State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 05-10

January 20, 2005

Agenda Item No.: 05-1-2

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 2572-246, entitled “How New Chemistry Findings Affect Our Understanding of the Weekend Effect - A Modeling Study”, has been submitted by the University of California, Irvine;

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

WHEREAS, the Air Resources Board will fund this proposal for a total amount $150,000; and

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

> Proposal Number 2572-246, entitled “How New Chemistry Findings Affect our Understanding of the Weekend Effect - A Modeling Study”, has been submitted by the University of California, Irvine, for a total amount not to exceed $150,000.

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 2572-246, entitled “How New Chemistry Findings Affect Our Understanding of the Weekend Effect - A Modeling Study”, has been submitted by University of California, Irvine, for a total amount not to exceed $150,000.

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 $150,000.

I hereby certify that the above is a true and correct copy of Resolution 05-10, as adopted by the Air Resources Board.

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Lori Andreoni, Clerk of the Board

ATTACHMENT A

"How New Chemistry Findings Affect our Understanding of the Weekend Effect - A Modeling Study"

Background

Emissions caused by human activities show important changes during the week and thus affect the cycle of ambient pollutants during the week and on weekends. The observation that ozone concentrations are higher on weekends than on weekdays, despite lower atmospheric levels of ozone precursors on weekends, has been long recognized as the Weekend Effect. Photochemical models have incorporated different versions of the basic chemical mechanism and have predicted both decreases and increases in ozone concentrations at different locations after NO_X emissions are reduced. Current air quality simulation modeling assessments are missing potentially important physical and chemical processes that would tend to reduce their sensitivity to NO_X species and potentially bias them against NO_X controls. This project will include state-of-the science emissions, meteorology, and atmospheric chemistry for a thorough modeling study. This research work includes a significant number of model runs that will increase our understanding of the ozone and PM air quality dynamics associated with heterogeneous chemical processes and their influence on the weekend effect in the South Coast Air Basin of California (SoCAB).

Objective

The main objective of this proposal is to quantify the impact of recent chemical findings and potential energy legislation on the dynamics of atmospheric pollutants during weekends. The study will focus on the SoCAB.

Methods

This project will use the California Institute of Technology (CIT) atmospheric chemical transport model to simulate atmospheric dynamics in the SoCAB. The CIT Airshed model will be used to study the impact of heterogeneous reactions of nitric acid on surfaces with atmospheric nitrogen oxides on the ozone formation cycle during weekdays and weekends. The proposed work will also perform simulations and analysis of weekend/weekday conditions for both baseline and distributed power generation implementation scenarios. Finally, this study will characterize the temporal and spatial uncertainties related to ozone aloft. Spatial variation of model uncertainties will be determined using probability density distributions to describe the variance of predicted concentrations in the SoCAB.

Expected Results

The results of the project will be documented as a technical report submitted to ARB and as technical papers submitted to peer-reviewed journals. At the conclusion of the project, files with relevant information/data used in this study and suitable for data archiving will also be submitted to the ARB. The investigator will present the results of the project to ARB staff at two 1-hour long technical seminars, one in Sacramento and the second in El Monte.

Significance to the Board

Current air quality simulation modeling assessments are missing potentially important physical and chemical processes that would tend to reduce their sensitivity to NO_X species and potentially bias them against NO_X controls. This project will include state-

of-the science emissions, meteorology, and atmospheric chemistry for a thorough modeling study. This research includes a significant number of model runs that will increase our understanding of the ozone and PM air quality dynamics associated with heterogeneous chemical processes and their influence on the weekend effect in the SoCAB.

Contractor:
University of California, Irvine

Contract Period:
24 months

Principal Investigator (PI):
Donald Dabdub, Ph.D.

Contract Amount:
$150,000

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:
This Principal Investigator has performed very successfully on past contracts. Prof. Dabdub is a world leader in developing the massively parallel computing techniques that will be crucial in this project, and his research studies are well-published.

Prior Research Division Funding to UCI:

Year	2004	2003	2002
Funding	$446,358	$676,814	$0

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

University of California, Irvine

How New Chemistry Findings Affect Our Understanding of the Weekend Effect - A Modeling Study

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	135,701	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	4,060	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	102	
7.	Mail and Phone	$	102	
8.	Supplies	$	881	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$140,846
INDIRECT COSTS				
1.	Overhead	$	0	
2.	General and Administrative Expenses	$	9,154	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$9,154
TOTAL PROJECT COSTS				**$150,000**