

State of California
AIR RESOURCES BOARD

Resolution 02-6

February 21, 2002

Agenda Item No.: 02-1-6

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 2506-223, entitled "Keeping Tahoe Blue through Identifying Nitrogen Transport to Lake Tahoe: Additional Ambient Air Nitrogen Species Measurements", has been submitted by the University of California, Berkeley;

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 2506-223 entitled "Keeping Tahoe Blue through Identifying Nitrogen Transport to Lake Tahoe: Additional Ambient Air Nitrogen Species Measurements", submitted by the University of California, Berkeley, for a total amount not to exceed \$175,036.

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 2506-223 entitled "Keeping Tahoe Blue through Identifying Nitrogen Transport to Lake Tahoe: Additional Ambient Air Nitrogen Species Measurements", submitted by the University of California, Berkeley, for a total amount not to exceed \$175,036.

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 \$175,036.

I hereby certify that the above is a true and correct copy of Resolution 02-6, as adopted by the Air Resources Board.

Marie Kavan, Clerk of the Board

ATTACHMENT A

“Keeping Tahoe Blue through Identifying Nitrogen Transport to Lake Tahoe: Additional Ambient Air Nitrogen Species Measurements”

Background

Nutrient loading is believed responsible for loss of clarity in Lake Tahoe. Enrichment of nitrogen and phosphorus in Lake Tahoe has been observed and some researchers have attributed a significant portion of that enrichment to atmospheric sources. However, the estimates of atmospheric (and some non-atmospheric) contributions are uncertain. Better quantification is required to understand what actions would be effective for reducing nitrogen enrichment of the Lake. Through dry and wet deposition, atmospheric nitrogen oxides including NO_x, nitric acid and organic nitrates may contribute to increases in the nitrogen available as a nutrient in the Lake. Sources of atmospheric nitrogen oxides may include direct emissions within the Basin from vehicles and home wood burning as well as natural sources and emissions from combustion, bacterial modification of fertilizers and natural bacterial emissions from the Sacramento Valley and the Bay Area that are transported to the Tahoe Basin.

Objective

The objective of this project is to provide a detailed baseline of observations of the annual cycle of four different types of reactive nitrogen oxides in the Tahoe Basin and advance the understanding of the sources, chemical transformations, surface deposition rates and the dynamical factors that affect the input of atmospheric nitrogen oxides to Lake Tahoe. The project will determine the deposition rates and the origin of deposited nitrogen by measuring ambient concentrations of nitric acid, nitrogen dioxide, peroxy acetyl nitrate, and total organic nitrates at Lake Tahoe.

Methods

State-of-the-art laser induced fluorescence (LIF) instrument, designed and built by Dr. Cohen, will be used to measure the target species.

Expected Results

Atmospheric measurements will be made of nitric acid, nitrogen dioxide, peroxyacetyl nitrate, total alkyl nitrates, and total organic nitrates at the upwind boundary of the Lake Tahoe Basin. Fluxes of nitrogen species may also be measured near Lake level to estimate deposition to the Lake. These measurements will be analyzed to determine: 1) the factors that control the mixing ratios of total reactive nitrogen in the Lake Tahoe Basin, 2) the factors that control partitioning among nitrogen species, 3) the contribution alkyl nitrates make to the atmospheric nitrogen oxides deposited to the Lake Tahoe Basin, and 4) the fractions of NO_y in the Tahoe Basin contributed by the global background, sources in regions of California to the West, and local sources.

Significance to the Board

Ambient data, including fluxes, will provide inputs and validation databases for the Board's Lake Tahoe air quality modeling exercises. It is expected that these modeling

exercises will characterize any enrichment from the atmosphere to the lake and evaluate required control measures to reduce the enrichment.

Contractor:

University of California, Berkeley

Contract Period:

30 months

Principal Investigator:

Ronald C. Cohen

Contract Amount:

\$175,036

Cofunding:

This research at Lake Tahoe is funded by the California Air Resources Board. However, it is part of a larger cooperative research effort that includes funding of various aspects by the California State Water Quality Control Board, U. S. EPA, Tahoe Regional Planning Agency (TRPA), and the U. S. Forest Service.

Basis for Indirect Cost Rate:

The State and UC System have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:

This Principal Investigator has performed very successfully on past contracts, including making similar measurements at Blodgett Forest Research Station using the proposed instrument.

Prior Research Division Funding to the University of California, Berkeley:

Year	2001	2000	1999
Funding	\$	\$0	\$3,992,027

BUDGET SUMMARY

University of California, Berkeley

“Keeping Tahoe Blue through Identifying Nitrogen Transport to Lake Tahoe: Additional Ambient Air Nitrogen Species Measurements”

DIRECT COSTS AND BENEFITS

1.	Labor and Employee Fringe Benefits	\$104,032
2.	Subcontractors	\$
3.	Equipment	\$
4.	Travel and Subsistence	\$ 17,010 ¹
5.	Electronic Data Processing	\$
6.	Reproduction/Publication	\$ 1,000
7.	Mail and Phone	\$ 1,000
8.	Supplies	\$ 26,975 ²
9.	Analyses	\$
10.	Miscellaneous	<u>\$ 9,917</u>
	Total Direct Costs	\$159,934

INDIRECT COSTS

1.	Overhead	\$ 15,102
2.	General and Administrative Expenses	\$
3.	Other Indirect Costs	\$
4.	Fee or Profit	<u>\$</u>
	Total Indirect Costs	<u>\$ 15,102</u>

TOTAL PROJECT COSTS

\$175,036

¹The travel cost consists of 70 roundtrips from Berkeley to Lake Tahoe to maintain measurement instruments.

² The costs for supplies are based on costs incurred during the Blodgett Forest project which is comparable in scope and duration. The supplies required for the proposed laboratory operations include laboratory chemicals, gases, optics, and laser repairs.