State of California
AIR RESOURCES BOARD

Resolution 85-35
December 16, 1983

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 002-1 entitled "The Evolution of Aerosol Loadings During Wintertime Stagnation Episodes in the Southern San Joaquin Valley" 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 002-1 entitled "The Evolution of Aerosol Loadings During Wintertime Stagnation Episodes in the Southern San Joaquin Valley" submitted by the California Institute of Technology for a total amount not to exceed $53,000; and

WHEREAS, the Governor's Executive Order D-26-83 prohibits State agencies from awarding research contracts through January 31, 1984.

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 002-1 entitled "The Evolution of Aerosol Loadings During Wintertime Stagnation Episodes in the Southern San Joaquin Valley" submitted by the California Institute of Technology for a total amount not to exceed $53,000.

BE IT FURTHER RESOLVED, that, should an exemption from the prohibition contained in Executive Order D-26-83 on awarding contracts for research be granted, or upon the expiration of Executive Order D-26-83, the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $53,000.

I certify that the above is a true and correct copy of Resolution 83-35as passed by the Air Resources Board.

Harold Holmes

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 83-19-4b(1)
DATE: December 16, 1983

ITEM: Research Proposal No. 002-1 entitled "The Evolution of Aerosol Loadings During Wintertime Stagnation Episodes in the Southern San Joaquin Valley."

RECOMMENDATION: Adopt Resolution 85-35 approving Research Proposal No. 002-1 for funding in an amount not to exceed $53,000. The total amount requested for this research is $105,762. Additional funding in the amount of $52,762 is being sought from the U.S. Evironmental Protection Agency.

SUMMARY: A large number of sources in the Southern San Joaquin Valley emit sulfur oxides and nitrogen oxides into the atmosphere. Under stagnant, humid conditions these pollutants can be transformed into acid gases and particles, including acidic fogs. These reaction products, either alone or combined with sources of particulate matter and ammonia in the valley, can contribute to the formation and persistence of dense haze and fogs which can severely restrict visibility and may affect human health.

Because the phenomenon of acid fog has only recently been identified, our understanding of the mechanisms of its formation, dispersion and dissipation are extremely limited. The Southern San Joaquin Valley represents a nearly ideal "laboratory" for the kind of study that is required to elucidate these and other processes.

In this study aerosol and fogwater samples will be collected and analyzed for chemical composition. Relatively small amounts of an inert, chemical tracer gas (sulfur hexafluoride) will also be released to determine transport and dilution patterns in the valley. Data from an extensive series of measurements will be analyzed to determine the retention time of pollutants released in the Valley and also the rate of formation of acids and their neutralization products in fog droplets.

The results of this research are needed to better understand the physical and chemical dynamics of aqueous aerosols and as a basis for future studies of the potential adverse health effects of acid fog. This improved understanding will help explain the formation of such fogs in areas of the State that are subject to both high acid precursor concentrations and foggy atmospheres.

State of California
AIR RESOURCES BOARD

Resolution 83-36
December 16, 1983

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 1224-104 entitled "Effects of Short-term Exposure to Carbon Monoxide in Subjects with Coronary Artery Disease" has been submitted by the University of California, Irvine, 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 1224-104 entitled "Effects of Short-term Exposure to Carbon Monoxide in Subjects with Coronary Artery Disease" submitted by the University of California, Irvine, for a total amount not to exceed $51,008; and

WHEREAS, the Governor's Executive Order D-26-83 prohibits State agencies from awarding research contracts through January 31, 1984.

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 1224-104 entitled "Effects of Short-term Exposure to Carbon Monoxide in Subjects with Coronary Artery Disease" submitted by the University of California, Irvine, for a total amount not to exceed $51,008.

BE IT FURTHER RESOLVED, that, should an exemption from the prohibition contained in Executive Order D-26-83 on awarding contracts for research be granted, or upon the expiration of Executive Order D-26-83, the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $51,008.

I certify that the above is a true and correct copy of Resolution 83-36 as passed by the Air Resources Board.

