

State of California

AIR RESOURCES BOARD

Resolution 82-1

January 13, 1982

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 solicited research Proposal Number 1068-88 entitled "Emissions from Bulk Solids Handling Operations for Cement" has been submitted by TRC Environmental Consultants Inc. to the Air Resources Board; and

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

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

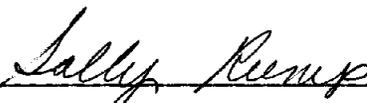
Proposal Number 1068-88 entitled "Emissions from Bulk Solids Handling Operations for Cement", submitted by TRC Environmental Consultants, Inc., for a total amount not to exceed \$75,000;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1068-88 entitled "Emissions from Bulk Solids Handling Operations for Cement", submitted by TRC Environmental Consultants, Inc., for a total amount not to exceed \$75,000;

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and shall execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$75,000.

I certify that the above is a true and correct copy of Resolution 82-1, as passed by the Air Resources Board.



BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO: 82-1-Zb.1
DATE: February 13, 1982

ITEM: Research Proposal No. 1068-88 entitled: Emissions From Bulk Solids Handling Operations for Cement

RECOMMENDATION: Adopt Resolution 82-1 approving Research Proposal No. 1068-88 for funding in an amount not to exceed \$ 75,000

SUMMARY: The contractor will develop and will demonstrate a method which can be used by the Board's Engineering Evaluation Section to determine size-segregated particulate matter emission rates from the loading and unloading of cement in bulk. In Task 1, the contractor will determine if methods exist which can be applied to bulk handling operations for cement. In Task 2, cement loading and unloading methods used in California will be described, including details on how relevant emission factors were derived. In Task 3, a loading or unloading facility will be selected for particulate matter emissions evaluation. A method for determining the total mass and the size-segregated particulate matter emission rates from the operations at the facility will be developed. Mass fractions in the fine and inhalable particle size ranges are to be identified. The effectiveness of the method is to be demonstrated in the field. In Task 4, applicability to other bulk solid materials transfer operations in California will be assessed.

The RFP was approved by the Research Screening Committee at the October 6, 1981 meeting and released with a five week response period. Eight proposals were received. The proposal submitted by TRC Environmental Consultants Inc. was determined by the staff and the Research Screening Committee to be the best response to the RFP. The Committee recommended augmenting the proposed budget to the full amount that the State budgeted for this project, \$ 75,000, to provide for additional field work.

SUMMARY (Cont.)

TRC Environmental Consultants (TRC) will review the literature and assess the various types of sampling methodologies available, and simultaneously it will perform a survey of the types of cement handling operations that exist in California. A sampling methodology will be developed that is applicable to such cement handling operations. Demonstration of mass-flux profiling is proposed at three distinct fugitive dust sources within a selected cement handling facility. Sixty field tests are proposed, and these tests will be designed to determine both the accuracy and the precision of the method through the use of inert tracer gases. Once the use of the methodology has been demonstrated on cement handling operations, its suitability for application to other bulk solids material transfer operations in California will be assessed.

State of California

AIR RESOURCES BOARD

Resolution 82-2

January 13, 1982

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 solicited research Proposal Number 1080-88 entitled "Effects of Ozone or SO₂ on Growth and Yield of Rice" has been submitted by the University of California at 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:

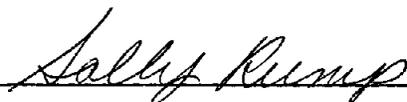
Proposal Number 1082-88 entitled "Effects of Ozone or SO₂ on Growth and Yield of Rice", submitted by the University of California at Riverside for a total amount not to exceed \$95,987;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1082-88 entitled "Effects of Ozone or SO₂ on Growth and Yield of Rice", submitted by the University of California at Riverside for a total amount not to exceed \$95,987;

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and shall execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$95,987.

I certify that the above is a true and correct copy of Resolution 82-2, as passed by the Air Resources Board.



BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO.: 82-1-262
DATE: January 13, 1982

ITEM: Research Proposal No. 1082-88 entitled "Effects of Ozone or SO₂ on Growth and Yield of Rice".

