

**State of California
AIR RESOURCES BOARD**

Research Screening Committee Meeting

**Cal/EPA Headquarters Building
1001 I Street
Conference Room 550
Sacramento, California 95814
(916) 445-0753**

**December 16, 2003
9:00 a.m.**

ADVANCE AGENDA

Interagency Proposals

- 1. Air Pollution and Cardiovascular Disease in the California Teachers Study Cohort, State of California, Department of Health Services, \$188,536, Proposal No. 2546-233.**

The relationship between short-term (i.e., 24-hour) exposure to ambient air pollution and exacerbation of pre-existing cardiopulmonary illness and mortality in susceptible individuals has been well established. However, little is known about the health effects of long-term exposure of ambient air pollution, particularly on the development of cardiac or respiratory diseases and mortality; and the roles of specific sources, especially traffic-associated emissions, with respect to the pathogenesis of chronic illness. This study has the unique opportunity to use an existing dataset, the California Teachers' cohort, established by the Northern California Cancer Center and the California Department of Health Services, which includes 133,479 current and former female public school teachers and administrators recruited in 1995. Investigators have followed this cohort for incidence of disease and mortality. The information gathered from this cohort will allow the investigators to study whether long-term exposure to PM (PM10 and PM2.5) air pollution or to any of several gaseous pollutants is associated with cardiovascular and cardiopulmonary disease incidence or mortality. Investigators will also determine whether exposure to traffic emissions, measured by residential proximity to busy roads, is related to cardiovascular disease incidence or mortality.

- 2. “Determination of Reactive Oxygen Species Activity in PM and Enhanced Exposure Assessment for the NIH, NIEHS Study Entitled: Ultrafine Particulate Matter and Cardiorespiratory Health,” University of California, Irvine, \$175,000 and mobile monitoring platform (ARB) (co-funded with South Coast Air Quality Management District, \$900,371 total), Proposal No. 2545-233.**

The elderly, especially those with cardiovascular disease, have been identified as especially vulnerable to the effects of air pollution. Investigators in numerous epidemiological studies have found that PM, or some component of PM, may cause changes in blood, in cardiac function, and may be associated with mortality in people with cardiovascular disease. Controlled animal and human exposure studies have been conducted which suggest mechanistic explanations for these findings. Recent studies suggest that the ultrafine fraction (diameter less than 0.1 μm) may have a special potential for harm. A major study is about to begin in southern California to study the impacts of air pollution on this group. The three-year study is funded by the National Institute of Environmental Health Sciences (NIEHS) at a cost of \$3.3 million. PM air pollution, in particular the ultrafine size fraction, is of special interest. The study, as funded by NIEHS, has limited air monitoring and does not include health-related assays that could provide mechanistic linkages between health outcomes and PM exposures. This proposal would provide funds to augment planned monitoring and allow for consideration of comprehensive, time-resolved air monitoring data for use in epidemiological analyses. The proposal would also provide funds for health-related assays on biological markers of effects that are related to possible mechanisms of cardiac injury. This information would allow ARB to better utilize study results for Ambient Air Quality Standards and health guidelines development needed to protect the health and welfare of the State's citizens.

- 3. “Survey of Ventilation Practices and Housing Characteristics in New California Homes,” University of California at Berkeley, Survey Research Center, \$445,864 (funded by the California Energy Commission), Proposal No. 2547-233.**

The California Energy Commission (Commission) sets energy efficiency standards for California homes, in order to conserve energy. New buildings designed to meet current standards have notably lower natural air exchange between indoor and outdoor air than older homes. Additionally, some materials used in new homes emit formaldehyde and other Toxic Air Contaminants. Concerns have been raised regarding whether occupants use windows, doors, exhaust fans, and other mechanical ventilation devices enough to remove indoor contaminants and moisture. The objectives of this study are to: 1) determine the use of windows, doors, and mechanical ventilation devices in new single-family homes in California; 2) determine the occupants' perceptions of indoor air quality and comfort; 3) examine the key factors that determine occupant ventilation

practices; and 4) identify barriers to occupant use of natural and mechanical ventilation to achieve adequate air exchange. Investigators will conduct a mail survey of a large sample of owner-occupants of new California homes to obtain information on building characteristics, ventilation practices and equipment, indoor pollutant sources, occupant activities, and occupant comfort and satisfaction. Investigators will analyze the relationships among ventilation practices, perceived indoor air quality, and house and household characteristics, and identify barriers to the use of natural ventilation (windows and doors) and mechanical ventilation. The study results will also be used to design a field study to measure indoor air quality and ventilation characteristics in new homes. This study will provide information needed by the Commission to assess the impact of current energy efficiency standards and help determine the need for mechanical ventilators in new homes. This study and the planned field study will provide information needed by the Air Resources Board for assessing Californian's indoor exposures to Toxic Air Contaminants.

**4. "Hourly, In-situ Quantitation of Organic Aerosol Marker Compounds,"
University of California, Berkeley, \$269,330, Proposal No. 2544-233.**

Regulatory efforts to achieve fine particulate matter (PM_{2.5}) standards require improvements in our knowledge of the factors controlling the concentration, size and chemical composition of PM_{2.5}. While many advances have been made in measuring and modeling the inorganic ionic species that are found in PM_{2.5}, much less is known about the organic fraction. Yet organic matter is a major constituent of airborne particles, comprising 20-40% of the PM_{2.5} mass in many regions. Quantitative knowledge of the composition of PM_{2.5} organic matter is key to tracing its sources and understanding its formation and transformation processes. The objective of this work is to identify the origins of PM_{2.5} organic matter within a region in California that is currently out of compliance with PM air quality standards. The proposed field work includes two measurement campaigns, each of one month duration. This work will address the critical need for on-line, time-resolved, quantitative measurement of atmospheric PM_{2.5} organics at the molecular level. This research will provide useful new data of immediate value for air quality attainment strategies for the Central Valley and the development of the State Implementation Plan. The placement of an air monitoring supersite in Fresno provides a unique opportunity for complementary research.

Other Business

**5. Information Update, "Epidemiologic Investigation to Identify Health
Effects of Ambient Air Pollutants in California," \$10,599,078, Contract
No. 94-331**

The 10-year Children's Health Study (CHS) is coming to a close. We received a preliminary draft final report on November 17 for staff's review. Because of the

comprehensive nature of the final report for this landmark study, we thought we would provide the RSC with an opportunity to make comments to staff regarding the completeness of the report. These comments would be forwarded to the Study investigators, along with staff comments, for preparation of the draft final report. This report would be formally reviewed by the RSC in 2004. Our main concern is whether or not the contractors adequately analyzed health outcomes related to certain pollutants that we feel are very important to the Study. These pollutants include CO, NO, NOx, and ultra-fine particles. Health outcomes related to traffic density and participants' proximity to roadways is another area of concern related to adequate analysis.