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 83-19-4b(2)
DATE: December 16, 1983

ITEM: Research Proposal No. 1224-104 entitled "Effects of Short-term Exposure to Carbon Monoxide in Subjects with Coronary Artery Disease".

RECOMMENDATION: Adopt Resolution 83-36 approving Research Proposal No. 1224-104 for funding in an amount not to exceed $51,008.

SUMMARY: The State's carbon monoxide (CO) standards are based in part on a series of clinical studies carried out on angina patients. These patients experience chest pains when their heart muscles fail to receive adequate oxygen. Carbon monoxide acts competively to decrease the ability of the blood to carry oxygen to the heart and thus endangers the health of this group of heart disease patients. Carbon monoxide acts on the blood by binding strongly to hemoglobin to form carboxy-hemoglobin (COHb). Our current air quality standards are designed to prevent exercising angina patients from reaching levels of COHb in excess of two percent.

The validity of some of the most important health studies carried out with angina patients under EPA auspices has recently come under question. It is, therefore, essential to restudy quickly, but carefully, the most pivotal of these studies. This proposal would allow for such replication, employing angina patients whose COHb levels will be increased to two percent as well as at one other level. These levels would be attained while breathing air containing controlled amounts of CO during light exercise.

The basic protocol of the study will have design characteristics the same as in the previously reported studies that are in question. Where appropriate, some improved methodologies will be used. Approximately 30 volunteers who have stable angina are to be studied.

This project, along with another that is being funded by the EPA, will provide the Board with a reliable scientific basis for a re-examination of the State ambient air quality standards for carbon monoxide.

State of California
AIR RESOURCES BOARD

Resolution 83-37
December 16, 1983

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 1225-104 entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Use" 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 1225-104 entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Use" submitted by the University of California, Riverside, for a total amount not to exceed $49,994; and

WHEREAS, the Governor's Executive Order D-26-83 prohibits State agencies from awarding research contracts through January 31, 1984.

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 1225-104 entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Use" submitted by the University of California, Riverside, for a total amount not to exceed $49,994.

BE IT FURTHER RESOLVED, that, should an exemption from the prohibition contained in Executive Order D-26-83 on awarding contracts for research be granted, or upon the expiration of Executive Order D-26-83, the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $49,994.

I certify that the above is a true and correct copy of Resolution 83-37 as passed by the Air Resources Board.

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 83-19-4b(3)
DATE: December 16, 1983

ITEM: Research Proposal No. 1225-104 entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Use".

RECOMMENDATION: Adopt Resolution 83-37 approving Research Proposal No. 1225-104 for funding in an amount not to exceed $49,994.

SUMMARY: Air pollution damage to the State's crop, native and ornamental plants is a continuing concern of the Air Resources Board. To address this concern, the ARB contracted with the proponent and the Statewide Air Pollution Research Center to construct, operate and maintain twenty plant fumigation chambers at U.C. Riverside during 1981. The proponent has constructed and operated an excellent facility for studying air pollution effects on plants since that time. It has been used continuously to study various agricultural crops and native plants.

Past experience has demonstrated the need for competent technical people to maintain and operate the chambers for investigators who may not be familiar with the complex aspects of fumigation systems and air pollutant monitoring. This proposal will continue operation and maintenance of the chamber facility for investigators during 1984, and will upgrade the facility by automating data accumulation and processing.

The proponent will refurbish the facility at the conclusion of each experiment, assure that all equipment performs satisfactorily, oversee use of the facility, and upgrade the facility by installing a small computer system to accumulate and process data automatically. Automatic accumulation of data will greatly reduce the amount of labor required for this task. Under current procedures data are transcribed from strip charts and processed by hand. Strip chart recorders will remain in use as a check in the event of a failure in the computer system. This proposal eliminates the need for the investigators who are plant scientists, to maintain the facility; rather it provides that the technical aspects of running the facility are performed by highly qualified personnel.

