

State of California  
AIR RESOURCES BOARD

Resolution 04-15

May 20-21, 2004

Agenda Item No.: 04-5-2

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 2550-239, entitled "Analysis of Building Characteristics and Indoor Environmental Quality in California Classrooms," has been submitted by Westat, in response to RFP No. 03-328;

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

WHEREAS, the California Energy Commission has agreed to cosponsor this proposal for \$100,000 making the Air Resources Board's contribution \$16,780; and

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

Proposal Number 2550-239 entitled "Analysis of Building Characteristics and Indoor Environmental Quality in California Classrooms," submitted by Westat, for a total amount not to exceed \$116,780.

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 2550-239 entitled "Analysis of Building Characteristics and Indoor Environmental Quality in California Classrooms," submitted by Westat, for a total amount not to exceed \$116,780.

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 \$116,780.

I hereby certify that the above is a true and correct copy of Resolution 04-15, as adopted by the Air Resources Board.

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Lori Andreoni, Clerk of the Board

## **ATTACHMENT A**

### **“Analysis of Building Characteristics and Indoor Environmental Quality in California Classrooms”**

#### **Background**

The Air Resources Board (ARB) and the Department of Health Services (DHS) recently conducted a study to assess environmental health conditions in California’s portable classrooms, as required by California Health and Safety Code Section 39619.6. A great deal of new data were collected for the Portable Classrooms Study (PCS). However, detailed analyses of some of these data were not funded in the initial study. The ARB needs further analyses of the PCS data to help refine specific recommendations to schools and guide further activities for preventing indoor environmental quality (IEQ) problems in schools. The California Energy Commission (Commission) is also interested in further analysis of the PCS data in order to obtain information needed for revising their building energy efficiency standards for schools. The Commission is providing the major portion of the funding for this effort.

#### **Objective**

The objectives of this project are to further analyze variables on ventilation, other energy-related factors, and socioeconomic indicators, and to examine their relationship to indoor air quality and other environmental characteristics, in both portable and traditional classrooms.

#### **Methods**

The contractor will conduct basic statistical and multivariate analyses of the relationship between ventilation, other energy-related factors, and socioeconomic indicators to indoor air quality and other environmental characteristics, using statistical methods and software programs appropriate for population-weighted data.

#### **Expected Results**

The contractor will provide weighted descriptive statistics for variables on detailed building characteristics related to ventilation, temperature, relative humidity, noise, and lighting, that were not previously analyzed.

The contractor will analyze the relationships between key building performance variables and indoor environmental quality variables, using appropriate techniques for descriptive and multivariate methods available. The data analyses will explore four main types of associations: 1) between ventilation rates and/or ventilation indicators and the levels of indoor air pollutants, noise, teacher satisfaction, and other factors measured in the PCS; 2) between natural ventilation (use of open doors and windows) and levels of indoor air pollutants, moisture, noise, teacher satisfaction, and other factors measured in the PCS; 3) between lighting levels/type and teacher satisfaction and other factors; 4) between pollutant levels (indoor and outdoor) and a school's socioeconomic indicators, such as student body ethnicity and proximity to nearby pollutant sources.

The contractor, in consultation with ARB and Commission staff, will also conduct further analyses based on findings of the analyses described above.

**Significance to the Board**

The results of this study will help the ARB to better understand the impacts of ventilation types, other energy-related factors, and socioeconomic indicators on indoor pollution levels, including levels of Toxic Air Contaminants (TACs). ARB staff will also use results to help refine specific recommendations to schools and guide further activities for preventing IEQ problems in schools. The Commission will use the results to improve energy efficiency and IEQ in California schools through revised building standards.

**Contractor:**

Westat

**Contract Period:**

18 months

**Principal Investigator (PI):**

Robert Paul Clickner, Ph.D.

**Contract Amount:**

\$116,780

**Cofunding:**

The California Energy Commission is contributing \$100,000 to the cost of this study.

**Basis for Indirect Cost Rate:**

The indirect cost is part of their fully loaded rates.

**Past Experience with this Principal Investigator:**

Dr. Robert Clickner is an Associate Director at Westat and a senior statistician with 31 years of experience in the development, implementation, and management of statistical and environmental research projects. He has directed a number of major environmental studies of exposure to heavy metals, pesticides, lead-based paint in homes, indoor environmental quality, asbestos in schools, and industrial solid waste. Dr. Clickner has designed and analyzed national statistical surveys using a variety of optimization and modeling techniques, and has analyzed numerous environmental exposure survey databases, both weighted and unweighted. Dr. Clickner has presented numerous invited papers before universities, professional and technical organizations, and international institutes, and has served on the Board of Councilors of the International Society of Exposure Analysis. Although Dr. Clickner has not previously done work for the ARB, staff are familiar with his work on several large federally-funded exposure projects, which is impressive, and believe he is well-suited for this project.

**Prior Research Division Funding to Westat:**

Year	2003	2002	2001
Funding	\$0	\$0	\$0

# BUDGET SUMMARY

Westat

Analysis of Building Characteristics and Indoor Environmental  
Quality in California Classrooms

## **DIRECT COSTS AND BENEFITS**

1.	Labor and Employee Fringe Benefits	\$93,977	
2.	Subcontractors	\$16,866	
3.	Equipment	\$ 0	
4.	Travel and Subsistence	\$ 2,796	
5.	Electronic Data Processing	\$ 672	
6.	Reproduction/Publication	\$ 823	
7.	Mail and Phone	\$ 823	
8.	Supplies	\$ 823	
9.	Analyses	\$ 0	
10.	Miscellaneous	<u>\$ 0</u>	
	Total Direct Costs		\$116,780

## **INDIRECT COSTS<sup>1</sup>**

1.	Overhead	\$ 0	
2.	General and Administrative Expenses	\$ 0	
3.	Other Indirect Costs	\$ 0	
4.		<u>\$ 0</u>	
	Total Indirect Costs		<u>\$ 0</u>

**TOTAL PROJECT COSTS** **\$116,780**

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1. Indirect Costs are included in the fully loaded rates used in Labor and Employee Benefits

Attachment 1

**SUBCONTRACTORS' BUDGET SUMMARY**

Subcontractor: Building Ecology Research Group

Description of subcontractor's responsibility: Hal Levin of Building Ecology Research Group would provide California-based indoor air quality and ventilation expertise in the analyses of data and interpretation of results.

**DIRECT COSTS AND BENEFITS**

1.	Labor and Employee Fringe Benefits	\$14,850	
2.	Subcontractors	\$ 0	
3.	Equipment	\$ 0	
4.	Travel and Subsistence	\$ 540	
5.	Electronic Data Processing	\$ 0	
6.	Reproduction/Publication	\$ 0	
7.	Mail and Phone	\$ 0	
8.	Supplies	\$ 0	
9.	Analyses	\$ 0	
10.	Miscellaneous	<u>\$ 0</u>	
	Total Direct Costs		\$15,390

**INDIRECT COSTS**

1.	Overhead	\$ 0	
2.	General and Administrative Expenses	\$ 0	
3.	Other Indirect Costs	\$ 1,476 <sup>1</sup>	
4.	Fee or Profit	<u>\$ 0</u>	
	Total Indirect Costs		<u>\$ 16,866</u>

**TOTAL PROJECT COSTS** **\$16,866**

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(notes)

1. Indirect Costs are for Westat's administrative charges.