State of California
AIR RESOURCES BOARD

Resolution 03-1

January 31, 2003

Agenda Item No.: 03-1-2

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 research proposal, number 2524-227, entitled "Global Radiative Effect of Particulate Black Carbon," has been submitted by the California Institute of Technology.

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 2524-227, entitled "Global Radiative Effect of Particulate Black Carbon," submitted by the California Institute of Technology, for a total amount not to exceed $164,592.

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 2524-227, entitled "Global Radiative Effect of Particulate Black Carbon," submitted by the California Institute of Technology, for a total amount not to exceed $164,592.

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 $164,592.

I hereby certify that the above is a true and correct copy of Resolution 03-1, as adopted by the Air Resources Board.

Stacey Dorais

Stacey Dorais, Clerk of the Board

ATTACHMENT A

"Global Radiative Effect of Particulate Black Carbon "

Background

Assembly Bill 1493 requires the Air Resources Board to develop regulations that achieve the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other non-commercial vehicles. While carbon dioxide (CO_2) is the predominant greenhouse gas, black carbon particles also exert a climatic warming influence; a relevant question is the relative radiative forcing potentials of CO_2 and black carbon.

Motor vehicles emit a significant amount of fine organic carbon and black carbon particles. Recent studies suggest a significant climatic effect from black carbon particles, released in part from diesel and gasoline engines. Black carbon particles exert a warming effect in the atmosphere similar to that of greenhouse gases. It should be noted that inhaled black carbon (soot) particles have been implicated in human health effects. Therefore, any strategy aimed at the reduction of black carbon emissions because of their global warming potential will have the additional desirable consequence of removing from the air particulate matter (PM) deemed injurious to human health.

Objective

The goal of this project is to provide the Air Resources Board with state-of-the-science global radiative forcing estimates for black carbon and other particles.

Methods

Climate simulations will be performed using the NASA Goddard Institute of Space Studies (GISS) General Circulation Model. This research project will produce global average radiative forcing estimates for black carbon. These estimates, both at the top of the atmosphere and at the surface, will be obtained over 25-year intervals for 2000, 2025, 2050, 2075, 2100, based on Intergovernmental Panel on Climate Change estimates of emissions over the next century. The radiative forcing estimates will include both direct and indirect radiative forcing contributions.

Expected Results

The investigator will calculate an overall radiative forcing for all PM and attempt to estimate the fraction that might be attributable to black carbon. The product of this research program will be radiative forcing values for black carbon and other PM that can be compared with those for greenhouse gases, so that the relative effects on radiative forcing can be estimated by the ARB for each kilogram of black carbon emitted in California. Results of the project will be summarized in a Final Report to the ARB.

Significance to the Board
Quantitative understanding of the absorbing particles' role in climate forcing is required to accurately evaluate the radiative forcing impacts of PM emissions. This research project will provide an improved estimate of the climate change impacts of PM so that ARB's regulations could better represent the combined impacts of PM and greenhouse gases from passenger vehicles on global climate change.

Contractor:
California Institute of Technology

Contract Period:
24 months

Principal Investigator (PI):
Professor John H. Seinfeld

Contract Amount:
$164,592

Cofunding:
None

Basis for Indirect Cost Rate:
The indirect cost is a federally approved rate. Also, this is a global general circulation model calculation and data analysis study that needs state-of-the-art computer and support facilities to perform highly intensive computing and data storage necessary for this project and this is also included in the overhead rate.

Past Experience with this Principal Investigator:
Professor Seinfeld is a well-known authority on the subject of particle chemistry and thermodynamics, having developed the second- generation PM models and photochemical grid models currently used by ARB. Professor Seinfeld has consistently delivered an outstanding product at a reasonable cost in his previous contracts with ARB.

Prior Research Division Funding to the California Institute of Technology:

Year	2002	2001	2000
Funding	$55,912	$0	$119,631

BUDGET SUMMARY

California Institute of Technology

Global Radiative Effect of Particulate Black Carbon

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits[1]	$101,600	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 0	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 0	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$101,600
INDIRECT COSTS			
1.	Overhead[2]	$ 62,992	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$62,992
TOTAL PROJECT COSTS			**$164,592**

[1] Labor and employee fringe benefits include the salary for two graduate research assistants that reflects 24 months of compensation. Consistent with past practice, Professor Seinfeld does not charge ARB for his time.

[2] The indirect cost is a federally approved rate. Also, this is a global general circulation model calculation and data analysis study that needs state-of-the-art computer and support facilities to perform highly intensive computing and data storage necessary for this project and this is also included in the overhead rate.