State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 12-38

December 6, 2012

Agenda Item No.: 12-9-4

WHEREAS, the Air Resources Board (ARB or 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 2755-275, entitled "Measuring Real-World Emissions from the On-Road Passenger Car Fleet," has been submitted by the University of Denver;

WHEREAS, in accordance with Health and Safety Code section 39705, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2755-275 entitled "Measuring Real-World Emissions from the On-Road Passenger Car Fleet," submitted by the University of Denver, for a total amount not to exceed $75,000.

WHEREAS, the Research Division staff has reviewed Proposal Number 2755-275 and finds that in accordance with Health and Safety Code section 39701, that the results of the study will yield light-duty exhaust emission trends and distributions by vehicle model and age, and will explore the feasibility of using remote sensing devices to measure running loss evaporative emissions. Research Division staff recommends this proposal for approval.

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 recommendations of the Research Screening Committee and Research Division staff and approves the following:

> Proposal Number 2755-275 entitled "Measuring Real-World Emissions from the On-Road Passenger Car Fleet," submitted by the University of Denver, for a total amount not to exceed $75,000.

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 $75,000.

I hereby certify that the above is a true and correct copy of Resolution 12-38, as adopted by the Air Resources Board.

Tracy Jensen

Tracy Jensen, Clerk of the Board

ATTACHMENT A

"Measuring Real-World Emissions from the On-Road Passenger Car Fleet"

Background

Measurements of vehicle exhaust made using remote sensing devices (RSDs) deployed at roadsides have proven to be successful at monitoring motor vehicle exhaust emissions. Remote sensing studies conducted in California since 1999 have shown a steady reduction in tailpipe emissions of hydrocarbons, carbon monoxide, and nitric oxide from the light-duty on-road fleet. Continued RSD data will allow characterization of the relative importance of high-emitters in the current fleet, and will help evaluate the effectiveness of the low emission vehicle (LEV) II program in maintaining low emissions from vehicles throughout their useful lives.

Measurements of hydrocarbons, carbon monoxide, and nitric oxide emissions at the on-ramp from La Brea Boulevard to Interstate 10 in Los Angeles began in 1999 and were repeated about every two years through 2005. In 2008, new technological capabilities were added to include measurements of ammonia, nitrogen dioxide, and sulfur dioxide emissions. The proposed research will measure the on-road vehicle emissions at the La Brea Boulevard on-ramp during the spring of 2013 and 2015, thereby extending the historical record for hydrocarbons, carbon monoxide, and nitric oxide collected since 1999, and establishing an initial trend for ammonia, nitrogen dioxide, and sulfur dioxide from 2008 onward. The proposed research also increases the level of detail in data reporting requirements to include the high frequency data samples for each vehicle as well as the processed emissions ratios for each vehicle.

The LEV II emissions and durability standards were fully phased in by 2004. This project will enable ARB to observe the impact of vehicles manufactured after 2004 on fleet emissions and evaluate their durability as these vehicles come to constitute the majority of the fleet. The high frequency data samples will allow ARB to investigate methods for identification of gross evaporative emitters.

Objective

The study will yield light-duty exhaust emission trends and distributions by vehicle model year and age, and explore the feasibility of measuring running loss evaporative emissions using RSDs. The results will be used to evaluate the effectiveness of California's LEV II program in reducing vehicle exhaust emissions, and to investigate a potential new method to identify gross evaporative emitters.

Methods

This proposed study will use RSDs deployed at roadsides to measure vehicle exhaust emissions from the light-duty on-road fleet, building on a history of measurements at the on-ramp from La Brea Boulevard to Interstate 10 in Los Angeles. Measurements included hydrocarbons, carbon monoxide, and nitric oxide emissions in 1999, 2001, 2003, and 2005, and in 2008 expanded to include ammonia, nitrogen dioxide, and sulfur dioxide emissions.

Forty eight real-time pollutant emissions readings (each 10 millisecond average) will be collected from each passing vehicle. ARB staff will use this data to investigate the possibility of interpreting the real-time data in terms of evaporative emissions running losses. Data will also be acquired on weekend days to facilitate an analysis of weekday/weekend difference in exhaust emissions, including differences in the composition of the light-duty fleet and driver demographics on weekend days versus weekdays. More detailed analysis of the weekend day versus weekday difference may be limited by the instrumentation used in this study, and other confounding factors, such as the higher proportion of heavy-duty vehicles on the weekends, and potentially different weekend driving modes (e.g., traffic light control is usually not used on weekends).

Expected Results
The study will yield light-duty exhaust emission trends and distributions by vehicle model and age, and will explore the feasibility of using RSDs to measure running loss evaporative emissions.

Significance to the Board
The results will be used to evaluate the effectiveness of California's LEV II program in reducing vehicle exhaust emissions, and to investigate a potential new method to identify gross evaporative emitters.

Contractor:
The University of Denver

Contract Period:
42 months

Principal Investigators:
Gary Bishop, Ph.D.
Donald Stedman, Ph.D.

Contract Amount:
$75,000

Basis for Indirect Cost Rate:
The State and the University of Denver have agreed to a 47.4 percent indirect cost rate.

Past Experience with the Principal Investigators:
The proposed contractor has successfully performed similar studies for ARB in the past, thus demonstrating its experience and breadth of knowledge in the proposed area. The contractor already possesses the instruments and capabilities that have been used in previous, similar, studies, enabling it to conduct the study effectively and expeditiously.

Prior Research Division Funding to the University of Denver

Year	2012	2011	2010
Funding	$ 0	$ 0	$ 0

BUDGET SUMMARY

The University of Denver

"Measuring Real-World Emissions from the On-Road Passenger Car Fleet"

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	37,701	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	10,440[1]	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	2,741	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$ 50,882
INDIRECT COSTS				
1.	Overhead	$	24,118	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$ 24,118
TOTAL PROJECT COSTS				**$ 75,000**