

State of California
AIR RESOURCES BOARD

Resolution 87-86
October 8, 1987

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; and

WHEREAS, an unsolicited research proposal, Number 1549-135, entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Purposes," has been submitted by the University of California, Riverside;

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:

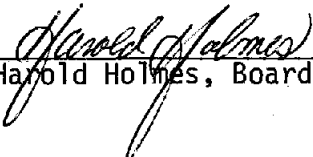
Proposal Number 1549-135, entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Purposes," submitted by the University of California, Riverside, for a total amount not to exceed \$37,454.

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 1549-135, entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Purposes," submitted by the University of California, Riverside, for a total amount not to exceed \$37,454.

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 in an amount not to exceed \$37,454.

I hereby certify that the above is a true and correct copy of Resolution 87-86, as adopted by the Air Resources Board.



Harold Holmes, Board Secretary

ITEM NO.: 87-13-3(b) 1
DATE: October 8, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1549-135 entitled "Maintain and Operate California Air Resources Board Field Fumigation Facility for Experimental Purposes."

RECOMMENDATION: Adopt Resolution 87-86 approving Proposal No. 1549-135 for funding in an amount not to exceed \$37,454.

SUMMARY: In order to foster research on the effects of air pollution on California vegetation, ARB contracted with the University of California, Riverside to build, operate, and maintain an open-top air pollution exposure facility for plant study. For the past several years, the facility has been in almost continuous use by ARB researchers (see, for example, the following item herein). Since its original construction the facility has been expanded to include additional chambers and capabilities for humidification and for acidic fog treatment. The current proposal would continue the operation, maintenance, and upgrading of the chamber facility for one year.

The activities for which the contractor would be responsible include: maintain and repair as needed the plant exposure chambers which have been built with ARB funds; ensure proper operation and periodic calibration of pollutant dispensing equipment, monitoring equipment, and automated data collection systems; perform necessary weed control and soil preparation between experiments; provide instruction, supervision, and day-to-day assistance to facility users; arrange pollutant delivery and sampling systems in accordance with user needs; and maintain necessary facilities that are shared by persons using the site.

It is necessary to retain persons with technical expertise to operate and maintain the ARB fumigation facility for plant scientists unfamiliar with its use. This ensures that maintenance and exposures are uniformly and correctly performed and the funds committed to experimental work in the chambers are most efficiently spent.

B U D G E T S U M M A R Y

University of California, Riverside

"Maintain and Operate California Air Resources Board
Field Fumigation Facility for Experimental Purposes"

BUDGET ITEMS:

Salaries	\$14,496
Benefits	4,146
Supplies*	11,500
Equipment	3,250
Other Costs	<u>657</u>

TOTAL, Direct Costs	\$34,049
TOTAL, Indirect Costs	<u>3,405</u>

TOTAL PROJECT COST \$37,454
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*Supplies:

Plastic coverings for 20 chambers	\$3,000
Dust Filters	3,000
Mist Bed Heating Coils	500
Analyzer Overhauls and Repair	3,000
Gases, fertilizers, pots, misc. supplies	2,000

State of California
AIR RESOURCES BOARD

Resolution 87-87
October 8, 1987

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; and

WHEREAS, an unsolicited research proposal, Number 1552-135R, entitled "Mechanistic Basis for the Growth and Yield Effects of Ambient Ozone on Valencia Oranges (*Citrus sinensis*)," has been submitted by the University of California, Riverside, to the Air Resources Board; and

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:

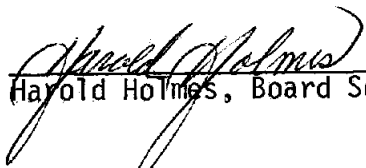
Proposal Number 1552-135R, entitled "Mechanistic Basis for the Growth and Yield Effects of Ambient Ozone on Valencia Oranges (*Citrus sinensis*)," submitted by the University of California, Riverside, for a total amount not to exceed \$58,308.

