State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 12-43

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 2749-275 entitled: "Improving Detection of Particulate Matter Emissions for Certification of Advanced Clean Cars (CRC Project E-99, 'Very Low PM Measurements')," has been submitted by the University of California, Riverside;

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

> Proposal Number 2749-275 entitled: "Improving Detection of Particulate Matter Emissions for Certification of Advanced Clean Cars (CRC Project E-99, 'Very Low PM Measurements')," submitted by the University of California, Riverside, for a total amount not to exceed $100,000.

WHEREAS, the Research Division staff has reviewed Proposal Number 2749-275 and finds that in accordance with Health and Safety Code section 39701, results from this project are expected to include specific recommended changes to the CFR Part 1066 test procedures used to certify light-duty vehicles. The goal of these changes will be to reduce test-to-test variability. The successful completion of this project will aid in the timely implementation of ARB's lower PM emissions standards. Research Division staff recommends this proposal for approval; and

WHEREAS, the Air Resources Board will fund this proposal for a total amount of $100,000, and the Coordinating Research Council and other co-funders will fund this proposal for $336,558.

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 2749-275 entitled: "Improving Detection of Particulate Matter Emissions for Certification of Advanced Clean Cars (CRC Project E-99, 'Very Low PM Measurements')" submitted by the University of California, Riverside, for a total amount not to exceed $100,000.

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 $100,000.

I hereby certify that the above is a true and correct copy of Resolution 12-43, as adopted by the Air Resources Board.

Tracy Jensen, Clerk of the Board

ATTACHMENT A

"Improving Detection of Particulate Matter Emissions for Certification of Advanced Clean Cars (CRC Project E-99, 'Very Low PM Measurements')"

Background

In January, 2012, ARB adopted a package of regulations to reduce emissions from light-duty vehicles (LDVs), including 3 milligrams per mile (mg/mile) and 1 mg/mile particulate matter (PM) certification standards. The previous PM standard was 10 mg/mile, so the new standards represent 70 and 90 percent reductions, respectively, in the PM standards. The magnitude of these reductions has raised concerns among the auto companies about test-to-test variability at these low emissions levels, and the impact this variability may have on their ability to demonstrate compliance with the applicable PM emissions standards.

In order to address these concerns, the Coordinating Research Council (CRC) is sponsoring a research project, E-99, "Very Low PM Measurements", and invited the ARB to be involved as a co-funding stakeholder. This CRC project has essentially the same goals as the ARB project, "Improving the Detection of Particulate Matter Emissions for Certification of Advanced Clean Cars (CRC Project E-99, 'Very Low PM Measurements')," and so the two project concepts have been combined into a single research project that shares two names.

Objective

The objective of this project is to improve the existing laboratory gravimetric filter certification test procedures used to demonstrate compliance with the PM emissions standards for LDVs.

Methods

The project will utilize a conventional light-duty vehicle test cell equipped with a dilution tunnel, the test vehicle will be a late model gasoline-fueled vehicle, and the test cycles will be the Federal Test Procedure (FTP) and the US06, a high-speed test cycle. This single vehicle will be used to study PM measurement improvements at emissions levels of both 3 mg/mile and 1 mg/mile. Confirmatory testing of test procedure improvements will be conducted for two vehicles, one at 3 mg/mile, and the second at 1 mg/mile.

The proposal is focused on making incremental improvements to the existing Code of Federal Regulations (CFR) Part 1066 test procedures for making LDV gravimetric PM emissions measurements. The test parameters to be studied are reducing dilution, partial flow sampling, increasing filter face velocity, combining PM emissions on a single filter, and filter handlings. The project will leverage an ARB-funded particle measurement research project, borrowing a particle measurement instrument, as a cost-saving measure.

Expected Results
Results from this project are expected to include specific recommended changes to the CFR Part 1066 test procedures used to certify light-duty vehicles. The goal of these changes will be to reduce test-to-test variability.

Significance to the Board
The successful completion of this project will aid in the timely implementation of ARB's lower PM emissions standards.

Contractor:
University of California, Riverside

Contract Period:
12 months

Principal Investigators (PIs):
Heejung Jung, Ph.D.
Kent Johnson, Ph.D.

Contract Amount:
$100,000

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with the Principal Investigators:
ARB staff has worked with both Dr. Heejung Jung and Dr. Kent Johnson on several ARB-sponsored previous research projects that involved vehicle emissions measurements, and particle characterization. These projects were successfully completed.

Prior Research Division Funding to the University of California, Riverside:

Year	2012	2011	2010
Funding	$ 0	$ 390,004	$ 0

BUDGET SUMMARY

Contractor: University of California, Riverside

"Improving Detection of Particulate Matter Emissions for Certification of Advanced Clean Cars (CRC Project E-99, 'Very Low PM Measurements')"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 27,514	
2.	Subcontractors	$ 0	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 160	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 0	
7.	Mail and Phone	$ 0	
8.	Supplies	$ 18,080[1]	
9.	Analyses	$ 28,320[2]	
10.	Miscellaneous	$ 18,518[3]	
	Total Direct Costs		$ 92,592
INDIRECT COSTS			
1.	Overhead	$ 7,408	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$ 7,408
TOTAL PROJECT COSTS			**$ 100,000**

[1] Test supplies and expenses for vehicle emissions testing include vehicle rental, equipment rental, fuel, and filter media.

[2] 'Analyses ' refers to vehicle emissions testing and includes fuel and setup preparation, actual vehicle emissions testing using the FTP and US06 test cycles.

[3] 'Miscellaneous' refers to 'facilities rental'. CE-CERT is a permanent off-campus facility and federal regulations require CE-CERT to account for facilities rental as a direct cost.