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**U.S. EPA Environmental Technology Verification (ETV) Program
Advanced Monitoring Systems (AMS) Center**

Air Stakeholder Committee Teleconference

Thursday, May 8, 2008

1:00 pm – 3:00 pm EDT

Teleconference Meeting Minutes

AGENDA

Welcome, Agenda, and Meeting Objectives	Rachel Sell, Battelle
Introduction of New EPA Project Officer Doug Grosse	Rachel Sell
ETV Upcoming Events • EPA Science Forum • Upcoming ETV Team Meetings	Amy Dindal, Battelle
Update on Technology Categories • Applikon MARGA system • Leak Detection and Repair (LDAR) Devices at Petroleum Refineries and Chemical Plants • Odor Detection (electronic-nose) Technologies – Odotech • Selected Ion Flow Tube Mass Spectrometers	Tom Kelly, Battelle
Discussion of Evolving Technology Categories • Baghouse Filtration Continuous Monitor (Leak Detection) • Ozone Detector Card • Fungal Contamination Field Monitors • Cavity Ringdown Spectroscopy - Picarro Inc. • Personal Sampling Pumps	Ann Louise Sumner, Battelle
Update on Non-Air AMS Technology Categories • Water update • Soil Rapid Toxicity Technologies • Spot Test Kits for Lead in Paint • Radio Frequency Identification Devices for Hazardous Waste Package Tracking	Amy Dindal
Introduction of New Stakeholder and Discussion of EPA's Advanced Technology Initiative	Dennis Mikel, EPA

Recap of Priorities - *What's on the Horizon?*

Rachel Sell

Next Meeting and Action Items

Rachel Sell

Adjourn

ATTENDEES

Stakeholder Committee Members:

Ernest Bouffard, Connecticut Department of Environmental Protection

Chuck Dene, EPRI

Rudy Eden, South Coast Air Quality Management District (AQMD)

Philip Galvin, New York State Dept. of Environmental Conservation

Cliff Glowacki, Covenant Associates

Dennis Mikel, EPA

Will Ollison, American Petroleum Institute (API)

Roy Owens, Owens Corning

Don Stedman, University of Denver

Participant:

Jean Marie Cencetti, Arkema

ETV AMS Center Staff:

Amy Dindal, Battelle

Doug Grosse, EPA

Tom Kelly, Battelle

Rachel Sell, Battelle

Ann Louise Sumner, Battelle

Abby Waits, EPA

Welcome, Agenda, and Meeting Objectives

Rachel Sell, Battelle AMS Center Stakeholder Committee Coordinator, welcomed committee stakeholders and AMS Center staff, took roll call of those stakeholders participating in the teleconference, and proceeded with an overview of the agenda, noting the focus of the call would be on upcoming ETV events, updates on technology categories moving forward, updates on evolving technology categories, and identifying priority technology categories for verification.

Introduction of New EPA Project Officer Doug Grosse

Ms. Sell introduced Doug Grosse, the new EPA project officer for the AMS Center. Doug replaced Bob Fuerst, who retired from EPA. Doug is an environmental engineer in EPA's Office of Research and Development, National Risk Management Research Laboratory. Doug has been with the EPA nearly 30 years; in this capacity he has served as branch chief in the Technology Transfer program. In addition, Doug has participated in evaluations under the Superfund Innovative Technology Evaluation (SITE) program and has been the author of workshop

proceedings in a number of different technical areas including mercury, arsenic, and vapor intrusion.

ETV Upcoming Events

Amy Dindal, Battelle AMS Center program manager, provided an update on upcoming ETV events. The 2008 EPA Science Forum will be held May 20-22, in Washington, D.C. This year's Science Forum will emphasize the theme of "Innovative Technologies: Key to Environmental and Economic Progress," and will feature presentations on several ETV tests. In addition, six AMS Center vendors will exhibit their technologies. ETV will also staff a booth. Ms. Dindal added that an ETV team meeting will be held on May 19 in conjunction with the Science Forum. The ETV team meeting will cover updates from the various ETV Centers; discussion of ETV policies will also be held. The next ETV event will be held in New York City on October 7-8 in conjunction with EPA Region 2 and EPA's Small Business Innovative Research (SBIR) office. This workshop will highlight recent and upcoming environmental technology developments, verification under these two programs, and will identify opportunities for linking technology with needs and priorities in Region 2 and other local organizations. Stakeholders, particularly those in the NYC area, will be contacted for their interest in participating in these meetings.