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 1552-135R, entitled "Mechanistic Basis for the Growth and Yield Effects of Ambient Ozone on Valencia Oranges (*Citrus sinensis*)," submitted by the University of California, Riverside, for a total amount not to exceed \$58,308.

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 in an amount not to exceed \$58,308.

I hereby certify that the above is a true and correct copy of Resolution 87-87, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-13-3(b) 2
DATE: October 8, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1552-135R entitled "Mechanistic Basis for the Growth and Yield Effects of Ambient Oxidants of Valencia Oranges (Citrus Sinensis)."

RECOMMENDATION: Adopt Resolution 87-87 approving Proposal No. 1552-135R for funding in an amount not to exceed \$58,308.

SUMMARY: In 1983, ARB funded a multi-year study to determine the effects of photochemical oxidants or sulfur dioxide on oranges. Forty-two two-year-old Valencia orange trees were planted at the Statewide Air Pollution Research Center. Large clear plastic chambers were erected over the trees. Air pollutant exposures, physiological and growth measurements, and environmental monitoring began in May of 1984. The investigator harvested the first crop in 1986 and a second crop in 1987. Exposure to ambient oxidants caused a yield loss, compared to exposure to filtered air. Sulfur dioxide at a concentration of 0.10 ppm in filtered air also caused a yield reduction.

This proposal would extend all current activities except sulfur dioxide exposure through the summer of 1988 so that a third crop could be harvested. The investigator would continue environmental monitoring to determine if environmental differences between the chambers and outside environments may affect plant response. The investigator would have to make physiological and growth measurements, determine fruit yield and quality, and collect and analyze leaves for starch content.

Yield information from a third harvest is important for two reasons. First, it would improve the reliability of the ozone dose - yield response equation developed from this study. Yields of perennial crops vary from year to year, and experience with grapes has shown that several years of harvest data are needed to take this variability into account. Second, the additional harvest would determine whether the differences between plants in

State of California
AIR RESOURCES BOARD

Resolution 87-88
October 8, 1987

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; and

WHEREAS, an unsolicited research proposal, Number 1551-135R, entitled "Field Assessment of the Effects of Ambient Ozone on Cotton (*Gossypium hirsutum*) in the San Joaquin Valley," has been submitted by the University of California, Riverside, to the Air Resources Board;

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:

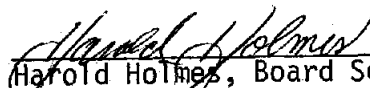
Proposal Number 1551-135R, entitled "Field Assessment of the Effects of Ambient Ozone on Cotton (*Gossypium hirsutum*) in the San Joaquin Valley," submitted by the University of California, Riverside, for a total amount not to exceed \$188,218.

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 1551-135R, entitled "Field Assessment of the Effects of Ambient Ozone on Cotton (*Gossypium hirsutum*) in the San Joaquin Valley," submitted by the University of California, Riverside, for a total amount not to exceed \$188,218.

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 in an amount not to exceed \$188,218.

I hereby certify that the above is a true and correct copy of Resolution 87-88, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-13-3(b) 3
DATE: October 8, 1987

State of California
AIR RESOURCES BOARD

ITEM: Research Proposal No. 1551-135R entitled "Field Assessment of the Effects of Ambient Ozone on Cotton (Gossypium hirsutum) in the San Joaquin Valley"

RECOMMENDATION: Adopt Resolution 87-88 approving Proposal No. 1551-135R for funding in an amount not to exceed \$188,218.

SUMMARY: This study addresses two problems in estimating yield losses in crops due to ozone exposure: whether or not losses actually occur in the field at levels predicted by the yield reduction equations obtained in previous experiments; and whether significant errors in the yield loss estimates may result because of differences in ozone sensitivity of crop varieties. Cotton, California's most valuable annual crop, will be the experimental species.