RECOMMENDATION: Adopt Resolution 82-2 approving Research Proposal No. 1082-88 for funding in an amount not to exceed \$95,987.

SUMMARY: Rice is an important crop in California particularly in the Sacramento Valley. It is usually grown in areas of low air pollution, but these areas may be threatened by increased air pollution from proposed power generating facilities and population increases. Although some Japanese researchers have studied the effects of air pollution on rice, information is incomplete and no information is available on the effect of air pollution on rice grown in California.

This proposal would study the effect of ozone or SO₂ on three widely-grown varieties of rice in California. Fumigation of the plants would simulate field conditions by using the 20 fumigation chambers located at Riverside and built by the Air Resources Board. Plant parameters that will be measured during or after fumigation include time of flowering, dry weight of foliage, yield at harvest, photosynthesis, transpiration and foliar injury. Data will be analyzed and regression curves calculated to relate plant performance to the various pollutant treatments.

The proposed study should be useful in determining if present ozone or SO₂ levels are causing economic losses in yield or predicting what concentration of these pollutants might be harmful to rice. The information also may be used in setting future ambient air quality standards and/or emission standards if needed.

State of California

AIR RESOURCES BOARD

Resolution 82-3

January 13, 1982

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 solicited research Proposal Number 1081-88 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:

Proposal Number 1080-88 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 \$50,000;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1080-88 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 \$50,000;

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and shall execute all necessary documents and contracts for Phase I of the research effort proposed in an amount not to exceed \$50,000.

I certify that the above is a true and correct copy of Resolution 82-3, as passed by the Air Resources Board.



BOARD SECRETARY

State of California
AIR RESOURCES BOARD

Item: 82-1-2b.3

Date: January 13, 1982

ITEM:

Research Proposal No. 1088-88 entitled "A Study of the Characteristics of Chemical Reaction Mechanisms for Photochemical Smog".

RECOMMENDATION:

Adopt Resolution 82-3 approving Research Proposal No. 1088-88 for funding in an amount not to exceed \$88,615.

SUMMARY:

Comparison of the results of calculations with various photochemical models shows that significant differences in predictions can occur between the models, depending on the photochemical mechanism employed. These differences indicate a need for further study of the reaction mechanisms that are employed in the models and of the methods by which these reaction mechanisms are incorporated into the model. The methodology by which the photochemical mechanisms can be incorporated into a model in a manageable way is especially difficult when one considers that a model may consist of upwards of 100 photochemical reactions involving hundreds of pollutant species.

Existing photochemical models also could be improved by substituting new kinetic data on organic reactions, especially those of aromatic hydrocarbons. Many of the reaction rates used in existing models have been estimated or have resulted from relatively crude measurement techniques. The recent kinetic measurements by Pitts, et al., as well as other investigators, represent a significant improvement over earlier data. Inclusion of these improved kinetic data on aromatics is especially important because of the increased use of aromatics in unleaded motor fuels.

The main objectives of this proposal are: (1) to review and analyze the methodologies by which the various reactions are lumped together and incorporated into the models, and (2) to incorporate improved kinetic data on aromatic compounds into existing models. These objectives will be met by accomplishing the following tasks, which will be performed successively.

SUMMARY (cont)

PHASE I

- Task 1. To perform a fundamental study of the mode of representing organic reactions in chemical mechanisms for photochemical smog to reach general conclusions on the key reaction steps and their mechanism sensitivity; this task would be performed in a manner that is essentially independent of particular mechanisms or models;
- Task 2. To revise the aromatic hydrocarbon portion of the Caltech mechanism to include the latest kinetic data on aromatic reactions;
- Task 3. To evaluate the revised mechanism against selected smog chamber data and to generate ozone isopleth plots suitable for comparison with other mechanisms;

PHASE II

- Task 1. To use the information developed in Phase I and to revise as needed the California Institute of Technology mechanism currently incorporated in the Caltech Air Quality model;
- Task 2. To implement the revised mechanism on the Air Resources Board computer in the Caltech Air Quality Model.

