State of California
AIR RESOURCES BOARD

Resolution 84-51
October 25, 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 1280-110, entitled "A Coordinated Study of the Role of Nitrogenous Pollutants in the Formation of Atmospheric Mutagens and Acid Deposition", 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 1280-110 entitled "A Coordinated Study of the Role of Nitrogenous Pollutants in the Formation of Atmospheric Mutagens and Acid Deposition", submitted by the University of California, Riverside, for a total amount not to exceed $440,437.

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 1280-110 entitled "A Coordinated Study of the Role of Nitrogenous Pollutants in the Formation of Atmospheric Mutagens and Acid Deposition", submitted by the University of California, Riverside, for a total amount not to exceed $440,437.

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 $440,437.

I hereby certify that the above is a true and correct copy of Resolution 84-51 as adopted by the Air Resources Board.

Harold Holmes

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 84-14-6b(1)
DATE: October 25, 1984

ITEM: Research Proposal No. 1280-110 entitled "A Coordinated Study of the Role of Nitrogenous Pollutants in the Formation of Atmospheric Mutagens and Acid Deposition"

RECOMMENDATION: Adopt Resolution 84-51 approving Research Proposal No. 1280-110 for funding in an amount not to exceed $440,437.

SUMMARY:

Oxides of nitrogen play a key role in the formation and/or transformation of a number of important air pollutants including: ozone, nitrogen dioxide, fine particulate matter, mutagenic compounds, and atmospheric acidity. This project addresses the last two of these, the complex role of NOx in the enhancement of mutagenicity of polycyclic aromatic hydrocarbons (PAH), and the closely associated role of NOx as a contributor to atmospheric acidity and acid deposition.

This proposal consists of two carefully coordinated ambient air monitoring studies that would employ sophisticated long-path-length spectroscopic techniques and highly specialized analytical techniques. Using these methods, the investigators would characterize the diurnal concentrations of gaseous precursors and reaction intermediates in the atmosphere during a summer oxidant episode and during a winter NOx/CO episode. In conjunction with these measurements, various PAHs would be exposed to the ambient atmosphere on filters to determine whether and to what extent nitrogenous pollutants enhance the mutagenicity of atmospheric particles by forming nitro-PAHs.

Specifically, this project would investigate the following: 1) the role of the various NOx species in the formation of mutagenic particles in the atmosphere; 2) whether mutagen formation occurs in the atmosphere, or is an artifact of the sampling method (i.e., do mutagens form on the filter as a result of prolonged exposure to a large volume of polluted air?); and 3) the role of the various NOx species in the formation of nitric acid in the atmosphere.

The specific measurements to be made are:

1) long-path (approximately 1-2 km) Fourier Transform Infrared Spectroscopy (FTIR) would be used to measure nitric acid, formaldehyde, ozone, PAN, formic acid and dinitrogen pentoxide, an important precursor of nitric acid;

2) differential optical absorption spectroscopy would be used to measure nitrate radical, NO_2, nitrous acid, and formaldehyde; and

3) conventional continuous monitors would be used to measure ozone, NOx, CO, temperature, relative humidity, solar radiation, light extinction, wind direction and wind velocity.

The information from this investigation would provide, for the first time, simultaneous measurements of all the nitrogen oxides species known to be important in air pollution chemistry, including precursors, atmospheric intermediates and end products such as nitric acid and possible nitro-PAHs. Combining the mutagenicity studies and atmospheric studies is expected to result in improved efficiency as compared to the cost of performing these needed studies separately.

BUDGET SUMMARY

STATEWIDE AIR POLLUTION RESEARCH CENTER

A COORDINATED STUDY OF THE ROLE OF NITROGENOUS POLLUTANTS IN THE FORMATION OF ATMOSPHERIC MUTAGENS AND ACID DEPOSITION

($440,437 - 24 MONTHS)

BUDGET ITEMS	Year 1 January 1,1985 December 31,1985	Year 2 January 1,1986 December 31,1986
Salaries	$ 98,350	$105,571
Employee Benefits	22,388	23,972
Equipment	10,501*	12,185**
Supplies and Materials	20,265	18,505
Travel	1,260	2,520
Other Expenses (reproduction and computer usage)	2,000	2,500
Total Direct Costs	$154,764	$165,253
Indirect Costs	58,427	61,993
Total Costs	$213,191	$227,246

* Includes $4,210 (half of the total price) for Teknivert Data System for Gas Chromatograph

** Includes $7,975 for state-of-the art TECO Pulsed Fluorescence SO_2 analyzer and the remaining $4,210 for Teknivert Data System for Gas Chromatograph