State of California
AIR RESOURCES BOARD

Joint Meeting with the Board and the
Research Screening Committee

Cal/EPA Headquarters Building
1001 I Street
Conference Room 2550
Sacramento, California 95814
(916) 445-0753

July 20, 2006
9:00 a.m.

ADVANCE AGENDA

Interagency Proposals

1. "Ventilation and Indoor Air Quality (IAQ) in Small and Medium Commercial Buildings (SMCB) Phase II Field Study," University of California, Davis, $1,059,996, Proposal No. 2610-252

Small and medium commercial buildings (SMCBs), having total floor area less than 50,000 square feet, likely dominate California's commercial buildings. Unlike larger commercial and public buildings, as well as schools, there is no significant indoor air quality (IAQ) and heating, ventilation, and air conditioning (HVAC) data for SMCB available to support "Title 24" California Energy Commission (CEC) building energy efficiency standards regulations. Under CEC sponsorship, the UC Berkeley Survey Research Group and LBNL principal investigators will conduct a survey program of the SMCB sector (Phase I) to collect HVAC and IAQ information. Concurrent with the survey program, this proposal would fund a field study of approximately 40 SMCB (Phase II) to study building characteristics, operation and maintenance of the building HVAC and air filtration systems, and IAQ. In this project the investigators would obtain field data on the design and performance parameters of HVAC and air filtration systems in SMCB using a tracer method. Staff from the National Institute of Standards and Tests has offered to support a limited number of total building air flow measurements by sealing the building air handler HVAC system and testing flow from outside to inside the building using several different pressurization schemes and "blower doors." To characterize the building indoor environment, principal investigators would collect integrated indoor and outdoor concentrations of a suite of aldehydes, VOCs, real time CO, CO_2, O_3, integrated PM10 and PM2.5. The history of both moisture and indoor air quality (IAQ) complaints would be recorded. To estimate penetration rates for particulate matter in SMCB the investigators will measure particulate matter and black carbon inside and outside of buildings. The data will be analyzed to determine relationships between and among building ventilation, filtration, operation and IAQ

pollutant levels and problems. The survey and field study will constitute an important contribution to energy efficiency standards and indoor air quality health-based guidelines.

Contract Augmentation

2. "Augmentation to Improvements to Versatile Aerosol Concentration Enrichment System," University of California, Davis, $29,109, Augmentation to Contract No. 04-332, Proposal No. 2611-252

The Versatile Aerosol Concentration Enrichment System (VACES) forms a critical component of current ARB-funded research on the adverse health effects caused by particulate matter. Studies have shown that elevation in PM10 and PM2.5 concentrations are correlated with increases in acute morbidity and mortality in the population. VACES allows researchers to study such effects on animal models by concentrating ambient particles. This technology is based on inducing particles to grow by water condensation, concentrating the droplets with a virtual impactor, and then drying the particles back to their original size. This method has been documented to preserve many particle properties, such as size, bulk chemistry, indicators of single-particle composition, and particle morphology. Recent work conducted by Prof. A. Wexler's group, however, demonstrated that although VACES operates as claimed under most meteorological conditions of southern California, the system failed to concentrate aerosols for a range of conditions that are commonly encountered in northern California. This project will address these shortcomings by constructing improvements to VACES that will enable the system to operate well under a wider range of ambient conditions than is currently possible. Additional work will include the development of a theory of operation and a written operating manual for the improved system. These solutions will provide researchers with a stable aerosol concentration system that is capable of maintaining high concentration enrichment factors over a wide range of ambient conditions, and will help support the Air Resource Board's future health effects studies that utilize improved VACES.