State of California

AIR RESOURCES BOARD

Resolution 79-45

April 25, 1979

WHEREAS, an unsolicited research Proposal Number 855-70 entitled "Toxicological Investigation of Fine Particle Emissions From Oil-Fired Power Plants" has been submitted by the University of California at 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 the proposal:

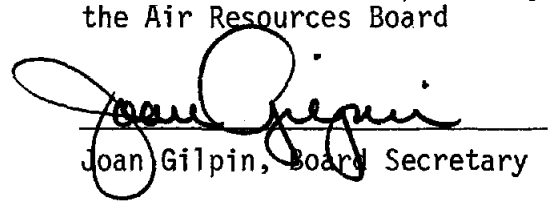
> Proposal Number 855-70 entitled "Toxicological Investigation of Fine Particle Emissions from Oil-Fired Power Plants", submitted by the University of California at Davis for an amount not to exceed $132,527;

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:

> Proposal Number 855-70 entitled "Toxicological Investigation of Fine Particle Emissions from Oil-Fired Power Plants", submitted by the University of California at Davis, for an amount not to exceed $132,527,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $132,527.

I certify that the above is
a true and correct copy of
Resolution 79-45 as passed by
the Air Resources Board



Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-8-5b(8)
DATE: April 25, 1979

ITEM: Research Proposal No. 855-70 entitled "Toxicological Investigation of Fine Particle Emissions from Oil-Fired Power Plants"

RECOMMENDATION: Adopt Resolution 79-45 approving Research Proposal 855-70 for funding in an amount not to exceed $132,527.

SUMMARY: Oil-fired power plants produce the majority of combustion generated electricity in California. In the process they emit considerable amounts of fine particles in the respirable size range. Only a limited number of studies have been done on the physical and chemical nature of this material. None has been done on their toxic nature.

These limited data indicate that oil ash is different in many ways from other fly ashes, such as from coal. The overall distribution of particle sizes is shifted toward the smaller end of the spectrum for oil; trace-element enrichment and particle morphology also differ for coal. The trace elements present in oil ash include some believed to be harmful in very low concentrations. Previous studies on the analysis of such ashes suggests their presence but the method of analysis leaves questions on the elements of concern as well as the size distribution of over 85% of the particles. They were too fine to be separated with the methods used in these studies.

The main objective of this study by U.C. Davis is to evaluate the relative biological hazards of ashes from oil-fired power plants in terms of their mutagenic and toxicological properties. These findings will be compared with what is already known about ash from coal fired plants and data that will become available to compare with wet-scrubbed, baghouse-filtered coal plants that are expected to be constructed in California.

The Board and other state and local regulatory agencies will be faced with decisions on trade-offs dealing with coal- and oil-fired plants in

State of California
AIR RESOURCES BOARD

Resolution 79-38
April 25, 1979

WHEREAS, an unsolicited research Proposal Number 848-70 entitled "Investigation of the Role of Natural Hydrocarbons In Photochemical Smog Formation in California" 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 the proposal:

> Proposal Number 848-70 entitled "Investigation of the Role of Natural Hydrocarbons In Photochemical Smog Formation in California" submitted by the University of California, Riverside, for an amount not to exceed $128,222;

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:

> Proposal Number 848-70 entitled "Investigation of the Role of Natural Hydrocarbons In Photochemical Smog Formation in California" submitted by the University of California, Riverside, for an amount not to exceed $128,222,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $128,222.

I certify that the above is
a true and correct copy of
Resolution 79-38 as passed by
the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 79-8-5b (1)
DATE: April 25, 1979

ITEM: Research Proposal No. 848-70 entitled "Investigation of the Role of Natural Hydrocarbons in Photochemical Smog Formation in California".

RECOMMENDATION: Adopt Resolution 79-38 approving Research Proposal No. 848-70 for funding in an amount not to exceed $128,222.

SUMMARY: Recent reports in the literature have advanced the hypothesis that a significant relationship exists between enhanced emissions attributable to biomass increases resulting from wet winters and abnormally high ozone levels during the following summer. Naturally-occurring hydrocarbons volatilized from supposedly larger biomass were suggested as the primary factor responsible for the observed increase in days with ozone concentrations exceeding the federal air quality standard.

