

BOARD MEETING DATE: September 2, 2016

AGENDA NO. 6

PROPOSAL: Recognize Revenue and Appropriate Funds to Test and Deploy Low-Cost Sensors for Monitoring Ambient Concentrations of PM2.5 and Ozone

SYNOPSIS: U.S. EPA's National Exposure Research Laboratory (NERL) is developing a Portable Observation Device (POD) based on low-cost sensor technology and capable of measuring fine particulate matter (PM2.5) and ozone. NERL has expressed interest in working with SCAQMD's Air Quality Sensor Performance Evaluation Center (AQ-SPEC) to characterize the performance and reliability of these PODs. NERL is also interested in deploying these PODs in the South Coast Air Basin alongside similar sensor devices developed in AQ-SPEC. Recently, SCAQMD has been selected by U.S. EPA for performing these testing and monitoring activities. This action is to recognize \$101,900 in revenue into the General Fund and appropriate \$9,900 in the Science & Technology Advancement Budget to support this work.

COMMITTEE: Technology, July 22, 2016; Recommended for Approval

RECOMMENDED ACTION:

Recognize revenue of \$101,900 into the General Fund upon receipt and appropriate \$9,900 from the General Fund Unassigned (Undesignated) Fund Balance into Science & Technology Advancement's FY 2016-17 Budget (Org 43) Services and Supplies Major Object as follows: Lab Supplies Account \$5,000, Office Expense Account \$2,200, and Mileage Account \$2,700. Salaries and Employee Benefits of \$92,000 are already included in Science & Technology Advancement's FY 2016-17 Adopted Budget.

Wayne Natri
Acting Executive Officer

Background

U.S. EPA's National Exposure Research Laboratory (NERL) is conducting a sensor performance evaluation in the southern California geographical area in support of collaborative work with the US EPA Region 9. To this end, NERL is developing a Portable Observation Device (POD) based on low-cost sensor technology and capable of measuring fine particulate matter (PM_{2.5}), ozone, and environmental conditions (relative humidity and temperature). Recently, NERL has expressed interest in working with SCAQMD's Air Quality Sensor Performance Evaluation Center (AQ-SPEC) to evaluate the basic performance features of these PODs by using direct comparisons with field- and laboratory-based instrumentation. NERL is also interested in deploying these PODs in a geographically diverse pattern within the South Coast Air Basin and operating them in a continual fashion for a period of up to nine (9) months.

SCAQMD staff working in the AQ-SPEC is uniquely qualified to conduct this type of comprehensive sensor performance evaluation versus reference monitors. Numerous particulate and gaseous sensors have already been tested by SCAQMD research staff using reference monitors under field and laboratory conditions. The results of this testing can be found online at www.aqmd.gov/aq-spec.

Proposal

This action is to recognize \$101,900 in revenue into the General Fund and appropriate \$9,900 in the Science & Technology Advancement Budget to evaluate the performance of NERL's PODs and to deploy them in the South Coast Air Basin alongside similar sensor devices developed by AQ-SPEC staff.

Field and laboratory evaluation of up to ten (10) air quality sensor devices (PODs)
AQ-SPEC staff will perform an independent and thorough performance characterization of up to ten (10) of NERL's newly developed sensor PODs using both field- and laboratory-based testing. Specifically, all PODs will be operated side-by-side with a more "common" Federal Reference Method (FRM) for measuring ambient ozone and with two different Federal Equivalent Methods (FEMs) for monitoring ambient PM_{2.5}. The testing will be conducted at SCAQMD's fully instrumented station in Rubidoux, CA. All sensor PODs will be evaluated in the field for a period of at least one month to provide robust statistical information about the comparability with FRM/FEM instruments measuring the same pollutants and their overall performance. After field testing is complete, three (3) randomly selected PODs will be brought back to the AQ-SPEC lab, where a state-of-the-art characterization chamber will be used to challenge them with known concentrations of PM and ozone under different temperature and relative humidity levels.

Field deployment and operation of up to ten (10) air quality sensor devices (PODs)
SCAQMD staff will deploy and operate up to ten (10) of NERL's PODs at up to ten (10) different monitoring sites in southern California. These will include SCAQMD sites, Schools and Environmental Justice (EJ) areas, and the Salton Sea. Candidate locations suggested by EPA are listed below:

- Salton Sea - Mecca, CA (2-3 sensors)
 - 1 collocated with Saul Martinez SLAMS (State and Local Air Monitoring Stations) site
 - 1 collocated with Indio SLAMS site
 - 1 at Mecca Elementary School
- Rubidoux/Mira Loma - Riverside, CA (2-3 sensors)
 - 1 collocated with Rubidoux SLAMS
 - 1 collocated with Mira Loma SLAMS
 - 1 at Rubidoux High School
- Carson - Wilmington Area (3-4 sensors)
 - 1 collocated with Long Beach Near-road SLAMS
 - 1 collocated with Long Beach Hudson SLAMS
 - 1 at Carson Senior High School
 - 1 at Wilmington Middle School

All PODs will be collocated with similar sensor devices developed by AQ-SPEC staff and measuring the same particle and gaseous pollutants (e.g. PM_{2.5} and ozone).

Benefits to SCAQMD

This work will provide valuable information on the performance of low-cost sensor devices over a wide range of field and laboratory conditions and during an extended period of time. It will also allow us to study the spatial and temporal variability of ambient PM_{2.5} and ozone in the South Coast Air Basin, and it will serve as a template for developing future air monitoring networks based on low-cost sensor technology.

Resource Impacts

Funding for this effort from the EPA's NERL contract shall be recognized into the General Fund and \$9,900 appropriated into Science & Technology Advancement's FY 2016-17 Budget, Services and Supplies Major Object, upon Board approval. The balance of \$92,000 for Salaries and Employee Benefits is already included Science & Technology Advancement's FY 2016-17 Budget.