State of California

AIR RESOURCES BOARD

Resolution 80-12

March 26, 1980

WHEREAS, an unsolicited research Proposal Number 888-75 entitled "Effects of Air Pollution on Airway Function" has been submitted by the University of California at 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 888-75 entitled "Effects of Air Pollution on Airway Function" submitted by the University of California at San Francisco for an amount not to exceed $95,987;

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 888-75 entitled "Effects of Air Pollution on Airway Function" submitted by the University of California at San Francisco for an amount not to exceed $95,987,

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and 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 80-12, as passed by the Air Resources Board.

Sally Rump

Sally Rump
BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO: 80-5-5
DATE: March 26, 1980

ITEM: Research Proposal No. 888-75 entitled "Effects of Air Pollution on Airway Function".

RECOMMENDATION: Adopt Resolution 80-12 approving Research Proposal No. 888-75 for funding in an amount not to exceed $95,987.

SUMMARY: The proponent has recently completed studies on human subjects that showed increased airway resistance following short exposures to levels of sulfur dioxide not previously believed important to health.

This proposal consists of two groups of studies. The first would follow-up the proponent's most recent research showing that some asthmatics were sensitive to a single 1-ppm exposure to SO_2 for 10 minutes. This response level is below what has been reported by other researchers using even longer exposure periods. A major objective of this study is to determine the threshold level of SO_2 exposure associated with increased airway resistance and to determine whether repeated SO_2 exposures lessen the magnitude of response.

A second related effort involves repeated SO_2 exposures of well-characterized human subjects who show mild asthma. Subjects will be given doses of 3 ppm SO_2 over a 15-minute period on each of four consecutive days. Airway resistance measurements will be made before and after the exposure. The collected data will be studied in terms of any possible lessening of functional response to the pollutant. Histamine responsiveness will also be studied before and after the repeated SO_2 exposure. Pharmacologic research would also be done to determine which neurological pathways are involved in the SO_2 response.

The group II studies focus on the effects of combined ozone - SO_2 insults on mucus secretion rates in dogs. Mucus secretion rates have been shown to vary with exposure to certain air pollutants. It is also generally accepted that mucus is an important factor in the removal of foreign matter from the lung as well as in defense against infection.

State of California

AIR RESOURCES BOARD

Resolution 80-13

March 26, 1980

WHEREAS, an unsolicited research Proposal Number 889-75 entitled "Size-Selective Samplers for Particulate Monitoring in California" has been submitted by the Air and Industrial Hygiene Laboratory, 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:

> Proposal Number 889-75 entitled "Size-Selective Samplers for Particulate Monitoring in California" submitted by the Air and Industrial Hygiene Laboratory, California Department of Health Services for an amount not to exceed $82,398;

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 889-75 entitled "Size-Selective Samplers for Particulate Monitoring in California" submitted by the Air and Industrial Hygiene Laboratory, California Department of Health Services for an amount not to exceed $82,398;

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $82,398.

I certify that the above is a true and correct copy of Resolution 80-13, as passed by the Air Resources Board.

Sally Rump

Sally Rump
BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO: 80-5-5
DATE: March 26, 1980

ITEM: Research Proposal No. 889-75 entitled "Size-Selective Samplers for Particulate Monitoring in California".

RECOMMENDATION: Adopt Resolution 80-13 approving research proposal No. 889-75 for funding in an amount not to exceed $82,398.

SUMMARY: The importance of size-selective monitoring of particulate matter in the ambient air has become increasingly apparent. At a workshop entitled "A California Ambient Air Quality Standard for Inhalable Particles" held in May of 1979, a committee of experts concluded that size-selective monitoring should be instituted throughout the State, and that information on the concentration of airborne particulate matter in the 2.5-15 μm and the 0-2.5 μm size ranges should be collected. This information along with associated health effects is needed for the standard-setting process. In addition, particle size information is an important tool in determining the origins of ambient aerosols.

