmentation Proposal No. 030-4A entitled "A Study of the Influence of Sediments in Buffering Aquatic Systems and Development of a Model of the Acidification Process"

RECOMMENDATION: Adopt Resolution 86-84 approving Proposal No. 030-4A for funding in an amount not to exceed ~~$46,591~~. 39,760

SUMMARY: This proposal is a request to augment an existing ARB Contract, No. A4-042-32, to include additional time and funds to complete a modified and extended scope of work. The contractors have been involved in the collection of field data on sediment-water column exchange at three high-elevation lakes of the Sierra Nevada for three field seasons.

The objective of the original study (Contract No. A4-042-32), begun in July 1984, was to study and quantify the sediment-water column exchange processes of three lakes in the Sierra Nevada and to investigate how these processes influence the buffering capacity/alkalinity of these lakes. This information is believed to be essential to our understanding of the sensitivity and susceptibility of low-alkalinity lakes in California to acidification. The objective remains unchanged. Based on preliminary results, however, the contractor identified and the ARB staff concurred with the need for additional (under-the-ice) samples in order to develop and validate a computer model of lakewater and sediment alkalinity in order to meet the overall objective.

The project is designed to investigate the role that lake sediments play in neutralizing acid inputs to sensitive Sierra lakes. The contractors studied this question by collecting samples of sediments, pore water in the sediments, and overlying lake water. They have also performed experiments in the laboratory to understand the rates at which sediments provide buffering material to the overlying water. These field and laboratory data are being used to validate a model being formulated to explain how sediments interact with lakewater to buffer acids.

The ARB staff and Scientific Advisory Committee recommended that this additional work be completed and that the supplemental set of under-the-ice sediment pore water samples be analyzed. This will require that the contractors receive additional funds for personnel and equipment and more time to run the models and to complete the final report. The result of this additional effort will be a more complete, semi-quantitative understanding of the importance of sediments in buffering acidic inputs to sensitive subalpine lakes in the Sierra Nevada. The ARB staff and the Scientific Advisory Committee did consider the alternative of augmenting the project after the funds were exhausted but determined that the delay caused would be unacceptable since the results of this study are needed as input to other projects already in place.

The principal investigators are Drs. John Harte and Ronald Amundson.

BUDGET SUMMARY

University of California, Berkeley

"A Study of the Influence of Sediments in Buffering Aquatic Systems and Development of a Model of the Acidification Process"

BUDGET ITEMS:

Salaries	$17,369	
Benefits	3,776	
Supplies & Expenses	15,000*	
Travel	-0-	
TOTAL, Direct Costs		$36,145
TOTAL, Indirect Cost		10,446
TOTAL PROJECT COST		~~$46,591~~ 39,760

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* Includes water analyses, computer time and publication expenses