State of California
AIR RESOURCES BOARD

Resolution 83-38
December 16, 1983

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 to augment Contract Number A2-088-32 entitled "Development of Methods to Estimate the Benefits of Visibility Improvement" has been submitted by the Santa Fe Research Corporation 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:

> An augmentation to Contract Number A2-088-32 entitled "Development of Methods to Estimate the Benefits of Visibility Improvement" submitted by the Santa Fe Research Corporation" for a total amount not to exceed $9,855; and

WHEREAS, the Governor's Executive Order D-26-83 prohibits State agencies from awarding research contracts through January 31, 1984.

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:

> An augmentation to Contract Number A2-088-32 entitled "Development of Methods to Estimate the Benefits of Visibility Improvement" submitted by the Santa Fe Research Corporation" for a total amount not to exceed $9,855.

BE IT FURTHER RESOLVED, that, should an exemption from the prohibition contained in Executive Order D-26-83 on awarding contracts for research be granted, or upon the expiration of Executive Order D-26-83, the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $9,855.

I certify that the above is a true and correct copy of Resolution 83-38 as passed by the Air Resources Board.

Harold Holmes

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 83-19-4b(4)
DATE: December 16, 1983

ITEM: Proposal to augment Contract Number A2-088-32 entitled "Development of Methods to Estimate the Benefits of Visibility Improvement".

RECOMMENDATION: Adopt Resolution 83-38 approving Proposed Augmentation of Contract A2-088-32 for an amount not to exceed $9,855.

SUMMARY: This proposal requests an augmentation of a study, now in progress, to develop a methodology for evaluating quantitatively the residential property value benefits of visibility improvements in two California air basins. In the ongoing study, the development of spatially detailed data sets containing visibility, housing prices and socio-economic data is complete for four Los Angeles area counties and five San Francisco area counties covering two time periods, 1973-74 and 1978-79. Also, work is well under way in the estimation of economic models relating visibility data and housing values (sale prices) using the above mentioned data sets.

The purpose of the proposed augmentation is to demonstrate the use, and particularly the applicability and limitations, of the developed methodology and also to provide quantitative benefit estimates for a candidate emission control measure.

Under the proposed augmentation, the emissions, air quality and visibility changes will be estimated for a possible future measure to reduce particulate emissions from heavy duty vehicles in California. The likely phasing-in period for the emissions and air quality changes will be incorporated in the analysis. Using models developed in the original contract, dollar benefits of the improved visibility will be derived. A written report will be prepared to explain the use of the benefit estimation methodology. It will also establish guidelines for future application of the methodology to other potential control measures.

State of California
AIR RESOURCES BOARD

Resolution 83-39
December 16, 1983

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 1228-104 entitled "Correlative and Sensitive Discriminants for Air Quality Control" has been submitted by the Professional Staff Association of Los Angeles County/USC Medical Center 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 1228-104 entitled "Correlative and Sensitive Discriminants for Air Quality Control" submitted by the Professional Staff Association of Los Angeles County/USC Medical Center for a total amount not to exceed $123,000; and

WHEREAS, the Governor's Executive Order D-26-83 prohibits State agencies from awarding research contracts through January 31, 1984.

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 1228-104 entitled "Correlative and Sensitive Discriminants for Air Quality Control" submitted by the Professional Staff Association of Los Angeles County/USC Medical Center for a total amount not to exceed $123,000.

BE IT FURTHER RESOLVED, that, should an exemption from the prohibition contained in Executive Order D-26-83 on awarding contracts for research be granted, or upon the expiration of Executive Order D-26-83, the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $123,000.

I certify that the above is a
true and correct copy of Resolution 83-39
as passed by the Air Resources Board.

Harold Holmes

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 83-19-4b(5)
DATE: December 16, 1983

ITEM: Research Proposal No. 1228-104 entitled "Correlative and Sensitive Discriminants for Air Quality Control".

RECOMMENDATION: Adopt Resolution 83-39 approving Research Proposal No. 1228-104 for funding in an amount not to exceed $123,000.

