

State of California  
AIR RESOURCES BOARD

Resolution 01-35

September 20, 2001

Agenda Item No.: 01-7-3

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 2499-221, entitled "Correlation between Solids Content and Hiding as it Relates to Calculation of VOC Content in Architectural Coatings," has been submitted by California Polytechnic State University, San Luis Obispo;

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

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

Proposal Number 2499-221 entitled "Correlation between Solids Content and Hiding as it Relates to Calculation of VOC Content in Architectural Coatings," submitted by California Polytechnic State University, San Luis Obispo, for a total amount not to exceed \$99,932.

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 2499-221 entitled "Correlation between Solids Content and Hiding as it Relates to Calculation of VOC Content in Architectural Coatings," submitted by California Polytechnic State University, San Luis Obispo, for a total amount not to exceed \$99,932.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and agreements for the interagency research effort proposed herein, and as described in Attachment A, in an amount not to exceed \$99,932.

I hereby certify that the above is a true and correct copy of Resolution 01-35, as adopted by the Air Resources Board.

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Marie Kavan, Clerk of the Board

## ATTACHMENT A

### “Correlation between Solids Content and Hiding as it Relates to Calculation of VOC Content in Architectural Coatings”

#### **Background**

Architectural coatings are a significant source of volatile organic compounds (VOC) emissions in California. In recent years, water-based coatings have been increasing their market share relative to solvent-based coatings. Paint can labels must state their VOC content, which facilitates both enforcement of rules and consumer comparison of the VOC content of different brands. U.S. EPA rules, which are adopted by local air districts, define "regulatory VOC" by computing the VOC of coatings on a "less water and exempt compounds basis". However, for coatings with a high percentage of water, the regulatory VOC can be much higher than the actual VOC.

The regulatory definition implies that the volume of solids is directly related to the ability of the applied coating to "hide" the underlying substrate. If a particular coating does not "hide" sufficiently, the consumer will repeat the application with additional paint. However, a low-solids water-based coating with a high "regulatory VOC" can provide the same hiding ability as a high-solids solvent-based coating with higher "actual VOC". In that case, a consumer looking for a low-VOC paint might buy a can that would emit more VOCs when applied.

#### **Objective**

The objective of this project is to investigate the relationship between the type and amount of solids, and coverage and hiding, for selected classes of water-based architectural coatings.

#### **Methods**

The first task will be to develop a plan for experimental design. The contractor, California Polytechnic State University (CalPoly), will use standard methods to determine film thickness and coverage, produce films of uniform thickness, and determine the hiding power of paints by reflectometry. The second task will be to formulate, apply, and evaluate coatings. CalPoly will prepare thirty formulations, apply them to suitable substrates, and test them. CalPoly will vary levels of pigment to adjust pigment volume concentration in the dry films.

#### **Expected Results**

Based on the expected results of this project, ARB staff may be able to justify an alternative VOC calculation procedure for labeling paint cans. Ultimately, this would provide a more accurate way to compare the emissions impacts of various coatings. Enforcement would be easier since the test method will be more straightforward.

**Significance to the Board**

The Board, during its approval of the 2000 Suggested Control Measure for Architectural Coatings, directed ARB staff to evaluate the issue of the “less water and exempts” calculation. Manufacturers indicate that the labeling requirement “penalizes” them for formulating coatings with water. The results of this project are expected to provide benefits to manufacturers of water-borne coatings, and to consumers who will be better able to compare labeled VOC contents on paint cans.

**Contractor:**

California Polytechnic State University, San Luis Obispo

**Contract Period:**

16 months

**Principal Investigator (PI):**

Professor Albert C. Censullo

**Contract Amount:**

\$99,932

**Cofunding:**

None

**Basis for Indirect Cost Rate:**

The 35 percent indirect cost rate is a federally approved rate.

**Past Experience with this Principal Investigator:**

The PI has almost completed an ARB-funded project (98-310) titled, "Investigation of Low Reactivity Solvents for Use in Consumer Products." In earlier work for the ARB, the PI's team developed sampling methods and analyzed over 50 water-based and solvent-based coatings. In that work, the PI demonstrated excellent analytical abilities and showed a willingness to put extra effort into the project to ensure accurate and useful results.

**Prior Research Division Funding to California Polytechnic State University, San Luis Obispo:**

Year	2001	2000	1999
Funding	\$ 0	\$ 0	\$ 0

# BUDGET SUMMARY

California Polytechnic State University, San Luis Obispo

Correlation between Solids Content and Hiding as it Relates to  
Calculation of VOC Content in Architectural Coatings

## **DIRECT COSTS AND BENEFITS**

1.	Labor and Employee Fringe Benefits	\$66,917	
2.	Subcontractors	\$ 0	
3.	Equipment	\$ 1,000	
4.	Travel and Subsistence	\$ 2,007	
5.	Electronic Data Processing	\$ 0	
6.	Reproduction/Publication	\$ 500	
7.	Mail and Phone	\$ 0	
8.	Supplies	\$ 3,600	
9.	Analyses	\$ 0	
10.	Miscellaneous	<u>\$ 0</u>	
	Total Direct Costs		\$74,024

## **INDIRECT COSTS**

1.	Overhead	\$25,908	
2.	General and Administrative Expenses	\$ 0	
3.	Other Indirect Costs	\$ 0	
4.	Fee or Profit	<u>\$ 0</u>	
	Total Indirect Costs		<u>\$25,908</u>

## **TOTAL PROJECT COSTS**

**\$99,932**