One of the weakest links in the biomass hydrocarbon-ozone hypothesis is that no evidence is available to show whether reactive hydrocarbons of biomass origin are actually accumulating to a concentration sufficiently high to cause greater ambient ozone levels in locations such as the South Coast and Bay Area Air Basins. While a substantial amount of data gathered under ambient conditions suggests that biomass hydrocarbons do not accumulate to concentrations that would have a significant effect on ozone production, such conclusions have been challenged in the published literature and the issue remains unresolved.

The objective of this investigation by the Statewide Air Pollution Research Center at U.C. Riverside will be to determine whether there are circumstances under which common types of California vegetation emit sufficient hydrocarbons to result in significant changes in oxidant concentrations in the ambient atmosphere.

The staff and the Research Screening Committee believe that the question concerning the importance of natural

State of California

AIR RESOURCES BOARD

Resolution 79-39

April 25, 1979

WHEREAS, a solicited research Proposal Number 847-70 entitled "Effects of Acid Rain on Plants and Soils in California", has been submitted by the University of California, Berkeley, 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 the proposal:

> Proposal Number 847-70 entitled "Effects of Acid Rain on Plants and Soils in California", submitted by the University of California, Berkeley, for an amount not to exceed $83,771;

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:

> Proposal Number 847-70 entitled "Effects of Acid Rain on Plants and Soils in California", submitted by the University of California, Berkeley, for an amount not to exceed $83,771,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $83,771.

I certify that the above is
a true and correct copy of
Resolution 79-39 as passed by
the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-8-5b(2)
DATE: April 25, 1979

ITEM: Research Proposal No. 847-70 entitled "Effects of Acid Rain on Plants and Soils in California"

RECOMMENDATION: Adopt Resolution 79-39 approving Research Proposal No. 847-70 for funding in an amount not to exceed $83,771.

SUMMARY: The California Air Resources Board and staff became aware and concerned about the possible impact of acid deposition, resulting from SO_x and NO_x emissions, upon California plants, soils, aquatic biota and ecosystems. The Board considered the problem during hearings on the sulfate and sulfur dioxide ambient air standards. Testimony given at that time contended that acid rain was unlikely to occur in California, and that, should it occur in California, the soils and vegetation likely to experience such occurrence would not be detrimentally impacted. Since that time, primarily because of research funded by the ARB, we have found that precipitation events occur with significantly increased acidity (lower than the expected pH value of 5.65) over widespread areas of California. A low pH value of 2.7 has been measured in the South Coast Air Basin for one event. Events with low pH values such as 4.05 in the San Joaquin Valley, 3.7 at Lake Tahoe, 4.4 near the Napa Valley and 4.7 in the Plumas National Forest have also been reported.

The mean weighted annual pH of rain at Pasadena was measured at 4.05, some 50 times more acidic than expected. Increased pressures to use higher sulfur fuels and for increased industrial and tertiary oil recovery activity will no doubt result in further increases in deposition unless proper controls are utilized. Because of the above mentioned considerations it is both timely and important to gain a better understanding of the impact acid rain may have upon California soils and plants.

Research proposed by the University of California at Berkeley involves two major efforts: 1) the study of acid rain effects upon selected California soils; and 2) studies of selected California plants

including agricultural crops. The artificial acid rain is to consist of several actual acid rain constituents, reflecting California's rain which has been altered by air pollutant emissions. The same three treatment levels of acid rain are to be used for both plants and soils. These levels approximate severe, existing or average and unaffected conditions of rain.

California plant species selected include: fir, pine, barley, apple, grass, clover, sugar beets and grapes. Plants are to be studied under controlled but realistic field conditions in fertilized and unfertilized soils. They are to be potted or trayed and grown outdoors in a field facility which has a high plastic overhead to protect the plants from prevailing rainfall. Test plants will receive the acid rain treatments mentioned above at this field facility. Injury will be noted on short lived plants grown to maturity and effects upon growth of plant parts and thus yield determined. Special attention is also to be given to possible effects on leaf cuticles and suspected sensitive tissue such as overwintering buds.