The objectives of this project are to provide the ARB with technical support for fine particle monitoring by characterizing and validating candidate samplers. Specifically, this project will provide for: 1) laboratory testing of the newly developed size-selective hi-vol sampler and critical assessment of all available data relating to the sampler; 2) modification and characterization of the AIHL cyclone sampler.

These two samplers were selected for evaluation and development based on the outstanding characteristics displayed in preliminary testing. The size-selective hi-vol appears to be well suited to sampling inhalable particles (less than 15 μ) and the AIHL cyclone is ideally suited to collection of respirable particles (less than 2.5 μ in diameter).

This study will provide the information needed for the State to decide which of the available fine particle samplers should be used in California.

State of California

AIR RESOURCES BOARD

Resolution 80-14

March 26, 1980

WHEREAS, an unsolicited research Proposal Number 906-75 entitled "Assessment of Simultaneous Use of NO_x Control Systems on Stationary Sources" has been submitted by the Aerospace 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:

> Proposal Number 906-75 entitled "Assessment of Simultaneous Use of NO_x Control Systems on Stationary Sources" submitted by the Aerospace Corporation for an amount not to exceed $99,642;

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 906-75 entitled "Assessment of Simultaneous Use of NO_x Control Systems on Stationary Sources" submitted by the Aerospace Corporation for an amount not to exceed $99,642;

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $99,642.

I certify that the above is a true and correct copy of Resolution 80-14, as passed by the Air Resources Board.

Sally Rump

Sally Rump
BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO: 80-5-5
DATE: March 26, 1980

ITEM: Research Proposal No. 906-75 entitled "Assessment of Simultaneous Use of NO_x Control Systems on Stationary Sources".

RECOMMENDATION: Adopt Resolution 80-14 approving Research Proposal No. 906-75 for funding in an amount not to exceed $99,642.

SUMMARY: The objective of this research project is to study the capability of currently available technology to reduce NO_x emissions from specified sources below the levels achievable by combustion modifications alone. This technology includes thermal deNO_x (TDN), selective catalytic reduction (SCR) and low NO_x burners (LNB). The first two use ammonia for NO_x reduction; LNB uses burners designed for more effective control of the fuel-air mixture. While SCR can achieve 90 percent NO_x removal, these systems are expensive and may be difficult to retrofit on existing installations. However, the simultaneous application of TDN and SCR, at a reduced capacity, size and cost, may achieve 90 percent NO_x reduction at a cost less than that of SCR alone. Further, the concurrent use of LNB, either alone, with, or in combination with TDN and SCR, may be more energy efficient and cost-effective. The sources to be investigated include refinery and industrial boilers, refinery heaters, a refinery CO boiler and a glass furnace.

The contractor will study the interactions of the above-mentioned NO_x reduction systems when they are used simultaneously, and the potential reductions and associated costs when the systems are used in varying capacities within a system.

The information and data generated by this study should enable staff and local districts to develop cost-effective strategies for the reduction of NO_x emissions from the sources listed above.

State of California

AIR RESOURCES BOARD

Resolution 80-16

March 26, 1980

WHEREAS, an unsolicited research Proposal Number 905-75 entitled "Direct Measurement of Nitrous Acid, Nitrogen Dioxide and Formaldehyde in Auto Exhaust by Differential Optical Absorption Spectroscopy" has been submitted by the Statewide Air Pollution Research Center, 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 905-75 entitled "Direct Measurement of Nitrous Acid, Nitrogen Dioxide and Formaldehyde in Auto Exhaust by Differential Optical Absorption Spectroscopy" submitted by the Statewide Air Pollution Research Center, University of California, Riverside for an amount not to exceed $98,488;

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 905-75 entitled "Direct Measurement of Nitrous Acid, Nitrogen Dioxide, and Formaldehyde in Auto Exhaust by Differential Optical Absorption Spectroscopy" submitted by the Statewide Air Pollution Research Center, University of California, Riverside for an amount not to exceed $98,488.

