

State of California
AIR RESOURCES BOARD

Resolution 82-38

July 21, 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, a solicited research Proposal Number 1107-90 entitled "Improvement of Emission Inventories for Reactive Organic Gases and Oxides of Nitrogen in the South Coast Air Basin", has been submitted by Systems Applications Inc., to the Air Resources Board; and

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

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

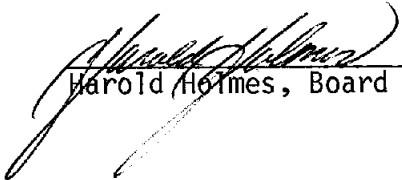
Proposal Number 1107-90 entitled "Improvement of Emission Inventories for Reactive Organic Gases and Oxides of Nitrogen in the South Coast Air Basin", submitted by Systems Applications, Inc., for a total amount not to exceed \$249,752;

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 1107-90 entitled "Improvement of Emission Inventories for Reactive Organic Gases and Oxides of Nitrogen in the South Coast Air Basin", submitted by Systems Applications, Inc., for a total amount not to exceed \$249,752;

BE IT FURTHER RESOLVED, that the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$249,752.

I certify that the above
is a true and correct copy of
Resolution 82-38 as passed by
the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 82-14-3b1

DATE: July 21, 1982

ITEM: Research Proposal No. 1107-90 entitled "Improvement of Emission Inventories for Reactive Organic Gases and Oxides of Nitrogen in the South Coast Air Basin"

RECOMMENDATION: Adopt Resolution 82-38 approving Proposal No. 1107-90 for funding in an amount not to exceed \$249,752

SUMMARY: Ambient concentrations of ozone in the South Coast Air Basin have remained steady or have decreased only slightly over the past ten years despite programs to control emissions of the primary ozone precursors, reactive organic gases (ROG) and oxides of nitrogen (NOx). Among the potential reasons for this trend are one or more of the following: population growth and/or increased use of motor vehicles has produced an increase in reactive organic gas emissions such that existing controls effectively are maintaining a constant ozone concentration; or, uncertainties exist in the emissions inventory so that the inventory does not reflect actual emissions of pollutants, particularly ROG and NOx, into the atmosphere. These and other uncertainties have led to the identification of a need to improve the emission inventory for ROG and NOx in the Basin.

Inaccuracies in the Basin inventory could result from the use of inappropriate emission factors particularly for the highly volatile and reactive organic species such as olefins in gasoline; omission of important sources and deficiencies in source data; and overestimation of the effectiveness of emission control equipment. The primary objectives of this research project are to develop improved, modeling-quality inventories for ROG and NOx from stationary sources in the Basin. To accomplish these objectives, the contractor will: review the current inventories for reactive organic gas emissions; randomly select and systematically survey a number of representative 5 km x 5 km grid cells in the Basin; perform source tests and speciation analyses for selected emission sources; then, applying the newly developed emission factors, upgrade the inventories for all other grid cells in the Basin to produce on magnetic tape a new Basin-wide gridded inventory; determine the uncertainty in the new inventory; and document operating perturbations that can affect the yearly emission totals.

State of California
AIR RESOURCES BOARD

Resolution 82-39

July 21, 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, a solicited research Proposal Number 1154-93 entitled "Visibility Model Verification by Image Processing Techniques", has been submitted by the California Institute of Technology to the Air Resources Board; and

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

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

Proposal Number 1154-93 entitled "Visibility Model Verification by Image Processing Techniques", submitted by the California Institute of Technology for a total amount not to exceed \$72,463;

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 1154-93 entitled "Visibility Model Verification by Image Processing Techniques", submitted by the California Institute of Technology for a total amount not to exceed \$72,463;

BE IT FURTHER RESOLVED, that the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$72,463.

I certify that the above
is a true and correct copy
of Resolution 82-39 as passed
by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 82-14-3b2

DATE: July 21, 1982

ITEM: Research Proposal No. 1154-93 entitled "Visibility Model Verification by Image Processing Techniques"

RECOMMENDATION: Adopt Resolution 82-39 approving Proposal No. 1154-93 for funding in an amount not to exceed \$72,463.

SUMMARY: Visibility degradation that is caused by air pollution may result in significant economic losses, either direct or indirect, as well as the loss or diminution of scenic vistas. Such degradation is caused by airborne particles and gases that attenuate light. A modeling approach recently developed at the California Institute of Technology consists of taking ambient air quality measurements and calculating visual properties from the measurements in regional haze situations.

The objective of this project is to develop a mathematical model that will relate pollutant characteristics to visual air quality based on radiative transfer theory and ambient measurements. Ambient air quality measurements will be made at the same time that photographs are taken during smoggy and clear conditions in the South Coast Air Basin. The clear condition photograph will be digitized for input to a computer, and the model will be applied with the ambient data taken during the study to compare the simulated smoggy photograph with the one taken during actual smoggy conditions. This will provide validation of the model that has been constructed.

The proposed modeling procedure is based on fundamental light scattering principles, and thus could be applied to other areas of the state experiencing extreme visibility problems. Because the Air Resources Board is responsible for air quality standards based on visibility and fine particle concentrations, a reliable mathematical model that relates the chemical and physical characteristics of pollutants to visibility would provide to the Board a useful basis for understanding and documenting the visual effects of proposed standards on visual air quality.