As part of the soil effects studies, samples from the upper soil horizon will be gathered from approximately thirty-four "type locations" in California that have received designations from the USDA Soil Conservation Service. These soils will be tested to determine the effects of acid rain upon nutrient leaching and ion mobility using a standardized leaching device and procedures. These procedures are presently widely accepted and practiced. The acid rain treatments will be the same as those proposed for the plant studies. The large array of soils screened for sensitivity will be reduced to a smaller subset to study the effects of repetitive wetting/drying cycles, various acid inputs where ion constituents are varied, etc.

Leachates are to be analyzed for all major components of interest such as Na, Ca, Mg, K, electrical conductivity, acidity, alkalinity, pH, NO_3^-, $SO_4^=$ and possibly heavy metals. Interpretation of results will incorporate, as possible, considerations of effects likely to occur simultaneously to sensitive plants growing on sensitive soils.

State of California
AIR RESOURCES BOARD

Resolution 79-40
April 25, 1979

WHEREAS, an unsolicited research Proposal Number 840-69a entitled Adaptation to Ozone Exposure has been submitted by the University of California, Santa Barbara, 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 the proposal:

> Proposal Number 840-69a entitled Adaptation to Ozone Exposure submitted by the University of California, Santa Barbara, for an amount not to exceed $122,279;

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:

> Proposal Number 840-69a entitled Adaptation to Ozone Exposure submitted by the University of California, Santa Barbara, for an amount not to exceed $122,279,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $122,279.

I certify that the above is
a true and correct copy of
Resolution 79-40 as passed by
the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 79-8-5b (3)
DATE: April 25, 1979

ITEM: Research Proposal No. 840-69a entitled "Adaptation to Ozone Exposure"

RECOMMENDATION: Adopt Resolution 79-40 approving Research Proposal 840-69a for funding in an amount not to exceed $122,279.

SUMMARY:

A current controversy surrounding the health effects of ozone involves the question of whether humans exhibit tolerance or desensitization to repeated exposures. Studies conducted to date indicate that, over a period of about three days, decreased sensitivity, as measured by pulmonary function, seems to occur in some subjects tested. No one really knows the persistence of this adaptation or if intervening days of low ozone causes the phenomenon to reverse itself.

What is proposed by U.C. Santa Barbara in this study is a continuation of a current contract which began a two-year study into ozone-sulfur dioxide effects and ozone adaptation. Subjects of various ages and health status will be exposed sequentially to high, low and/or zero ozone levels while undergoing an intermittent moderate exercise protocol. The intent of the varying sequences is to study different facets of the functional adaptation. For example, there will be a test to check whether one or two days of exposure to low ozone levels between high exposure days will alter the response to subsequent high level ozone exposures. As many as 290 two-hour exposures will be carried out in these protocols.

The results of the proposed effort would help provide a final resolution to the issue of whether meaningful "protective" changes occur after repeated ozone exposure, as has been suggested by other researchers. The results will also point the way to a better physiological understanding of the body's overall response mechanism to ozone insult.

At that point, a reasonable assessment of the acute health implications of repeated ozone exposure, such as those occurring in urban areas, might be possible. Directions for other more basic studies should also be evident at the completion of the proposed effort.

State of California

AIR RESOURCES BOARD

Resolution 79-41

April 25, 1979

WHEREAS, a solicited research Proposal Number 806-68a entitled "Augmentation to the Sulfuric Acid-Nitric Acid Program", 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 Research Screening Committee has reviewed and recommends for funding the proposal:

> Proposal Number 806-68a entitled "Augmentation to the Sulfuric Acid-Nitric Acid Program", submitted by the California Department of Health Services, for an amount not to exceed $55,201;

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:

> Proposal Number 806-68a entitled "Augmentation to the Sulfuric Acid-Nitric Acid Program", submitted by the California Department of Health Services, for an amount not to exceed $55,201,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $55,201.

I certify that the above is
a true and correct copy of
Resolution 79-41 as passed by
the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-8-5b(4)
DATE: April 25, 1979

ITEM: Research Proposal No. 806-68a entitled "Augmentation to the Sulfuric Acid-Nitric Acid Program"

RECOMMENDATION: Adopt Resolution 79-41 approving Research Proposal No. 806-68a for funding in an amount not to exceed $55,201.