SUMMARY: One of the most difficult questions facing the Board is the development of bases for ambient air quality standards that will protect against the chronic effects of exposure to air pollutants. The results of the studies proposed here will add significantly to our understanding of the human health consequences of long-term exposure to photochemical smog.

Two types of cells line the alveoli of the deep lung. The most common cell of the alveolar wall is the Type I cell. It is a very thin cell whose role is the efficent exchange of gases between the atmosphere in the lung and the blood. The Type II cell is distinquished by its thickness and appears to play a role in the lung defenses, including production of secretions. Previous work under ARB sponsorship has led to the development of methods to detect whether NO_2 or O_3 alone or the two in combination affect the rates of conversion of Type I cells to Type II and whether such changes are reversible.

These studies have shown that Type II cell populations increase at the expense of Type I cells, even at relatively low concentrations of NO_2 (0.3 ppm). Consistent changes have also been seen in alveolar walls in exposed animals. Such cellular level changes are thought to be the possible initiators of several irreversible diseases, including emphysema and fibrosis of the lung.

The primary purpose of this proposal is to study how the lung's structural components are changed by NO_2 exposure. It is closely related to the earlier work by the proponent, but differs in that the elastin and collagen to be measured in lung tissue are important indicators of permanent structural alterations of the lung. Attempts will be made to relate shifts in cellular-level components to changes in the amounts of these two proteins.

Staining techniques have been developed that specifically identify and differentiate elastin and collagen in lung sections. These specific stains will make it possible for the proponents to expand computer-assisted image analysis

methodologies that have proven very useful in previous studies. These methods allow the assessment of very large numbers of microscopic changes in lung structure. Subtle shifts can then be readily detected and recorded for analysis.

The exposure study planned will assess the effects of ambient level NO_2 on the lungs of developing mice. The experiment will employ 200 pairs of test animals, half to be exposed to the NO_2 atmosphere, half to serve as controls. The NO_2 exposure atmosphere will be 0.25 ppm presented in an intermittent fashion over a six week period. Animals will be removed from the control and exposed groups at the end of the exposure, ten weeks and six months after the exposure has ceased. Animals removed at 10 weeks and 6 months will serve to evaluate repair or recovery processes that might occur during the 14 weeks after exposures have ceased.

State of California
AIR RESOURCES BOARD

Resolution 83-40
December 16, 1983

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 to augment Contract Number A2-042-32 entitled "A Study of the Characteristics of Chemical Reaction Mechanisms for Photochemical Smog" 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 Research Screening Committee has reviewed and recommends for funding:

> An augmentation to Contract Number A2-042-32 entitled "A Study of the Characteristics of Chemical Reaction Mechanisms for Photochemical Smog" submitted by the California Institute of Technology for a total amount not to exceed $38,615; and

WHEREAS, the Governor's Executive Order D-26-83 prohibits State agencies from awarding research contracts through January 31, 1984.

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:

> An augmentation to Contract Number A2-042-32 entitled "A Study of the Characteristics of Chemical Reaction Mechanisms for Photochemical Smog" submitted by the California Institute of Technology for a total amount not to exceed $38,615.

BE IT FURTHER RESOLVED, that, should an exemption from the prohibition contained in Executive Order D-26-83 on awarding contracts for research be granted, or upon the expiration of Executive Order D-26-83, the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $38,615.

I certify that the above is a true and correct copy of Resolution 83-40 as passed by the Air Resources Board.

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 83-19-4b(6)
DATE: December 16, 1983

ITEM: Proposal to augment Contract Number A2-042-32 entitled "A Study of the Characteristics of Chemical Reaction Mechanisms for Photochemical Smog."

RECOMMENDATION: Adopt Resolution 83-40 approving Proposed Augmentation of Contract A2-042-32 for an amount not to exceed $38,615.