State of California

AIR RESOURCES BOARD

Resolution 82-4

January 13, 1982

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 solicited research Proposal Number 1081-88 entitled "Correlative and Sensitive Discriminants for Air Quality Control" has been submitted by the Professional Staff Association, L.A. 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 1081-88 entitled "Correlative and Sensitive Discriminants for Air Quality Control" submitted by Professional Staff Association, L.A. County/USC Medical Center for a total amount not to exceed \$173,958;

NOW, THEREFORE, BE IT RESOLVED, that the Air Resources Board under the powers and authority granted by the Health and Safety Code, Section 39705, hereby accepts the recommendation of the Research Screening Committee and approves the following:

Proposal Number 1081-88 entitled "Correlative and Sensitive Discriminants for Air Quality Control" submitted by Professional Staff Association, L.A. County/USC Medical Center for a total amount not to exceed \$173,958;

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and shall execute all necessary documents and contracts for the research effort proposed in an amount not to exceed \$173,958, contingent upon the principal investigator's having submitted a manuscript describing work completed to date under the above named project to a peer reviewed journal for publication.

I certify that the above is a true and correct copy of Resolution 82-4, as passed by the Air Resources Board.



BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO.: 82-1-2b.4
DATE: January 13, 1982

ITEM: Research Proposal No. 1081-88 entitled "Correlative and Sensitive Discriminants for Air Quality Control", Professional Staff Association, L.A. County/USC Medical Center.

RECOMMENDATION: Adopt Resolution 82-4 approving Research Proposal No. 1081-88 for funding in an amount not to exceed \$173,958.

SUMMARY: The proposed study is an extension of work done under ARB sponsorship to elucidate the adverse health effects of exposure to low levels of nitrogen dioxide (NO₂), as well as ozone (O₃) and mixtures of the two pollutants. Completed efforts consist of the development and application of methods for the study of cellular and biochemical indicators of NO₂ at or near ambient concentrations. These methods currently are employed in studies to determine the rates of conversion of Type I pneumocytes (lung cells) to Type II (NO₂, O₃ and combination) and studies of whether such changes are reversible (NO₂ only). These two types of cells are the principal cells lining the alveoli of the lung. The most common cell of the alveolar wall, in terms of area covered, is the Type I cell. It is a very thin cell whose role is the efficient exchange of gases between the atmosphere in the lung and the blood. The Type II cell is distinguished by its thickness and its apparent role in lung defenses, including production of secretions. It appears from completed studies that Type II cell populations increase at the expense of Type I cells, even at relatively low concentrations of NO₂ (0.3 ppm) with repeated short-term exposures. Such cellular changes are thought to be the early steps in the development of several disease states, including emphysema. The investigators have also found that the developing lungs of animals appear to be more sensitive to the pollutants under study than do fully developed lungs.

Other studies, utilizing sensitive measures of rates of protein leakage into alveolar spaces, have indicated increased leakage after exposure to NO₂, also at or near ambient concentrations. These measurements are currently being employed in test designs with ozone (alone) as well as ozone combined

SUMMARY (con't)

with NO₂. Attention is also drawn to the effects of NO₂ and O₃ on the key sub-cellular structures known as mitochondria and lamellar bodies. The importance of effects on mitochondria derives from their role in producing energy for cellular processes. Ongoing studies indicate a change in the dimensions of the mitochondria in lung cells after NO₂ exposures. The lamellar bodies, which also may be affected, function in part to produce phospholipids and supply most of the surfactant vital to the maintenance and operation of the normal lung.

This proposal has two main objectives. The first is to investigate the nature and long term reversibility of cellular level alterations due to NO₂ and O₃ exposures, alone and combined, in developing lungs. The second is to employ recently developed methods to study the association that is thought to exist between loss of alveolar cells and replacement by elastic and connective tissues. These tissue changes are commonly observed "markers" of several common lung diseases. Other satellite investigations will be carried out to address ultrastructural changes as well as systemic effects.