

State of California  
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 04-37

November 18, 2004

Agenda Item No.: 04-10-2

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 2559-245, entitled "Particle Phase Peroxides: Concentrations, Sources, and Behavior," has been submitted by the University of California, Los Angeles;

WHEREAS, the staff of the Air Resources Board has reviewed and recommended this proposal for approval; and

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

Proposal Number 2559-245, entitled "Particle Phase Peroxides: Concentrations, Sources, and Behavior," submitted by the University of California, Los Angeles, for a total amount not to exceed \$109,975.

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 2559-245, entitled "Particle Phase Peroxides: Concentrations, Sources, and Behavior," submitted by the University of California, Los Angeles, for a total amount not to exceed \$109,975.

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 \$109,975.

I hereby certify that the above is a true  
And correct copy of Resolution 04-37, as  
Adopted by the Air Resources Board.

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Lori Andreoni, Clerk of the Board

## ATTACHMENT A

### “Particle Phase Peroxides: Concentrations, Sources, and Behavior”

#### **Background**

Particulate matter (PM) has been associated with significant adverse health outcomes, but it is difficult to devise cost effective control strategies without a better understanding of the cause of PM toxicity. Recent studies implicate reactive oxygen species (ROS) as responsible for much of this toxicity, and the dominant ROS in PM is hydrogen peroxide. Hydrogen peroxide damages lung epithelial cells at levels well below those expected for ambient samples. A recent *in vivo* study showed that hydrogen peroxide in PM produced symptoms associated with respiratory distress, while gas-phase hydrogen peroxide did not. After developing a technique to quantify peroxide levels in aerosols, the investigator found that ROS levels are more than 100 times the level that had been predicted. This indicates that PM may be able to continuously generate ROS within the lung.

#### **Objectives**

The objectives of this project are to: 1) categorize PM types in terms of their ability to generate hydrogen peroxide, and 2) establish the chemical components of PM that contain, affect concentrations of, or generate hydrogen peroxide.

#### **Methods**

The investigator will measure reactive oxygen species levels in PM from several sites, and investigate the relationship between these toxic compounds and source type. Samples will be collected from gasoline exhaust, diesel exhaust, biogenic emissions, wood smoke and soil dust, and photochemically processed air. Size-segregated aerosols will be collected on filters and analyzed for peroxides. The investigator will also carry out laboratory studies on ambient PM samples to determine the source of peroxides in PM.

#### **Expected Results**

The project will determine the sources, prevalence, levels, and behavior of hydrogen peroxide in ambient air.

#### **Significance to the Board**

This study will contribute substantially to the understanding of PM toxicity. Successful completion of this study should help the ARB to devise control strategies for PM sources that are especially effective in generating reactive oxygen species and thereby harming human health.

**Contractor:**

University of California, Los Angeles

**Contract Period:**

24 months

**Principal Investigator (PI):**

Suzanne E. Paulson, Ph.D.

**Contract Amount:**

\$109,975

**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:**

Professor Suzanne E. Paulson has successfully completed two research projects for the Air Resources Board. These were titled "Total Non-Methane Organic Carbon: Development and Validation of a New Instrument; Measurements of Total Non-Methane Organic Carbon and C2-C10 Hydrocarbons In the South Coast Air Basin," and "An Investigation of the Relationship Between Total Non-Methane Organic Carbon and the Sum of the Speciated Hydrocarbons and Carbonyls."

**Prior Research Division Funding to UCLA:**

Year	2003	2002	2001
Funding	\$0	\$0	\$1,200,000

# BUDGET SUMMARY

University of California, Los Angeles

Particle Phase Peroxides: Concentrations, Sources, and Behavior

## **DIRECT COSTS AND BENEFITS**

1.	Labor and Employee Fringe Benefits	\$ 71,772
2.	Subcontractors	\$ 0
3.	Equipment	\$ 0
4.	Travel and Subsistence	\$ 2,612
5.	Electronic Data Processing	\$ 570
6.	Reproduction/Publication	\$ 412
7.	Mail and Phone	\$ 432
8.	Supplies	\$ 9,000
9.	Analyses	\$ 3,000
10.	Miscellaneous	<u>\$ 13,272<sup>1</sup></u>

Total Direct Costs \$101,070

## **INDIRECT COSTS**

1.	Overhead	\$ 8,905
2.	General and Administrative Expenses	\$ 0
3.	Other Indirect Costs	\$ 0
4.	Fee or Profit	<u>\$ 0</u>

Total Indirect Costs \$ 8,905

## **TOTAL PROJECT COSTS**

**\$109,975**

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<sup>1</sup> Miscellaneous: Fee remission for graduate student researcher, \$12,022  
Publication fees, \$1,250