

State of California
AIR RESOURCES BOARD

Resolution 04-24

July 22, 2004

Agenda Item No.: 04-7-2

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 2551-243, entitled "Quantifying Pollutant Emissions from Office Equipment", has been submitted by the University of California at Berkeley;

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

WHEREAS, the California Energy Commission has agreed to sponsor this proposal in full; and

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

Proposal Number 2551-243 entitled "Quantifying Pollutant Emissions from Office Equipment", submitted by the University of California at Berkeley, for a total amount not to exceed \$799,279.

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 2551-243 entitled "Quantifying Pollutant Emissions from Office Equipment", submitted by the University of California at Berkeley, for a total amount not to exceed \$799,279.

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 \$799,279.

I hereby certify that the above is a true and correct copy of the Resolution 04-24, as Adopted by the Air Resources Board.

Lori Andreoni, Clerk of the Board

ATTACHMENT A

“Quantifying Pollutant Emissions from Office Equipment”

Background

There is increasing concern that commonly used office equipment such as printers and personal computers emit air pollutants at rates that can have adverse health impacts. A short list of studies have been conducted over the last decade that have found various pollutants including VOCs, ozone, and PM to be emitted at levels that may impact health. However, these studies have generally only focused on one type of equipment and one or two pollutants or pollutant groups, and none have focused on office equipment possessing a high share of the California market. Most importantly, ultrafine PM and a number of semi-volatile organic compounds (SVOCs) have not been measured from office equipment in previous studies. Methods by which the equipment users can reduce emissions or reduce their exposures to the pollutants from office equipment also have not been studied. This study would be the first comprehensive study of emissions and energy use from personal computers and printers.

The ARB is interested in obtaining better data on emissions from office equipment in order to assess Californians' indoor exposures to Toxic Air Contaminants, as required under HSC 39660.5. The ARB could also use the data in providing guidance to the public and to other agencies regarding their indoor exposures and approaches to reduce those exposures. The California Energy Commission (Commission) is interested in this information because of the increased energy requirements of office equipment, both from its operation and from the increased ventilation requirements attributable to the added heat load and emissions. The funding for this project is being provided through the Commission's Public Interest Energy Research (PIER) program.

Objective

There are four primary objectives of the proposed study. The first objective is to identify and quantify the emission rates of air pollutants emitted by office printers and personal computers by measuring the concentrations of these pollutants while the equipment is operated in a chamber. The second objective is to understand the temporal and operational factors which influence emissions from office printers and personal computers. Tests designed to understand these factors will also permit the evaluation of the variation in emissions from different types of equipment that are in use. The project will investigate the relationship between energy consumption and emissions for machines performing comparable tasks. Finally, operational practices that would reduce equipment emissions will also be identified.

Methods

A series of chamber tests would be conducted in which personal computers and printers are placed in a sealed chamber (20 cubic meters and one cubic meter), whereby emissions are measured while the equipment is operated over prescribed duty cycles at controlled experimental conditions (e.g., temperature, air flow rate).

Energy use of the equipment will also be measured, and attempts will be made to estimate the heating loads that result from equipment operation. Finally, the identification of measures that operators can take to reduce emissions and exposures will be investigated in this project.

Expected Results

It is expected that the results of this project will provide the first set of comprehensive data on emissions from personal computers and printers, and the relationship between energy use and emissions for this equipment.

Significance to the Board

The ARB and the Commission will have data that can be used to evaluate the health effects of office equipment, ways to reduce the health effects of emissions from office equipment, and the relationship between energy use and emissions from this equipment. The results of this project will allow more feasible and cost-effective air quality and energy policies to be implemented.

Contractor:

University of California at Berkeley

Contract Period:

36 months

Principal Investigator (PI):

Dr. Thomas E. McKone

Contract Amount:

\$799,279

Cofunding:

The California Energy Commission is funding this contract in full.

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:

Previous work done in this area by both the Principal Investigator and subcontractor make them highly qualified to perform the work in this project.

Prior Research Division Funding to UCB:

Year	2003	2002	2001
Funding	\$714,563*	\$1,906,974	\$296,261

* \$445,864 from the California Energy Commission

BUDGET SUMMARY

University of California at Berkeley

Quantifying Pollutant Emissions from Office Equipment

DIRECT COSTS AND BENEFITS

1.	Labor and Employee Fringe Benefits	\$424,488
2.	Subcontractors	\$234,954
3.	Equipment	\$ 23,000
4.	Travel and Subsistence	\$ 2,880
5.	Electronic Data Processing	\$ 0
6.	Reproduction/Publication	\$ 1,750
7.	Mail and Phone	\$ 1,000
8.	Supplies	\$ 58,950
9.	Analyses	\$ 0
10.	Miscellaneous	<u>\$ 3,000</u>
	Total Direct Costs	\$750,022

INDIRECT COSTS

1.	Overhead	\$ 49,257
2.	General and Administrative Expenses	\$ 0
3.	Other Indirect Costs	\$ 0
4.	Fee or Profit	<u>\$ 0</u>
	Total Indirect Costs	<u>\$49,257</u>

TOTAL PROJECT COSTS

\$799,279

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: Lawrence Berkeley National Laboratory

Description of subcontractor's responsibility: Lawrence Berkeley National Lab will provide the 20 cubic meter chamber that will be used in the testing, and will assist in the conducting of the screening tests and the individual equipment tests.

DIRECT COSTS AND BENEFITS

1.	Labor and Employee Fringe Benefits	\$103,226
2.	Subcontractors	\$ 0
3.	Equipment	\$ 0
4.	Travel and Subsistence	\$ 0
5.	Electronic Data Processing	\$ 0
6.	Reproduction/Publication	\$ 0
7.	Mail and Phone	\$ 2,160
8.	Supplies	\$ 16,275
9.	Analyses	\$ 0
10.	Miscellaneous	<u>\$ 26,000</u>
	Total Direct Costs	\$147,661

INDIRECT COSTS

1.	Overhead	\$ 66,921
2.	General and Administrative Expenses	\$ 0
3.	Other Indirect Costs	\$ 20,372
4.	Fee or Profit	<u>\$ 0</u>
	Total Indirect Costs	<u>\$ 87,293</u>

TOTAL PROJECT COSTS**\$234,954**