SUMMARY: California's significant harm level for airborne sulfate of 25 $\mu g/m^3$ 24-hour average, is based upon total water-soluble sulfate in high-volume filter samples. Such sulfate may include ammonium sulfate, ammonium acid sulfate and sulfuric acid as well as various metal and mixed metal-ammonium salts. Some of these are relatively harmful (e. g., sulfuric acid and ammonium acid sulfate). In part, the rationale for setting the California standard is based on the presumption that a significant mechanism for formation of the total water-soluble sulfate, as currently measured, involves sulfuric acid as an important constituent; but the actual levels of the acid in the atmosphere may vary substantially. As yet, no technique has been accorded general acceptance for determining sulfuric acid concentrations.

There exists a need for a validated technique to monitor sulfuric acid and nitric acid. There also exists a need for a field study to measure ambient concentrations of these strongly acidic respiratory irritants.

At the February 1, 1979 Research Screening Committee meeting, Proposal No. 806-68 entitled "Evaluation and Development of Procedures for Determination of Sulfuric Acid, Total Particle Phase Acidity and Nitric Acid in Ambient Air" was reviewed. The project was recommended for funding; however, because this project was not a budgeted item, only $62,000 of the requested $135,145 was awarded, with the understanding that additional funding would be considered if there were uncommitted funds at the end of the fiscal year.

The Board adopted resolution 79-6 at its February 20, 1979 meeting approving funding in the amount of $62,000.

State of California

AIR RESOURCES BOARD

Resolution 79-42

April 25, 1979

WHEREAS, an unsolicited research Proposal Number 852-70 entitled "A Study of Transferable Licenses to Emit Air Pollutants in the South Coast Air Basin", 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 the proposal:

> Proposal Number 852-70 entitled "A Study of Transferable Licenses to Emit Air Pollutants in the South Coast Air Basin", submitted by the California Institute of Technology, for an amount not to exceed $273,519;

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:

> Proposal Number 852-70 entitled "A Study of Transferable Licenses to Emit Air Pollutants in the South Coast Air Basin", submitted by the California Institute of Technology, for an amount not to exceed $273,519,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $273,519.

I certify that the above is
a true and correct copy of
Resolution 79-42 as passed by
the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-8-5b(5)
DATE: April 25, 1979

ITEM: Research Proposal 852-70 entitled "A Study of Transferable Licenses to Emit Air Pollutants in the South Coast Air Basin"

RECOMMENDATION: Adopt Resolution 79-42 approving Research Proposal 852-70 for funding in an amount not to exceed $273,519.

SUMMARY: This proposal from the California Institute of Technology opens up a new area of research for the Air Resources Board; that is, the investigation of economic incentives for air pollution abatement. This type of research is responsive to the public's demand for a cleaner environment and for a lower cost of government regulation. The contractor proposes to investigate and test a strategy for pollution abatement which when compared to current regulatory procedures could allow for greater growth in the California economy while meeting the air quality standards, and do it for less cost to both business and government.

The proposal comprises two major tasks. The first involves: 1) a complete technical description of the air pollution problem being addressed; 2) an economic analysis of the key industries affected, 3) an investigation of alternative systems of allocating "rights" to emit pollutants, and 4) an identification of the most promising allocation systems.

Given the technical air quality and economic description of the problem and the theoretical merits of the most promising systems, the second task would investigate the actual implementation of this innovative strategy. Careful testing of the most promising systems of rights allocation will be made to prevent any costly mistakes that might be made from implementing an untested approach. The testing will help to determine the most efficient systems, the effects on air quality and the cost of the rights to the polluters.

The objective of the study is to investigate a promising new system which would place a fixed upper limit on emissions, induce industries and

State of California
AIR RESOURCES BOARD

Resolution 79-43
April 25, 1979

WHEREAS, an unsolicited research Proposal Number 850-70 entitled "Proposed Additions to the Project 'Visibility in California'", has been submitted by the Technology Service Corporation, to the Air Resources Board; and

WHEREAS, the Research staff has reviewed and recommended Tasks, A, B and C of this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding Tasks A, B and C of the proposal:

> Proposal Number 850-70 entitled "Proposed Additions to the Project 'Visibility in California'", submitted by the Technology Service Corporation, for an amount not to exceed $22,489 for this study or $115,938 for the entire study;

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:

> Proposal Number 850-70 entitled "Proposed Additions to the Project 'Visibility in California'", submitted by the Technology Service Corporation, for an amount not to exceed $22,489 for this study or $115,938 for the entire study,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $22,489 for this study or $115,938 for the entire study.

