State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 09-10

February 26, 2009

Agenda Item No.: 09-2-2

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 2670-263, entitled "Development of an Updated Base Case Ambient VOC Mixture for Assessing Atmospheric Reactivity," has been submitted by the University of Texas, Austin;

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 2670-263 entitled "Development of an Updated Base Case Ambient VOC Mixture for Assessing Atmospheric Reactivity," submitted by the University of Texas, Austin, for a total amount not to exceed $40,010.

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 2670-263 entitled "Development of an Updated Base Case Ambient VOC Mixture for Assessing Atmospheric Reactivity," submitted by the University of Texas, Austin, for a total amount not to exceed $40,010.

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 $40,010.

I hereby certify that the above is a true and correct copy of Resolution 09-10, as adopted by the Air Resources Board.

Monica Vejar

Monica Vejar, Clerk of the Board

ATTACHMENT A

"Development of an Updated Base Case Ambient VOC Mixture for Assessing Atmospheric Reactivity"

Background

The current base case volatile organic compound (VOC) mixture used for assessing atmospheric reactivity was derived from datasets collected in the late 1980s and early 1990s. As VOC control programs have been aggressively implemented since then, the anthropogenic VOC mixture in the atmosphere has changed in both absolute and relative quantities. A recent preliminary study, funded by the U.S. EPA, showed that the make-up of the organic compounds that we breathe now differs significantly from 20 years ago.

The 20-year-old base case VOC mixture was used to derive condensed photochemical mechanisms, such as SAPRC-99 and SAPRC-07. These mechanisms have been useful for assessing atmospheric reactivity and other scientific and regulatory applications such as the State Implementation Plan. A number of VOC control measures have been implemented in California in the last two decades, resulting in a change to the relative abundance of anthropogenic versus biogenic organic compounds. More recent long-term trend observations and intensive field studies provide significantly larger datasets than 20 years ago. As a result, updating the base case VOC mixture is both necessary and feasible.

Objective

The objective of this project is to develop representative base VOC mixtures from ambient VOC data collected in California and other urban areas of the United States.

Methods

The proposal plans to realize the objective through five tasks. First, observation data from intensive field campaigns and long-term observational data of VOC and relevant parameters will be compiled for the period 2000-2007. Second, the database from the National Emissions Inventory and local traffic counts from Metropolitan Planning Organizations will be used to facilitate the selection of monitoring sites based on their representativeness and to provide quality assurance for the observational data. The compositional profiles will be used to model how future changes in emissions will affect the base case VOC mixture. Third, the ambient organic compound mixing ratios will be analyzed through a number of statistical methods, including time series analysis and positive matrix factorization. Fourth, the SAPRC-07 mechanism will be used, together with the EKMA box model, to evaluate the reactivity of new VOC mixtures with 4 different levels of NOx at 39 urban cities in the country. The modeling results will be used to evaluate the updated base-case VOC mixtures and applicable conditions. In the end, either one VOC mixture or a small number of mixtures will be recommended as the current base case VOC mixtures.

Expected Results
The contract will provide documented data collection and sources, the data analysis methodology, and recommendations for base organic compound mixtures. A presentation of the results will be made to ARB in Sacramento, CA, and a final project database will be provided to ARB.

Significance to the Board
The outcome of this project is expected to improve our modeling accuracy for air quality control programs and to facilitate the effective and efficient control of anthropogenic VOC emissions.

Contractor:
University of Texas, Austin (UTA)

Contract Period:
12 Months

Principal Investigators (PIs):
David W. Sullivan and David T. Allen, Ph.D.

Contract Amount:
$40,010

Basis for Indirect Cost Rate:
UTA has agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
The PIs have not received any contract from CARB previously. However, the team has a unique combination of qualifications. Professor David Allen has worked on urban air quality for the past two decades, and authored and coauthored six books and over 180 papers. Dr. David Sullivan worked at the Texas Commission on Environmental Quality during 1993-2005, and was the team leader for data analysts and the section manager for the monitoring data management and analysis section. He has been a research fellow at UTA analyzing ambient and emissions data since September 2005, and will lead this project.

Prior Research Division Funding to UTA:

Year	2008	2007	2006
Funding	$0	$0	$0

BUDGET SUMMARY

Contractor: University of Texas, Austin

Development of an Updated Base Case Ambient VOC Mixture for Assessing Atmospheric Reactivity

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	33,871	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	850	
5.	Electronic Data Processing	$	1,050	
6.	Reproduction/Publication	$	102	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	500	
	Total Direct Costs			$36,373
INDIRECT COSTS				
1.	Overhead	$	0	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	3,637	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$3,637
TOTAL PROJECT COSTS				**$40,010**