Agenda Item No.: 00-11-1

PROPOSED

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Development and Application of an Ambient Aerosol Concentrator and Exposure Facility: The Conduct of Inhalation Studies to Assess the Health Effects of Particulate Matter in the Los Angeles Basin

Resolution 00-37
November 16, 2000

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 2470-217, entitled "Development and Application of an Ambient Aerosol Concentrator and Exposure Facility: The Conduct of Inhalation Studies to Assess the Health Effects of Particulate Matter in the Los Angeles Basin", has been submitted by the University of California, Los Angeles;

WHEREAS, the Research Division staff have reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2470-217 entitled "Development and Application of an Ambient Aerosol Concentrator and Exposure Facility: The Conduct of Inhalation Studies to Assess the Health Effects of Particulate Matter in the Los Angeles Basin", submitted by the University of California, Los Angeles, for a total amount not to exceed $539,229.

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 2470-217 entitled "Development and Application of an Ambient Aerosol Concentrator and Exposure Facility: The Conduct of Inhalation Studies to Assess the Health Effects of Particulate Matter in the Los Angeles Basin", submitted by the University of California, Los Angeles, for a total amount not to exceed $539,229.

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 in an amount not to exceed $539,229.

"Development and Application of an Ambient Aerosol Concentrator and Exposure Facility: The Conduct of Inhalation Studies to Assess the Health Effects of Particulate Matter in the Los Angeles Basin"

Background

Studies have shown that exposure to ambient particulate matter (PM) is associated with exacerbation of asthma and respiratory illness, decreased lung function, and premature mortality. Despite growing evidence of detrimental health effects from exposure to PM, many questions remain concerning the nature of these effects and the importance of size and chemical composition of the particles responsible. Further, the mechanisms of toxicity are unclear. Although serious concern has been recently expressed regarding the health impacts from fine particulates, new studies have shown that ultrafine and coarse particles can cause detrimental effects as well.

Previous investigations of PM health effects have concentrated on the use of synthetic systems comprised of two or more components of ambient PM. These systems, although they have the advantage of precise characterization, lack the complexity and variability seen in ambient PM. New technologies allow test atmospheres to be generated from ambient particles for use in animal and human exposures.

A five-year program is underway to construct facilities to study the health effects of different size fractions of concentrated ambient PM in human volunteers, animal models, and *in vitro* systems. During the first year of this program, the investigators designed, assembled, and characterized the performance of fine and ultrafine PM concentrators and assembled mobile facilities for exposure of animals to concentrated ambient PM.

Objective

The objectives for Year 2 include development of facilities for human and animal exposures studies including a coarse concentrator, animal exposures to ambient air near freeways in an asthma model, and investigation of seasonal effects on toxicity, using animal exposures and *in vivo* studies at Mira Loma, one of the sites from the Children's Health Study.

Expected Results

The product from this effort will be the development and testing of a particle concentrator technology, capable of characterizing and generating exposure to real-time ambient PM. In addition, the concentrator, as well as the human and animal exposure facilities, will be completely mobile.

Significance to the Board

This facility and the work performed in it will provide information on how particles in California air impact the health of our citizens. Because it will employ real ambient particles the results will be directly applicable to such assessments. It will be possible, for example, to determine which portion of ambient PM is most harmful. The facility will

also serve as a focus to mount very sophisticated studies, under funding by others, of such things as mechanisms by which PM causes harm, how specific components of PM differ in toxicity and how PM interacts with other pollutants in ambient air.

Contractor:
University of California, Los Angeles

Contract Period:
12 months

Principal Investigator (PI):
John Froines, Ph.D.

Contract Amount:
$539,229

Cofunding:
Additional chemical characterization of the concentrated and ambient samples of PM used in the freeway study and the *in vitro* study at Mira Loma will be performed and funded through the U.S. EPA Southern California Particle Center and Supersite (SCPCS) Program. Sites from the Children's Health Study will be used in investigations of PM and different levels of photochemical activity as well as *in vitro* studies.

Basis for Indirect Cost Rate:
The indirect cost rate of 10 percent is a negotiated rate agreed to by the University of California, Los Angeles.

Past Experience with this Principal Investigator:
This project is for the second year of funding in a 5-year program to investigate the cardiopulmonary effects of concentrated PM in human volunteers, animal models, and *in vitro* systems. During the first year of this program, the investigators designed, assembled, and characterized the performance of fine and ultrafine concentrators and began the assembly of mobile facilities for exposure of animals to concentrated ambient PM. This work was successfully completed and the fine + ultrafine concentrated PM was studied in preliminary animal investigations funded through the SCPCS program. Given the initial success from the first year of the 5-year program under the direction of Dr. John Froines, we anticipate a successful completion to the aims included in this second year of funding.

Prior Research Division Funding to the University of California, Los Angeles:

Year	1999	1998	1997
Funding	$0	$668,945	$0

BUDGET SUMMARY

University of California, Los Angeles

Development and Application of an Ambient Aerosol Concentrator and Exposure Facility: The Conduct of Inhalation Studies to Assess the Health Effects of Particulate Matter in the Los Angeles Basin

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$110,628	
2.	Subcontractors	$330,057(1)	
3.	Equipment	$ 58,500(2)	
4.	Travel and Subsistence	$ 3,500	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 600	
7.	Mail and Phone	$ 1,200	
8.	Supplies	$ 18,774	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 0	
	Total Direct Costs		$523,229
INDIRECT COSTS			
1.	Overhead	$15,970	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$15,970
TOTAL PROJECT COSTS			**$539,229**

1 Subcontractors:

University of California, Irvine	$227,448
University of Southern California	$102,609
	$330,057

2

Housing Container for Exposure Unit	$25,000
Cage rack and watering system	18,350
Lab Products turbo air supply units	3,956
Fume cabinet	7,194
Computer	4,000
	$58,500

Attachment (##)

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: University of California, Irvine

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$132,010	
2.	Subcontractors	$0	
3.	Equipment	$0	
4.	Travel and Subsistence	$5,000	
5.	Electronic Data Processing	$0	
6.	Reproduction/Publication	$0	
7.	Mail and Phone	$0	
8.	Supplies	$36,032	
9.	Analyses	$0	
10.	Miscellaneous	$33,729	
	Total Direct Costs		$206,771
INDIRECT COSTS			
1.	Overhead	$20,677	
2.	General and Administrative Expenses	$0	
3.	Other Indirect Costs	$0	
4.	Fee or Profit	$0	
	Total Indirect Costs		$206,677
TOTAL PROJECT COSTS			**$227,448**

(notes)

Attachment (##)

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: University of Southern California

DIRECT COSTS AND BENEFITS			
11.	Labor and Employee Fringe Benefits	$59,007	
12.	Subcontractors	$0	
13.	Equipment	$22,000	
14.	Travel and Subsistence	$0	
15.	Electronic Data Processing	$0	
16.	Reproduction/Publication	$0	
17.	Mail and Phone	$0	
18.	Supplies	$3,000	
19.	Analyses	$0	
20.	Miscellaneous	$0	
	Total Direct Costs		$84,007
INDIRECT COSTS			
5.	Overhead	$18,602	
6.	General and Administrative Expenses	$0	
7.	Other Indirect Costs	$0	
8.	Fee or Profit	$0	
	Total Indirect Costs		$18,602
TOTAL PROJECT COSTS			**$102,609**

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