I certify that the above is
a true and correct copy of
Resolution 79-43 as passed by
the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO.: 79-8-5b (6)
DATE: April 25, 1979

ITEM: Research Proposal No. 850-70 entitled "Proposed Addition to the Project 'Visibility in California'"

RECOMMENDATION: Adopt Resolution 79-43 approving Research Proposal No. 850-70 for funding in an amount not to exceed $22,489.

SUMMARY:

The 1977 Clean Air Act requires an ARB program to prevent visibility deterioration in Class 1 areas of California. This will require California to identify sources of emissions that contribute to impairment of visibility in such areas, identify allowable emissions from these sources and develop schedules of compliance to meet these emission limits. In addition there is a need to acquire a fuller understanding of the relationship between visibility and particulate matter levels in urban areas of the State.

In order to devise compliance plans to meet the emission limitations,the staff will need to document existing baseline visibility levels and evaluate control strategies designed to prevent impairment of visibility. In addition, it will be necessary to identify local sources and sources associated with long-range transport and the degree to which these sources contribute to visibility degradation.

In response to these needs, Technology Services Corporation (TSC) has completed the first phase of a comprehensive study to characterize visibility in California. During the course of this first phase, the staff and the contractor have identified several areas where a small addition to the scope of work would significantly increase the probability that the results of the study would more clearly identify the sources of visibility degradation in California. The recommended addition includes three tasks:

Task A would provide four isopleth maps illustrating the spatial variation of median 1:00 p.m. visibilities in California for each season of the year. In addition, the seasonal variation in the spatial visibility patterns would be discussed. Also the time of occurrence of the lowest visibility and the magnitude of the lowest visibility would be determined.

As part of Task B, long-term visibility trends from 1948-1976 would be determined separately for each quarter. This analysis will include 10 to 15 locations and the results would be used to help identify the types of sources or controls responsible for the major long-term changes in seasonal visibilities.

Task C would result in a definition of general meteorological classes to help isolate air quality effects at various locations from climatological effects. Existing visibility levels would be stratified according to these meteorological classes for approximately 15 locations. The portion of the spatial gradients in California visibility that are due to aerosol concentrations could then be distinguished from that due to climatology.

State of California

AIR RESOURCES BOARD

Resolution 79-44

April 25, 1979

WHEREAS, an unsolicited research Proposal Number 851-70 entitled "Source-Receptor Reconciliation of South Coast Air Basin Particulate Air Quality Data", has been submitted by the Consultants on Air Pollution Control, 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 the proposal:

> Proposal Number 851-70 entitled "Source-Receptor Reconciliation of South Coast Air Basin Particulate Air Quality Data", submitted by the Consultants on Air Pollution Control, for an amount not to exceed $59,731;

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:

> Proposal Number 851-70 entitled "Source-Receptor Reconciliation of South Coast Air Basin Particulate Air Quality Data", submitted by the Consultants on Air Pollution Control, for an amount not to exceed $59,731,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $59,731.

I certify that the above is
a true and correct copy of
Resolution 79-44 as passed by
the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-8-5b(7)
DATE: April 25, 1979

ITEM: Research Proposal No. 851-70 entitled "Source Receptor Reconciliation of South Coast Air Basin Particulate Air Quality Data"

RECOMMENDATION: Adopt Resolution 79-44 approving Research Proposal No. 851-70 for funding in an amount not to exceed $59,731.

SUMMARY:

State and federal long-term air quality standards for total suspended particulate matter, 60 and 75 $\mu gm/m^3$ annual geometric mean respectively, are exceeded by roughly a factor of two in many parts of the South Coast Air Basin. The constituents of this total suspended particulate matter burden include an unusual high fraction of very fine particles of diameter less than one micrometer. These aerosols are largely responsible for the well-known visibility problem in the South Coast Air Basin, and they are easily respirable.

