PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 09-58

December 9, 2009

Agenda Item No.: 09-10-1

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 2681-265, entitled "Improved Characterization of Primary and Secondary Carbonaceous Particles," has been submitted by the University of California, San Diego;

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 2681-265, entitled "Improved Characterization of Primary and Secondary Carbonaceous Particles," has been submitted by the University of California, San Diego, for a total amount not to exceed $255,000.

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 2681-265, entitled "Improved Characterization of Primary and Secondary Carbonaceous Particles," has been submitted by the University of California, San Diego, for a total amount not to exceed $255,000.

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 $255,000.

ATTACHMENT A

"Improved Characterization of Primary and Secondary Carbonaceous Particles"

Background
The Air Resources Board, National Oceanic and Atmospheric Administration, and California Energy Commission have coordinated a joint field study of atmospheric processes over California and the eastern Pacific coastal region in 2010 (CalNex 2010). The goal of the CalNex campaign is to conduct a short-term atmospheric sampling program through which climate change and air quality can be studied, as new integrated policies are needed to effectively and efficiently address both environmental issues. Since organic aerosol is a significant contributor to both aerosol air quality and radiative forcing in many parts of the Earth, assessing its atmospheric role requires observations of organic functional groups.

Objective
The objective of this proposed study is to quantify the mass fraction of organic functional groups to emission sources from combustion and biological processes using trace metal and organic molecular signatures. The organic aerosol sampling will be carried out in coordination with CalNex 2010 measurements in the southern San Joaquin Valley (SJV).

Methods
The investigators will use a combination of different sampling techniques and instrumentation to provide a broader understanding of inorganic and organic mass that makes up the overall particle mass contributing to the out-of-compliance levels in the California's Central Valley. This project will be collocated at the super-site in the southern SJV during the six-week CalNex 2010 field study. The investigators propose to: (1) collect and analyze data collected by Aerosol Mass Spectroscopy (AMS) and Fourier transform infrared spectroscopy (FTIR), as well as x-ray Fluorescence (XRF); (2) use factor analysis to attribute the measured mass of organic carbon functional groups to sources based on trace metal signatures; and (3) compare these results to gas-phase organic tracers and oxidants. AMS measurements will be continuous during the study while FTIR and XRF will be coordinated with local meteorology and collocated sampling to collect four-eight hour samples.

Expected Results
Since organic aerosol is a significant contributor to both aerosol air quality and radiative forcing in many parts of the Earth, assessing their atmospheric role requires observations of organic functional groups. Results of this research project are expected to improve our knowledge of organic aerosol in regions where there are currently only sparse data. Identifying organic functional groups will help us understand how these particles will behave in the atmosphere in terms of their thermodynamic, microphysical, and optical properties.

Significance to the Board
This research is expected to provide useful new measurements and statistical analysis for developing air quality attainment strategies in California. Better characterization of organic carbon will also improve our ability to identify organic functional groups in particles that reduce air quality and harm health.

Contractor:
Scripps Institution of Oceanography, University of California, San Diego (UCSD)

Contract Period:
24 months

Principal Investigator (PI):
Professor Lynn Russell

Contract Amount:
$255,000

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

Past Experience with this Principal Investigator:
Professor Russell will serve as the principal investigator coordinating and synthesizing the effort for the overall project. Her 15+ years of experience in aerosol science and strong publication record make her ideal to fulfill this role.

Prior Research Division Funding to UCSD:

Year	2008	2007	2006
Funding	$591,261	$194,304	$174,998

BUDGET SUMMARY

Contractor: Scripps Institution of Oceanography, University of California, San Diego

Improved Characterization of Primary and Secondary Carbonaceous Particles

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	202,751	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	7,176	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	120	
7.	Mail and Phone	$	1,446	
8.	Supplies	$	13,110[1]	
9.	Analyses	$	10,210[2]	
10.	Miscellaneous	$	0	
	Total Direct Costs			$234,813
INDIRECT COSTS				
1.	Overhead	$	20,187	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$20,187
TOTAL PROJECT COSTS				**$255,000**

[1] The consumable supplies necessary for sample preparation, collection, and analysis. 360 samples and blanks will be collected during 30 days of sampling, with 40 filters allocated for calibration and testing. Additional items are required backup and replacement parts for field operations.

[2] X-Ray fluorescence analysis of the collection filters will be performed by Chester Laboratories. The total cost includes 150 samples at $67/sample plus $160 roundtrip shipping.