BOARD MEETING DATE: June 6, 2014

AGENDA NO. 3

- PROPOSAL: Execute Contract to Evaluate Emissions Inventories and Model Performance using Mobile Smog Chamber Studies
- SYNOPSIS: The amount of ozone formed in the atmosphere is a complex process dependent upon both ambient NOx and VOC concentrations. The chemical transport models used in the AQMP attempt to simulate this dependence for regulatory decisionmaking. This action is to execute a 6-month contract with the University of California, Davis in an amount not to exceed \$49,982 to perform unique, proof-of-concept mobile smog chamber studies examining the sensitivity of ozone formation on NOx and VOC levels at various locations in the South Coast Air Basin. These field measurements will help determine if this novel method can be used more broadly to evaluate emissions inventories, validate model performance, and enhance the ability to formulate effective ozone control strategies. Funding for this contract is budgeted in FY 2013-14 Budget as part of the U.S. EPA Section 105 Grant for the 22nd year of the PAMS program.

COMMITTEE: Administrative, May 9, 2014, Recommended for Approval

RECOMMENDED ACTION:

Authorize the Executive Officer to execute a contract with the University of California, Davis for mobile smog chamber studies of ozone formation across the South Coast Air Basin in an amount not to exceed \$49,982.

Barry R. Wallerstein, D.Env. Executive Officer

Background

The South Coast Air Basin faces a significant challenge in meeting federal standards for Ozone by future Clean Air Act deadlines. Ozone is a secondary pollutant that is not emitted directly from sources, but is chemically formed in the atmosphere in the presence of sunlight from reactions of NOx and VOCs. This chemical mechanism is highly complex and depends not only on NOx and VOC levels, but also on the ratio of VOC to NOx concentrations. Depending on the local VOC/NOx ratio, an incremental reduction in NOx emissions may have differing effects on ozone concentrations. Predicting changes in ambient ozone concentrations in response to changes in VOC and/or NOx emissions is a critical element of the AQMP modeling.

The proposed contract will provide a proof-of-concept for ambient measurements of ozone sensitivity to the VOC/NOx ratio at multiple locations in the Basin, which will ultimately improve our modeled predictions of the VOC and NOx emissions reductions that are needed for attainment of the ozone standards.

Proposal

Dr. Michael Kleeman at the University of California, Davis has approximately 20 years of extensive experience in the measurement and modeling atmospheric reactions for ozone and particulate matter formation. Dr. Kleeman and his team will collect ambient air samples throughout the basin using three mobile Teflon chambers. Ozone concentration inside one of the Teflon chambers will be perturbed by adding a mixture of VOCs while ozone concentrations inside another chamber will be perturbed by adding NOx. The third chamber will be used as a control. Ozone concentrations inside each chamber will be monitored as they are irradiated with a lamp capable of simulating sunlight. These experiments will allow researchers to determine the ozone concentrations in NOx and VOC concentrations throughout the basin. During the data analysis phase of the study, researchers will determine the locations that are highly sensitive to changes in NOx and VOC concentrations. SCAQMD staff will then compare these results to model predictions at those times and locations.

With a relatively small investment in funds, these experiments will provide an important "proof-of-concept" for these types of measurements while also providing useful initial results. The comparison between point measurements and modeled results will lay the groundwork for more comprehensive field studies throughout the South Coast Air Basin. In addition, this work could also lead to the development of a smaller, lower-cost instrument to make similar measurements of ozone sensitivity on shorter timescales at more locations.

Benefits to SCAQMD

Results of these experiments will help to assess a promising method to validate and improve the ozone formation chemistry in the AQMP modeling, to evaluate the current emission inventories, and to improve the effectiveness of ozone control strategies.

Sole Source Justification

The criteria for a sole-source award of contracts funded with federal funds is addressed in section VIII.B.3.a of the Procurement Policy and Procedures. The contract is only available from a single source because the contractor team has unique experience and capabilities that are critical for the proposed study. In addition, the contractor team already owns the instrumentation necessary for the study. Furthermore, section VIII.B.2.d.8 of the Procurement Policy and Procedures allows for sole source contracts for research and development efforts with educational institutions or nonprofit organizations.

Resource Impacts

Funding for this contract is available in the FY 2013-14 Budget from the U.S. EPA Section 105 Grant for the 22nd Year PAMS program. These funds were recognized and appropriated by the Board at the November 1, 2013 meeting.