This proposal from Glenn Cass and Gregory McRae would provide source/receptor relationships for particulate matter in the South Coast Air Basin. This would be accomplished through a trace metal balance approach for allocating South Coast Air Basin ambient particulate matter among emission sources. The proponents would:

1) Perform an analysis and presentation of South Coast Air Basin trace metal air quality data;

2) Prepare South Coast Air Basin particulate matter source signatures; and

3) Trace the relative contribution of different source types to the ambient particulate matter observed at selected monitoring sites.

This proposal presents an opportunity to employ newly-gained emissions and air quality data sets in a way that will assist the staff in the development of control strategies for particulate matter.

State of California

AIR RESOURCES BOARD

Resolution 79-46

April 25, 1979

WHEREAS, an unsolicited research Proposal Number 856-70 entitled "Chemical Consequences of Air Quality Standards and of Control Implementation Plans", 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 the proposal:

> Proposal Number 856-70 entitled "Chemical Consequences of Air Quality Standards and of Control Implementation Plans", submitted by the University of California, Riverside, for an amount not to exceed $124,886;

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:

> Proposal Number 856-70 entitled "Chemical Consequences of Air Quality Standards and of Control Implementation Plans", submitted by the University of California, Riverside, for an amount not to exceed $124,886,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $124,886.

I certify that the above is
a true and correct copy of
Resolution 79-46 as passed by
the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-8-5b(9)
DATE: April 25, 1979

ITEM: Research Proposal No. 856-70 entitled "Chemical Consequences of Air Quality Standards and of Control Implementation Plans"

RECOMMENDATION: Adopt Resolution 79-46 approving Research Proposal No. 856-70 for funding in an amount not to exceed $124,886.

SUMMARY: This proposal from the Statewide Air Pollution Research Center at the University of California, Riverside consists of three major program elements:

1. Effects of Relative Humidity on Photochemical Smog Formation.

   Although temperature and relative humidity are anticipated to significantly affect smog formation, the amount of well-defined and unambiguous data relating ozone build up to these variables is extremely limited. In order to address the need for well characterized data concerning these effects, the investigators are presently conducting a number of variable-temperature smog chamber experiments. For the coming year it is proposed to extend this temperature effects study to an examination of effects of humidity on smog chamber simulations of photochemical air pollution over a range of temperatures.

2. Atmospheric Reactions of Selected Pesticides.

   Increasing attention is being focused on the environmental hazards posed by pesticide materials and their transformation products in soil, water and air. The yearly application of pesticide chemicals in the United States now exceeds one billion pounds and estimates of pesticide use in California amount to as much as 20 percent of the national use.

   Recently, the California Air Resources Board has been concerned with reactive organic emissions from pesticide formulations and their possible contributions to oxidant

formation in the California central valleys. A further concern is the potential adverse health effects associated with the exposure of humans to pesticide ingredients and the related compounds resulting from smog-induced decomposition in the atmosphere.

This element of the proposal focuses on two insecticides which are widely used in California: Carbaryl and Phorate. They are representative of the two important classes of compounds, carbamates and organo-phosphates, which are increasingly displacing organo-chlorine compounds. The atmospheric products generated under photoreactive conditions as well as in clean air will be investigated. Carbamates, for example, have the potential to form highly carcinogenic nitrosamines when incorporated in NO_x-rich photochemical smog. Carbaryl has already been demonstrated to react with sodium nitrite in acid solution to form nitroso-carbaryl which is a mutagen in an in vitro bacterial test system.

3. Atmospheric Fate of Nitrogeneous Compounds Anticipated from Ammonia Injection at Power Plants.

Ammonia injection is being considered to reduce NO_x emissions from stationary fuel burning facilities such as electric utility power plants. Because of this, it is important to establish whether significant emissions of NH_3 may occur and whether secondary products may be formed which in themselves may constitute a hazard or which under atmospheric transformations may lead to the formation of toxic species.

The major thrust of this program element will be an investigation of the atmospheric reactions of the nitrogen-containing organic trace products which are anticipated to be formed in the NH_3-NO reduction process and for which, to our knowledge, virtually no information concerning their atmospheric reaction chemistry is available.

