State of California
AIR RESOURCES BOARD

Resolution 01-34

September 20, 2001

Agenda Item No.: 01-7-3

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 research proposal, number 2500-221, entitled "Source Apportionment of Fine and Ultrafine Particles in California," has been submitted by the University of California, Davis;

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 2500-221 entitled "Source Apportionment of Fine and Ultrafine Particles in California," submitted by the University of California, Davis, for a total amount not to exceed $314,998.

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 2500-221 entitled "Source Apportionment of Fine and Ultrafine Particles in California," submitted by the University of California, Davis, for a total amount not to exceed $314,998.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $314,998.

I hereby certify that the above is a true and correct copy of Resolution 01-34, as adopted by the Air Resources Board.

Marie Kavan

Marie Kavan, Clerk of the Board

ATTACHMENT A

"Source Apportionment of Fine and Ultrafine Particles in California"

Background

Airborne particulate matter (PM) has recently been implicated in increased mortality. Approximately 20,000 Californians die prematurely each year due to PM. Reducing fine particulate pollution is one of the most difficult environmental challenges facing California because of the great diversity of sources and chemical species involved. Developing a technically defensible PM control program requires identifying the contribution of each source type to the measured PM concentrations and then estimating the air quality benefits associated with implementing a suite of emission controls.

Linking sources to measured air quality uses empirical methods termed "source apportionment" and "receptor modeling." Source apportionment techniques for airborne PM determine how emissions released from different sources contribute to the observed concentrations of airborne particles. These models are popular because they can be applied to an air quality episode without detailed knowledge of meteorological conditions and emissions patterns within the geographical area of interest. Recent advances in traditional statistical source apportionment techniques combined with high-resolution source profiles have improved the power of this tool. Apportionment of the particulate matter would effectively reveal the contribution that different sources make to fine and ultrafine particle concentrations. Because fine particles have been implicated in serious health effects, a better understanding of source contributions to fine particle concentrations will enable decision makers to formulate effective control strategies to protect public health.

Objective

The objective of this research project is to perform a source apportionment of airborne fine and ultrafine particulate matter in California. Particle samples collected during several major ambient field monitoring and source sampling studies will be analyzed and a new ultrafine particle source library will be developed.

Methods

The investigators propose to carry out a statistical source apportionment study of airborne fine and ultrafine particles in California. Airborne particle samples collected with filter-based samplers and Micro Orifice Uniform Deposit Impactors (MOUDIs) will be analyzed for the quantity of unique chemical tracers that can be used in a source apportionment analysis. The final stage of the MOUDI collects particles exclusively in the ultrafine particle size range. Apportionment of the particulate matter collected on this stage will effectively reveal the contribution that different sources make to ultrafine particle concentrations. The standard chemical mass balance program will be used to calculate how the known sources of ultrafine and fine particles contribute to the concentrations of ambient air particles observed during CRPAQS and SCOS97 field monitoring programs.

Expected Results
This research project has been organized in three separate parts. These parts of research include characterizating ultrafine particles at the source, characteriing fine particles collected during SCOS97 and ultrafine particles collected during CRPAQS, and performing source apportionment analysis for collected fine and ultrafine particles. Source apportionment results will be compared with results from similar studies of fine PM in Southern California including the 1982 and 1993 studies that were also made by Prof. Cass' research group. Trends in fine PM sources among the 1982, 1993, and 1997 samples will provide a measure of the effectiveness of fine PM control strategies over this period. Finally, the results of all parts of the project will be documented as a technical report submitted to ARB and as technical papers submitted to peer-reviewed journals.

Significance to the Board
Currently, we know very little about the contribution that different urban sournces make to airborne ultrafine particle concentrations. The statistical source apportionment techniques proposed in this study can provide valuable insight. Information of this type plays a vital role in the design of emissions control programs that reduce airborne particle concentrations. Having a better understanding of the sources of atmospheric ultrafine particles is also needed to design abatement strategies.

Contractor:
University of California, Davis

Contract Period:
36 months

Principal Investigator (PI):
Dr. Michael Kleeman

Contract Amount:
$314,998

Co-funding:
No co-funding but this project has cost savings through a cooperative effort with ongoing major diesel study, i.e., CRC Project E55/59.

Basis for Indirect Cost Rate:
The State and University of California System have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Although staff has a limited direct experience with Dr. Kleeman, he has extensive previous experience in the construction of air quality models that describe aerosol

BUDGET SUMMARY

University of California, Davis

Source Apportionment of Fine and Ultrafine Particles in California

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 83,312	
2.	Subcontractors	$ 161,180[1]	
3.	Equipment	$ 2,500	
4.	Travel and Subsistence	$ 8,960	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 3,000	
7.	Mail and Phone	$ 2,000	
8.	Supplies	$ 20,906[2]	
9.	Analyses	$ 1,680	
10.	Miscellaneous	$ 14,474[3]	
	Total Direct Costs		$298,012
INDIRECT COSTS			
1.	Overhead	$ 16,986	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$16,986
TOTAL PROJECT COSTS			**$314,998**

[1] University of Colorado State ($111,176) and Arizona State University ($50,004)

[2] Supplies include items needed to collect source samples to characterize diesel vehicles (filter media, etc) in addition to items needed for trace organics analysis (solvents, standards, etc). Tape backup media are included to archive the databases produced during the research to insure against data loss. Glassware, plasticware, nitrogen blowdown and solvent are needed during sample extraction and analysis activities. Authentic standards are included in the budget so that trace organic compounds can be quantified with greater certainty, increasing the accuracy of the overall analysis.

[3] Student/University registration fee