State of California
AIR RESOURCES BOARD

Resolution 82-48

September 22, 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 unsolicited research Proposal Number 1157-93 entitled "Control of Atmospheric Aerosol Nitrate and Nitric 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.

I certify that the above is a true and correct copy of Resolution 82-48 as approved by the Air Resources Board.

Harold Holmes

Harold Holmes, Board Secretary

ITEM NO.: 82-18-7b1
DATE: September 22, 1982

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

RECOMMENDATION: Adopt Resolution 82-48 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 aquire a data base for model validation;

3. Preparation of emission inventories for $NH_3$, NOx 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.