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $98,488.

I certify that the above is a true and correct copy of Resolution 80-16, as passed by the Air Resources Board.

Sally Rump

Sally Rump
BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO: 80-5-5
DATE: March 26, 1980

ITEM: Research Proposal No. 905-75 entitled "Direct Measurement of Nitrous Acid, Nitrogen Dioxide and Formaldehyde in Auto Exhaust by Differential Optical Absorbtion Spectroscopy."

RECOMMENDATION: Adopt Resolution 80-16 approving Research Proposal 905-75 for funding in an amount to to exceed $98,488.

SUMMARY: Formaldehyde (HCHO) and nitrous acid (HONO) are key compounds in initiating and promoting the formation of photochemical smog. Because of the importance of the role of these compounds in smog formation it is desirable that reliable data for the emissions of these compounds be obtained. One significant source is believed to be the automobile. However, real-time measurement of formaldehyde in the exhaust of light-duty motor vehicles has been difficult and unreliable, and there are no published data for nitrous acid from auto exhaust whatsoever.

This proposal concerns the application of a new technique, differential optical absorption spectroscopy to measurement of HONO, HCHO, and NO_2 (as contrasted with total NO_x) in auto exhaust.

The specific objectives are:

To construct a prototype differential optical absorption spectrophotometer and, subsequently, to evaluate its effectiveness as a research instrument for the analysis of HONO, HCHO and NO_2 in exhaust gases.

To study the concentrations of HCHO, HONO and NO_2 emission rates as functions of engine operating conditions, emission control equipment (and its state of repair) as well as fuel composition. Testing on auto exhausts will be done at the Board's Haagen-Smit Laboratory in cooperation with the ARB staff.

State of California

AIR RESOURCES BOARD

Resolution 80-17

March 26, 1980

WHEREAS, a solicited research Proposal Number 886-75 entitled "Controls for Fine-Particle Emissions from Industrial Sources in California" has been sumbitted by Air Pollution Technology, 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 886-75 entitled "Controls for Fine-Particle Emissions from Industrial Sources in California" submitted by Air Pollution Technology, Inc. for an amount not to exceed $150,000;

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 886-75 entitled "Controls for Fine-Particle Emissions from Industrial Sources in California" submitted by Air Pollution Technology, Inc. for an amount not to exceed $150,000,

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $150,000.

I certify that the above is a true and correct copy of Resolution 80-17, as passed by the Air Resources Board.

Sally Rump

Sally Rump
BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO: 80-5-5
DATE: March 26, 1980

ITEM: Research Proposal No. 886-75 entitled "Control For Fine Particle Emissions from Industrial Sources In California".

RECOMMENDATION: Adopt Resolution 80-17 approving Research Proposal No. 886-75 for funding in an amount not to exceed $150,000.

SUMMARY: Fine particle emissions from industrial sources are of concern because they affect both health and visibility in the atmosphere. The major industrial sources for these fine particles (equivalent aerodynamic diameters of three micrometers or less) include fuel combustion, mineral and metallurgical operations, and food and agricultural operations. Particles less than one micrometer in diameter have the greatest effect on visibility. In addition, particles in this size range evade the normal barriers in the respiratory system and are inhaled deeply into the lungs.

With the guidance of the Research Screening Committee, the staff prepared and released a Request For Proposals for this project. Three responses were received, of which the proposal by Air Pollution Technology, Inc. was judged to be most meritorious by the staff and the Committee.

The objectives of this study are to determine the effectiveness and cost of control devices for fine particle emissions from the major industrial sources cited above and other sources.

Both new installations and retrofits of existing facilities are to be considered. Emerging technologies, such as the simultaneous control of both sulfur oxides and fine particle emissions by the addition of ground calcareous material, followed by filtration, are to be evaluated.