SUMMARY: This is a two-phase project to improve the mathematical treatment of the photochemistry module of air quality simulation models. The first phase of the project consisted of two objectives that were to: 1) review and analyze the methodologies by which the many simultaneously occurring chemical reactions can be combined to facilitate their solution; and 2) development of an improved kinetic mechanism for aromatic hydrocarbons for use in existing models.

In the second phase of the project, which the Research Screening Committee endorsed following review of the final report for the first phase, the proponent will apply the information developed during the first phase of this contract to improve the photochemistry module of an existing air quality simulation model. The methodology developed in Phase I provides a powerful tool for identifying deficiencies in the photochemical modules in models and thus, provides information on how to reduce errors resulting from these deficiencies.

The first phase of the project was recommended for funding by the Research Screening Committee in 1982, with funding of the second phase of the project to be contingent upon its successful completion. At the November meeting, the Committee reviewed the results of Phase I and recommended that the Board approve the funding of Phase II, which provides for the use of the methodology developed in Phase I, to improve the predictive accuracy of an existing air quality simulation model.

Accurate air quality simulation models are potentially important to evaluation of various control strategies and air quality maintenance plans. However, all existing models contain serious flaws in their predictive capabilities. It is therefore, highly desireable to use this state-of-the-art methodology to provide a more accurate modeling capability.

State of California
AIR RESOURCES BOARD

Resolution 83-41
December 16, 1983

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 1227-104 entitled "Effects of Ozone on the Asthmatic Airway" has been submitted by the University of California, San Francisco, 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 1227-104 entitled "Effects of Ozone on the Asthmatic Airway" submitted by the University of California, San Francisco, for a total amount not to exceed $169,860; and

WHEREAS, the Governor's Executive Order D-26-83 prohibits State agencies from awarding research contracts through January 31, 1984.

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 1227-104 entitled "Effects of Ozone on the Asthmatic Airway" submitted by the University of California, San Francisco, for a total amount not to exceed $169,860.

BE IT FURTHER RESOLVED, that, should an exemption from the prohibition contained in Executive Order D-26-83 on awarding contracts for research be granted, or upon the expiration of Executive Order D-26-83, the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $169,860.

I certify that the above is a true and correct copy of Resolution 83-41 as passed by the Air Resources Board.

Harold Holmes

Harold Holmes, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 83-19-4b(7)
DATE: December 16, 1983

ITEM: Research Proposal No. 1227-104 entitled "Effects of Ozone on the Asthmatic Airway".

RECOMMENDATION: Adopt Resolution 83-41 approving Research Proposal No. 1227-104 for funding in an amount not to exceed $169,860.

SUMMARY: Asthmatics are characterized by sensitive bronchoconstrictive responses and airway inflammation in response to injury. In this project, the contractor will examine the effect of ozone on the bronchial hyperreactivity of a well-characterized group of asthmatics. He will apply methods that he developed and successfully used in previous studies of asthmatics' response to sulfur dioxide, another lung irritant.

Three related investigations will be pursued. In the first, healthy asthmatic subjects will be screened and chosen for participation, based upon complete pulmonary function and bronchial reactivity tests. These subjects will be exposed to purified air in one test and 0.20-0.25 ppm ozone in another. Exposures will last for two hours. During this exposure the subjects will exercise for fifteen of each thirty minutes on a cycle ergometer at 300 kg-m/min (exertion equivalent to a brisk walk). Effects on bronchial reactivity will be measured directly by resistance change and also by a methacholine challenge on the eve of each study day and then following the experimental exposures.

In the second portion of the study, asthmatics will be recruited and exposed to ozone as previously described. Fiberoptic bronchoscopy will be performed before and after ozone exposure so that airway fluid can be collected. This fluid will be analyzed for the agents which cause inflammation and injury.

The third study will investigate the source of inflammation which occurs after ozone exposure. Dogs will be fed either a normal diet or one with an inhibitor called eicosapentaenoic acid. They will be exposed to ozone. Their periodic airway responsiveness, mucosal biopsy and fluid collection tests will be performed. These tests will aid in the identification of inflammatory agents. Finally, appropriate statistical tests will be used to analyze all data.