

State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 07-35

September 27, 2007

Agenda Item No.: 07-9-2

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 2639-257, entitled "Using Lead and Strontium Isotopes to Assess Asian Aerosol Impacts in Urban and Interior California," has been submitted by the University of California, Berkeley; and

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

WHEREAS, the Air Resources Board will fund this proposal for a total amount not to exceed \$80,806; and

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

Proposal Number 2639-257, entitled "Using Lead and Strontium Isotopes to Assess Asian Aerosol Impacts in Urban and Interior California," has been submitted by the University of California, Berkeley, for a total amount not to exceed \$80,806.

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 2639-257, entitled "Using Lead and Strontium Isotopes to Assess Asian Aerosol Impacts in Urban and Interior California," has been submitted by the University of California, Berkeley, for a total amount not to exceed \$80,806.

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 \$80,806.

I hereby certify that the above is a true and correct copy of Resolution 07-35, as adopted by the Air Resources Board.

/s/

Lori Andreoni, Clerk of the Board

ATTACHMENT A

“Using Lead and Strontium Isotopes to Assess Asian Aerosol Impacts in Urban and Interior California”

Background

Asian dust and combustion products are known to be regularly transported to California. Growth of Asian emissions will increase the background burden and may complicate attainment of air quality standards in California. High altitude monitoring data show that Asian aerosols dominate the mean composition of the lower free troposphere over California, while sparse data from a few coastal sites show much smaller sea-level impacts. The burden of Asian pollutants at low altitude inland sites is expected to be greater than at the coast, but there are no published data on this impact; however, these data are needed to assess current and future Asian background impacts on California air quality. Although Asian dust has a distinct chemical composition, the general similarity of combustion-product aerosols from both sides of the Pacific Ocean render chemical and elemental analyses unreliable to isolate the mass fraction of Asian aerosols in urban or agricultural areas of the state.

Ratios of stable isotopes of lead are well-known to be diagnostic “fingerprints” for source ore bodies, and thus markers for emissions from metallurgical and combustion emissions associated with those ores. This has been used in the past to track the sources of lead pollution on local and regional scales. Similarly, stable isotope ratios of strontium and neodymium are known to be diagnostic of their parent terranes, and these have been used to track Asian dust in polar ice. This project will exploit source-linked lead and strontium isotopic fingerprints measured in aerosol samples from Asia and rural California to assess Asian contributions of both fugitive dust and combustion products in low altitude urban and agricultural regions of California.

Objective

The objective of this research project is to measure the fraction of Asian lead in particulate matter (PM) samples from low and high altitude areas of California, and to use these data to estimate the mixing of Asian aerosols into the lower altitude, populated areas of the state.

Methods

This project will exploit source-linked lead and strontium isotopic fingerprints measured in aerosol samples from Asia and rural California to assess Asian contributions of both fugitive dust and combustion products in low altitude urban and agricultural regions of California.

Expected Results

Analysis of approximately 50 archived PM samples from a range of sites in the state will provide a data base to estimate the mixing of Asian PM from the free troposphere (generally above 1 km altitude) into boundary layer air in populated areas of the state.

Significance to the Board

Asian PM emissions are elevating background concentrations in western North America. Asia’s (especially China’s) economic growth has the potential to significantly increase emissions. Higher background concentrations complicate attaining state and Federal Air Quality Standards by reducing the effectiveness of local (in-state) emission reductions. Quantifying the effect of Asian pollution on California will allow explicit inclusions of background trends in air quality planning in the state.

Contractor:

University of California, Berkeley (UCB)

Contract Period:

30 months

Principal Investigator (PI):

Professor Donald DePaolo

Contract Amount:

\$80,806

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 DePaolo has taught and conducted research at UCB and the Lawrence Berkeley National Laboratory (LBNL) since 1988. He established and now directs the Center for Isotope Geochemistry (CIG), a joint research facility crossing the institutional boundaries of UCB and LBNL, with a staff of eleven scientists, lab managers/technicians and computer support, and facilities that include seven mass spectrometers suitable for the analyses in this project. He teaches courses in geochemistry and currently supervises four graduate students and two postdoctoral researchers. The CIG has been developing the ability to analyze PM samples under an internal Research and Development program at LBNL.

Prior Research Division Funding to UCB:

Year	2007	2006	2005
Funding	\$30,000	\$1,713,789	\$1,204,449

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

University of California, Berkeley

Using Lead and Strontium Isotopes to Assess Asian Aerosol Impacts in Urban and Interior
California

DIRECT COSTS AND BENEFITS

1.	Labor and Employee Fringe Benefits	\$	57,860
2.	Subcontractors	\$	0
3.	Equipment	\$	0
4.	Travel and Subsistence	\$	0
5.	Electronic Data Processing	\$	0
6.	Reproduction/Publication	\$	0
7.	Mail and Phone	\$	150
8.	Supplies	\$	15,450 ¹
9.	Analyses	\$	0
10.	Miscellaneous	\$	<u>0</u>
Total Direct Costs			\$73,460

INDIRECT COSTS

1.	Overhead	\$	7,346
2.	General and Administrative Expenses	\$	0
3.	Other Indirect Costs	\$	0
4.	Fee or Profit	\$	<u>0</u>
Total Indirect Costs			<u>\$7,364</u>

TOTAL PROJECT COSTS **\$80,806**

¹ Laboratory supplies are for sample collection and preparation, chemical separators for isotopic analysis, and mass spectrometry.