State of California
AIR RESOURCES BOARD

Resolution 05-22

March 17, 2005

Agenda Item No.: 05-3-2

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 contract augmentation for the project entitled “Hourly, In-situ Quantitation of Organic Aerosol Marker Compounds”, has been submitted by the University of California, Berkeley;

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:

> Contract Augmentation for the project entitled “Hourly, In-situ Quantitation of Organic Aerosol Marker Compounds”, submitted by the University of California, Berkeley, for a total amount not to exceed $99,819.

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:

> Contract Augmentation for the project entitled “Hourly, In-situ Quantitation of Organic Aerosol Marker Compounds”, submitted by the University of California, Berkeley, for a total amount not to exceed $99,819.

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 $99,819.

I hereby certify that the above is a true
and correct copy of Resolution 05-22, as
adopted by the Air Resources Board.

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Lori Andreoni, Clerk of the Board

ATTACHMENT A

"Hourly, In-situ Quantitation of Organic Aerosol Marker Compounds"

Background

Organic particulate matter (PM) is an aggregate of hundreds of individual compounds spanning a wide range of chemical and thermodynamic properties. Some of the organic compounds are "semivolatile" such that both gaseous and condensed phases exist in equilibrium in the atmosphere. The presence of semivolatile or multiphase organic compounds complicates the sampling process. While many advances have been made in measuring and modeling the inorganic ionic species that are found in PM2.5, much less is known about the organic fraction. Yet organic matter is a major constituent of airborne particles, comprising 20-40 percent of the PM2.5 mass in many regions.

In order to aid the interpretation of aerosol observations, it is extremely useful to measure a suite of trace gases whose source types and atmospheric lifetimes are better known than those of aerosols. The best suite of trace gases to observe when studying sources of organic aerosols is gas phase volatile organic compounds (VOCs). The UCB investigators have built and deployed instrumentation for measuring a wide variety of gas phase VOCs with hourly time resolution and have shown that the data are very useful for identification of source types through factor analysis and correlation with tracers of known origin. Quantitative knowledge of the composition of PM2.5 organic matter is key to tracing its sources and understanding its formation and transformation processes.

Objective

The objectives of this research project are to deploy in-situ gas-phase instrumentation for one month in the summer and one in the winter in Fresno, California, and to analyze the combined data sets to resolve organic aerosol source contributions based on factor analysis.

Methods

In this project, the investigators propose to enhance a current ARB contact for quantitative measurement of atmospheric PM2.5 organics at the molecular level. In order to aid the interpretation of the aerosol observations, investigators will measure a suite of trace gases whose source types and atmospheric lifetimes are better known than those of aerosols. To provide information on a wide range of compounds, two separate measurement channels are used, equipped with different pre-conditioning systems, pre-concentration traps, chromatography columns, and detectors. The gas phase measurements are to be done alongside the particle phase measurements during both summer and winter in order to provide supporting information for resolution of aerosol source types.

Expected Results

This research proposal will provide a strong source attribution analysis of the major contributors to the organics in PM2.5. We expect to observe a high fraction of identifiable primary compounds in Fresno. These primary compounds and their

temporal variability on a diurnal scale should be useful for attribution of aerosol loading to specific regional source categories. Hourly observations of gas-phase VOCs in Fresno alongside the particle-phase observations will be invaluable for helping to discern source categories and relative source strengths for organic aerosols.

Significance to the Board
This research will provide useful new data of immediate value for air quality attainment strategies for the Central Valley and the development of the State Implementation Plan. These data will also be very useful for other investigators who plan to conduct ARB sponsored field measurements at the same site in Fresno, including Dr. Kim Prather's group (UC San Diego), Dr. Judy Chow's group (DRI), and Dr. Ron Cohen's group (UC Berkeley).

Contractor:
University of California, Berkeley

Contract Period:
The contract will be extended by 9 months making the total contract period 45 months.

Principal Investigator (PI):
Professor Allen Goldstein, Ph.D.

Contract Amount:
With the contract augmentation of $99,819, added to the original contract amount of $269,330, the new contract total will be $369,140.

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

Past Experience with this Principal Investigator:
This Principal Investigator has performed very successfully on past contracts. Professor Allen Goldstein has experience in quantifying organic compounds and Dr. Susanne Hering has extensive experience in particle measurement and developing and refining PM sampling techniques. Both investigators have extensive experience in building automated methods for continuous, unattended operation in the field and their research studies are well-published.

Prior Research Division Funding to the University of California, Berkeley:

Year	2004	2003	2002
Funding	$919,732*	$715,194	$2,396,389

*CEC provided $799,732 in cofunding

B U D G E T S U M M A R Y

University of California, Berkeley

Hourly, In-situ Quantitation of Organic Aerosol Marker Compounds

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	72,810	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	6,000	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	1,500	
7.	Mail and Phone	$	0	
8.	Materials & Supplies	$	12,000[1]	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$92,310
INDIRECT COSTS				
1.	Overhead	$	7,509	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$7,509
TOTAL PROJECT COSTS				**$99,819**

[1] Supplies are needed as consumable items, replacement parts (such as gas chromatography columns, replacement flow controller, tubing, filters, pumps, and other air sampling supplies), support gases (He, N2, H2, Air) and chemical supplies, VOC standards, gas regulators, and spare parts for the organic particulate matter sampling and analytical system to insure proper operation during the field campaigns.