P R O P O S E D

State of California
AIR RESOURCES BOARD

Resolution 82-40

July 21, 1982

*Will Recall
later
NOT Adopted
see 82-48*

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, a solicited research Proposal Number 1157-93 entitled "Control of Atmospheric Aerosol Nitric and Nitrate Acid Concentrations", has been submitted by the California Institute of Technology to the Air Resources Board; and

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

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

Proposal Number 1157-93 entitled "Control of Atmospheric Aerosol Nitrate and Nitric Acid Concentrations", submitted by the California Institute of Technology for a total amount not to exceed \$375,620;

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 1157-93 entitled "Control of Atmospheric Aerosol Nitrate and Nitric Acid Concentrations", submitted by the California Institute of Technology for a total amount not to exceed \$375,620;

BE IT FURTHER RESOLVED, that the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$375,620.

ITEM NO: 82-14-363
DATE: July 21, 1982

ITEM: Research Proposal No. 1157-93 entitled "Control of Atmospheric Aerosol Nitric and Nitrate Acid Concentrations"

RECOMMENDATION: Adopt Resolution 82-40 approving Research Proposal No. 1157-93 for funding in an amount not to exceed \$375,620.

SUMMARY: It has been estimated that up to 40% of the visibility reduction in the eastern part of the South Coast Air Basin may be caused by aerosol nitrate, most of which is ammonium nitrate. Development of a control strategy to reduce fine particles and to improve visibility must, therefore, address the question of aerosol nitrates, and the relationship of pollutant emission to nitrate levels.

The precursors for ammonium nitrate formation are gaseous ammonia and nitric acid. Nitric acid is itself a secondary pollutant and is formed by a number of chemical reactions involving both oxides of nitrogen and reactive hydrocarbons, which are also responsible for ozone formation. Thus the implications of any control strategy for nitric acid control must be considered with respect to ozone formation.

Ammonia, the other precursor for aerosol nitrate formation arises from a number of anthropogenic as well as biogenic sources and to date a well-validated inventory has not been prepared. The reaction of ammonia and nitric acid to form nitrate aerosol is also affected by temperature and relative humidity. The project, to develop a control strategy for aerosol nitrate, will consist of the following tasks:

1. Modification of the Caltech photochemical airshed model to include nitrate aerosol formation;
2. Field sampling of ambient concentrations of NH_3 , NO_2 and NO_3 to acquire a data base for model validation;
3. Preparation of emission inventories for NH_3 , NO_x and RHC for time periods corresponding to the ambient sampling;
4. Model Evaluation and Validation; and
5. Development of a strategy to reduce aerosol nitrate formation.

State of California
AIR RESOURCES BOARD

Resolution 82-41

July 21, 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, a solicited research Proposal Number 1102-90 entitled "Mobile Source Emissions Analysis for California", has been submitted by Energy and Environmental Analysis, Inc. and Sierra Research to the Air Resources Board; and

WHEREAS, an independent panel of experts in vehicle pollution control and the Research Division staff has reviewed and recommended this proposal for approval; and

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

Proposal Number 1102-90 entitled "Mobile Source Emissions Analysis for California", submitted by the Energy and Environmental Analysis, Inc. and Sierra Research for a total amount not to exceed \$169,859;

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 1102-90 entitled "Mobile Source Emissions Analysis for California", submitted by Energy and Environmental Analysis, Inc. and Sierra Research for a total amount not to exceed \$169,859;

BE IT FURTHER RESOLVED, that the Executive Officer is authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein in an amount not to exceed \$169,859.

I certify that the above
is a true and correct copy
of Resolution 82-41 as passed
by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM: Research Proposal 1102-90 entitled "Mobile Source Emissions Analysis for California"

RECOMMENDATION: Adopt Resolution 82-41 approving Research Proposal 1102-90 for funding in an amount not to exceed \$169,859.

SUMMARY: Automotive emission control systems have increased in complexity and sophistication over the past decade as a result of increasingly stringent standards for emissions and fuel-economy. At the same time, the burden of maintaining these emission controls also has increased, and as a result, regulatory efforts have been shifted in the direction of developing the measures necessary to ensure the proper performance of emission control systems now in use.

This proposal by Engergy and Environmental Analysis, Inc. and Sierra Research addresses the needs of the Air Resources Board for a critical analysis of the impact of present and future automobile emission control technologies and the effects of recently enacted and pending state and federal legislation upon present and future mobile source emission levels in California.

Current (in-use) and projected emission control technology for passenger cars and light-duty trucks covering model years 1975-1987 will be catalogued and differences in calibration and approach between the various emission control systems will be identified. The current California sales mix of each technology type will be obtained and the future sales mix will be projected to 1987. Effects on emission of common malperformance modes for each emission control system will be estimated and used to derive California-specific emission factors for each emission control technology type. This information is to be used subsequently for analyses of motor vehicle emissions and controls relative to proposal for:

1. Clean Air Act revision.
2. Motor Vehicle Inspection and Maintenance programs, and
3. AB 965, which allows automobile manufacturers to offset California vehicles that are cleaner than applicable state standards with federal 49-state vehicles.