State of California

AIR RESOURCES BOARD

Resolution 80-18

March 26, 1980

WHEREAS, a solicited research Proposal Number 900-75 entitled "Control Techniques for Organic Gas Emissions from Fiberglass Impregnation and Fabrication Processes" has been submitted by Science Applications, 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 900-75 entitled "Control Techniques for Organic Gas Emissions from Fiberglass Impregnation and Fabrication Processes" submitted by Science Applications, Inc., for an amount not to exceed $74,945;

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 900-75 entitled "Control Techniques for Organic Gas Emissions from Fiberglass Impregnation and Fabrication Processes" submitted by Science Applications, Inc., for an amount not to exceed $74,945,

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $74,945.

I certify that the above is a true and correct copy of Resolution 80-18, as passed by the Air Resources Board.

Sally Rump

Sally Rump
BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO: 80-5-5
DATE: March 26, 1980

ITEM: Research Proposal No. 900-75 entitled "Control Techniques for Organic Gas Emissions from Fiberglass Impregnation and Fabrication Processes."

RECOMMENDATION: Adopt Resolution 80-18 approving Research Proposal No. 900-75 for funding in an amount not to exceed $74,945.

SUMMARY:

Gaseous emissions from the fabrication of polyester-impregnated glass matrices contribute directly to the formation of atmospheric ozone, as well as create local odor problems. There are also concerns about possible health hazards resulting from such volatile organic emissions. These gaseous emissions consist primarily of styrene monomer which is used as a diluent and cross linker for the polyester resin system.

Because OSHA has established a maximum work-place concentration of 100 ppm for styrene, fabricators have installed hoods around the lay-up work areas, which vent the styrene directly to the atmosphere. Control devices such as adsorbers and incinerators will reduce emissions from such plants, but the cost of installation and upkeep are prohibitively high for small producers. For this reason, local districts have exempted styrene emissions below an arbitrarily established weight limit from control.

At the request of the Stationary Source Control Division, Research staff prepared a Request for Proposals (RFP) to inventory statewide emissions from fiberglass impregnation and fabrication operations and to research methods for mitigation and control. The Research Screening Committee approved the RFP which was then released to approximately 90 prospective bidders. Five responses were received of which the proposal by Science Applications, Inc., was judged to be most pertinent by the staff and the Committee.

The objectives of this study are to inventory statewide organic gas emissions from fiberglass impregnation and fabrication operations. Concurrently the contractor will assess the effectiveness of process modifications for reducing emissions and will also

State of California

AIR RESOURCES BOARD

Resolution 80-19

March 26, 1980

WHEREAS, a solicited research Proposal Number 893-75 entitled "Study of Visible Emissions from Ships with Steam Boilers" has been submitted by the Acurex 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:

> Proposal Number 893-75 entitled "Study of Visible Emission from Ships with Steam Boilers" submitted by the Acurex Corporation for an amount not to exceed $99,848;

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 893-75 entitled "Study of Visible Emissions from Ships with Steam Boilers" submitted by the Acurex Corporation for an amount not to exceed $99,848,

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed in an amount not to exceed $99,848.

I certify that the above is a true and correct copy of Resolution 80-19, as passed by the Air Resources Board.

Sally Rump

Sally Rump
BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO: 80-5-5
DATE: March 26, 1980

ITEM: Research Proposal No. 893-75 entitled "Study of Visible Emissions from Ships with Steam Boilers."

RECOMMENDATION: Adopt Resolution 80-19 approving Research Proposal No. 893-75 for funding in an amount not to exceed $99,848.

SUMMARY: The California Legislature has requested the Air Resources Board to conduct a study of the compliance of ships with the California statutes prohibiting visible emission exceeding specified opacity standards for more than three minutes in any one-hour period unless exempted. Exemptions include vessels using steam boilers subject to emergency shut downs for safety reasons, and for specified tests and maneuvering. The legislature also requested that, following completion of this study, the ARB conduct a public hearing to consider adoption of, and adopt if appropriate, a compliance schedule which would require vessels to comply with statutory standards on and after January 1, 1984. The Board must also transmit the results of study to the Legislature by January 1, 1983.