The proposed study would use three different, but coordinated, techniques to address the problems identified above. Under the first approach, test plots of cotton grown in chambers would be established to measure the effects on yield of filtered air compared with ambient air at four widely separated sites with four different levels of ambient oxidants in the San Joaquin Valley. The results will provide yield loss data over a range of ambient oxidant concentrations comparable to previous field chamber research. The second approach would be to establish plots of ozone-sensitive and ozone tolerant cotton varieties in the field at these four locations and several additional locations with no chambers. The results will provide yield loss data associated with different cultivars.

The third approach would be to treat cotton plants with an antioxidant chemical. Research indicates that antioxidant chemicals can protect plants from ozone induced injury or yield loss. The results are expected to show smaller yield losses in the treated plants.

The combined evidence from these three techniques will serve to confirm if estimated yield losses are in fact occurring, and that these estimated losses are not attributable either to "chamber effects" or to some unique characteristic of previous experimental locations. The results will also indicate the range of sensitivity to ozone of important cotton varieties.

The study will take advantage of extensive air quality monitoring in ARB's San Joaquin Valley air quality study, expected to begin next spring, by coordinating the selection of cotton study sites with monitoring sites for the San Joaquin Valley study. The study will be a cooperative one involving county agricultural and private grower participants and the University of California. It will increase the agricultural community's awareness of the effects of air pollution on agriculture and will provide a mechanism for its active participation in the research and data gathering process. Ultimately, this study will provide a firmer scientific foundation for setting ambient air quality standards to protect crops and native vegetation.

The contractor will be the University of California, Riverside, and the principal investigator will be Dr. David M. Olszyk.

B U D G E T S U M M A R Y

University of California, Riverside

"Field Assessment of the Effects of Ambient Ozone on
Cotton (*Gossypium hirsutum*) In the San Joaquin Valley"

BUDGET ITEMS:

Salaries	\$78,291
Benefits	23,278
Supplies	6,200
Equipment	24,608
Other Costs	26,515
Travel	14,452
Equipment *	24,608

TOTAL, Direct Costs	\$173,344
TOTAL, Indirect Costs	<u>14,874</u>

TOTAL PROJECT COST \$188,218

* Fabrication of six open top field chambers	\$ 6,000
3 Dasibi Ozone Analyzers	12,900
3 Sultec Recorders	<u>5,708</u>
Total Equipment	\$24,608

State of California
AIR RESOURCES BOARD

Resolution 87-89
October 8, 1987

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; and

WHEREAS, a solicited research proposal, Number 1448-129R, entitled "Southern California Air Quality Study - Fall Study," has been submitted by the California Public Health Foundation;

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 1448-129R, entitled "Southern California Air Quality Study - Fall Study," submitted by the California Public Health Foundation, for a total amount not to exceed \$44,677.

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 1448-129R, entitled "Southern California Air Quality Study - Fall Study," submitted by the California Public Health Foundation for a total amount not to exceed \$44,677.

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 in an amount not to exceed \$44,677.

I hereby certify that the above is a true and correct copy of Resolution 87-89, as adopted by the Air Resources Board.


Harold Holmes, Board Secretary

ITEM NO.: 87-13-3(b) 4
DATE: October 8, 1987

State of California
AIR RESOURCES BOARD

- ITEM: Research Proposal No. 1448-129R entitled "Southern California Air Quality Study - Fall Study."
- RECOMMENDATION: Adopt Resolution 87-89 approving Proposal No. 1448-129R for funding in an amount not to exceed \$44,677.
- SUMMARY: The objective of this project is to support the Department of Health Services' participation in the fall portion of the Southern California Air Quality Study (SCAQS). Inasmuch as much of the fall effort will be devoted toward the study of nitrogen oxides, the principal investigator will measure nitrogen dioxide by the standard chemiluminescence monitoring technique in a variety of experimental configurations. This task will allow an assessment of the accuracy of routine monitoring methods for nitrogen dioxide.
- The second task of the study is to measure nitric, nitrous and hydrochloric acids and ammonia with the annular denuder technique, in order to evaluate the accuracy of the SCAQS sampler for these species.
- The objectives outlined in this proposal will help ensure that the general SCAQS objectives are met. The principal investigator for the project will be Dr. Bruce Appel.