State of California

AIR RESOURCES BOARD

Resolution 79-47

April 25, 1979

WHEREAS, an unsolicited research Proposal Number 861-70 entitled "The Selective Reduction of NO Through Ammonia Addition: Application to the Combustion of Oil Fuels", has been submitted by the Lawrence Berkeley Laboratory, 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 the proposal:

> Proposal Number 861-70 entitled "The Selective Reduction of NO Through Ammonia Addition: Application to the Combustion of Oil Fuels", submitted by the Lawrence Berkeley Laboratory, for an amount not to exceed $100,000;

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:

> Proposal Number 861-70 entitled "The Selective Reduction of NO Through Ammonia Addition: Application to the Combustion of Oil Fuels", submitted by the Lawrence Berkeley Laboratory, for an amount not to exceed $100,000,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $100,000.

I certify that the above is
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the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-8-5b(10)
DATE: April 25, 1979

ITEM: Research Proposal No. 861-70 entitled "The Selective Reduction of NO Through Ammonia Addition: Application to the Combustion of Oil Fuels"

RECOMMENDATION: Adopt Resolution 79-47 approving Research Proposal No. 861-70 for funding in an amount not to exceed $100,000

SUMMARY: The ammonia injection method of controlling NO_x emissions from large stationary sources is currently being considered as a control measure in California. During a research project that is now nearing completion, these investigators have studied the ammonia-related combustion products from a laboratory burner, using propane as the fuel. Trace compounds formed in the ammonia denox process will be identified and measured as a function of: 1) equivalence ratio, 2) ammonia concentration, 3) NO concentration, and 4) temperature of combustion products at the point of ammonia injection. These compounds include, in addition to ammonia, hydrogen cyanide, low molecular weight amines and nitriles.

The purpose of the new project proposed by the University of California at Berkeley is to extend this work to fuel oils, to identify products resulting from combustion of fuel-bound nitrogen and to investigate the influences of sulfur oxides. In this project, special analyses for nitrosamines will be made through a cooperative arrangement with the Statewide Air Pollution Research Center at the University of California, Riverside. All products will be evaluated for photochemical reactivity to determine whether they might react with polluted air to form other hazardous compounds such as nitrosamines or nitramines or promote oxidant or aerosol formation.

State of California

AIR RESOURCES BOARD

Resolution 79-48

April 25, 1979

WHEREAS, a solicited research Proposal Number 845-70 entitled "Alternatives to Agricultural Waste Burning of Rice Straw in California", has been submitted by the Copley International 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 the proposal:

> Proposal Number 845-70 entitled "Alternatives to Agricultural Waste Burning of Rice Straw in California", submitted by the Copley International Corporations, for an amount not to exceed $59,477;

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:

> Proposal Number 845-70 entitled "Alternatives to Agricultural Waste Burning of Rice Straw in California", submitted by the Copley International Corporation , for an amount not to exceed $59,477,

and authorizes the Executive Officer to initiate administrative procedures and to execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $59,477.

I certify that the above is
a true and correct copy of
Resolution 79-48 as passed by
the Air Resources Board

Joan Gilpin, Board Secretary

State of California
AIR RESOURCES BOARD

ITEM NO: 79-8-5b(11)
DATE: April 25, 1979

ITEM: Research Proposal No. 845-70 entitled "Alternatives to Agricultural Waste Burning of Rice Straw in California"

RECOMMENDATION: Adopt Resolution 79-48 approving Research Proposal No. 845-70 for funding in an amount not to exceed $59,477.

SUMMARY:

This project is intended to provide the Air Resources Board with information on the technical and economic feasibility of short-term alternatives to the burning of rice straw in the Sacramento Valley and San Joaquin Valley Air Basins with emphasis on incorporating the rice straw into the soil and on the implications for stem rot control.

Four proposals were submitted in response to the Request for Proposals for this study. The proposal submitted by Copley International Corporation was judged by the Research Screening Committee and the staff to be the best proposal and most likely to provide the ARB with the requested economic and technical details on incorporation, the stem rot problem, and related issues.

Prominent features of the study are the focus on the economics in addition to the technical aspects of alternatives to the open burning of rice straw, and a survey of all rice growers in the Sacramento and San Joaquin Valleys. All reasonable alternatives to rice straw burning will be considered in terms of small, medium and large rice farms. A technical evaluation committee composed of recognized experts in this field will be employed to comment on the literature review, on information voids, and on the various alternatives to burning.