ARB staff prepared a Request for Proposals (RFP) and upon approval of the Research Screening Committee, sent the RFP to 90 prospective contractors. Five responses were received of which the proposal from the Acurex Corporation was judged to be most meritorious by the staff and the committee.

The objectives of the research project are to survey ship operations relevant to the visible emission exemption conditions and to develop recommendations for a compliance schedule to reduce such emissions. Specifically, the contractor will conduct a study to determine whether vessels using steam boilers can be brought into compliance with Section 41701 of the California Health and Safety Code by January 1, 1984, or any earlier date, taking into account the age and physical condition of the affected vessels, vessel safety and operational requirements, and technological feasibility. The study will also include the extent, frequency, nature, environmental impact, and causes of visible emissions from vessels under conditions described in Section 41704 of the Health and Safety Code.

State of California

AIR RESOURCES BOARD

Resolution 80-20

March 26, 1980

WHEREAS, a solicited research Proposal Number 902-75 entitled "A Study of the Origin and Fate of Air Pollutants in California's Sacramento Valley" has been submitted by the Meteorology Research Inc., ($159,966) to the Air Resources Board; with a contribution from the California Institute of Technology ($139,979) for a total amount not to exceed ($299,945); 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 902-75 entitled "A Study of the Origin and Fate of Air Pollutants in California's Sacramento Valley" submitted by the Meteorology Research, Inc. ($159,966) with a contribution from the California Institute of Technology ($139,979) for a total amount not to exceed ($299,945); and

WHEREAS, the Research staff and the Research Screening Committee recommend that separate contracts be awarded to Meteorology Research, Inc., and the participating contractor in order to minimize the cost to the State;

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 902-75 entitled "A Study of the Origin and Fate of Air Pollutants in California's Sacramento Valley", submitted by the Meteorology Research, Inc. ($159,966), with a contribution from the California Institute of Technology ($139,979), for a total amount not to exceed $299,945;

BE IT FURTHER RESOLVED, that the Executive Officer shall initiate administrative procedures and execute all necessary documents and contracts individually with each of the contractors for the research effort proposed in a total amount not to exceed $299,945 for both contracts.

I certify that the above is a true and correct copy of Resolution 80-20, as passed by the Air Resources Board.

Sally Rump

Sally Rump
BOARD SECRETARY

State of California
AIR RESOURCES BOARD

ITEM NO: 80-5-5
DATE: March 26, 1980

ITEM: Research Proposal No. 902-75 entitled "A Study of the Origin and Fate of Air Pollutants in California's Sacramento Valley."

RECOMMENDATION: Adopt Resolution 80-20 approving Research Proposal No. 902-75 for funding in an amount not to exceed $299,945.

SUMMARY: Wind patterns in the Carquinez Straits and the Delta Region suggest that emissions from the Bay Area are transported into the Sacramento Valley. Local emissions are superimposed on the Bay Area emissions as they move downwind into the Sacramento Valley. These emissions contribute to the oxidant levels in the Sacramento Valley and in the western slopes of the Sierra Nevada. As a result, there is concern over the effect of ozone upon agriculture in the Sacramento Valley and upon the forests of the Sierra Nevada. The extent of transport of pollutants into and through the Sacramento Valley is only poorly characterized and is unquantified.

In this study, small amounts of inert chemical tracer gases will be released at selected points in the Bay Area and the Sacramento Valley. Air samples will be collected throughout the downwind receptor areas of the Sacramento Valley and of the western slopes of the Sierra Nevada, and based on the tracer gas concentrations measured in these samples, the pollutant transport routes will be identified and the impact will be quantified.

The results of this project are needed to assist in the development of control strategies that will permit achievement of the ambient air quality standard for ozone in the areas where the sources are located and in the adjacent downwind receptor areas.