Update on Technology Categories

Tom Kelly provided an update on four technology categories and reviewed slides from a PowerPoint presentation distributed to stakeholders before the teleconference.

Applikon MARGA system

Dr. Kelly provided background on the technology category. He described EPA's Clean Air Markets Division's (CAMD) interest in verification of a field sampling/ion chromatograph system that would provide automated near-real-time measurements of aerosol ionic species and soluble gases (i.e., nitrate, sulfate, chloride, ammonium, nitric and nitrous acids, ammonia, sulfur dioxide, etc.) in air. The only system identified during the open call for vendors in this category which will provide this type of data seems to be the Applikon MARGA (or Monitor for AeRosols and Gases in Air) system. Another ion chromatograph system (from URG Corporation) was identified, but is not believed to be as automated in operation or as complete in data acquisition and transfer.

Applikon is a German company that specializes in wet chemistry techniques. The MARGA system is a field-deployable ion chromatograph that provides hourly measurements for soluble gases and aerosol ionic components. In terms of an ETV verification, EPA's CAMD plans to support a 30-day field test of two MARGA systems. The verification would include a comparison to duplicate filter/denuder reference measurements, which are the integrated sampling methods that EPA is interested in replacing. In addition to EPA's CAMD, collaborators include North Carolina State University and EPA's Office of Air Quality Planning and Standards (OAQPS). Dr. Kelly also thanked JoAnn Rice and Cliff Glowacki for volunteering to serve as peer reviewers of the test/QA plan. Will Ollison also volunteered to serve as backup peer reviewer. The field test of the MARGA system is planned to start in September 2008.

Stakeholders asked what performance parameters were being reported. Dr. Kelly said that CAMD had defined a set of performance goals for accuracy (slope, intercept, and relative percent difference relative to the reference results), precision (relative percent difference between paired measurements), completeness (percent of valid data for entire field period and for periods covered by reference measurements), and reliability (percent time in operation, tolerance of power failure, extent of operator attendance needed).

Leak Detection and Repair (LDAR) Devices at Petroleum Refineries and Chemical Plants

Dr. Kelly reviewed the upcoming verification of portable infrared devices for leak detection of hydrocarbons at petroleum refineries and chemical plants. Infrared technologies allow visualization of leaks and offer a potentially cost-effective solution to Method 21 that relies on “sniffing” every pipeline component with an organic vapor analyzer to monitor for leaks at industrial component interfaces such as flanges, couplings, and valves.

This verification originated through EPA’s Environmental and Sustainable Technology Evaluations (ESTE) program. Three vendors have signed vendor agreements: FLIR, Pacific Advanced Technologies, and Electrophysics. TELOPS is a Canadian company that may also participate. Verification includes laboratory testing at a BP facility expected in summer 2008 and field testing at two industrial facilities in Texas. Field testing will occur in late summer 2008 and winter 2008 at both facilities. The Texas Chemical Council and American Chemistry Council are providing co-funding for the test.

Roy Owens said that his experience is that formaldehyde and other compounds are not well-detected with Method 21. Dr. Stedman added that LDAR devices wouldn’t see chlorine and people are interested in detecting this chemical at these facilities as well. EPA has agreed that the host facilities will not be subjected to enforcement actions as a result of any leaks disclosed during the testing.

Odor Detection (electronic-nose) Technologies – Odotech

Dr. Kelly provided an update on the odor detection (electronic-nose) technologies. A Canadian company, OdoTech, contacted the AMS Center regarding potential interest in ETV verification of the OdoWatch™ System, a network of sensor heads with a meteorological package that characterizes odors at various facilities such as concentrated animal feeding operations (CAFOs) or wastewater treatment plants. Each sensor head consists of 16 semiconductor sensors for various gases (e.g., NH₃, H₂S). OdoTech wants the entire system to undergo verification testing, not just the sensor heads. Dr. Kelly described how one or more sensor heads could be tested in laboratory and field settings.

The OdoWatch™ System is calibrated by comparison to a human odor panel, using whole air samples from the target facility. Output is reported as odor intensity, in “odor units”, not as a chemical measurement. Two systems are currently in place in the U.S. at water treatment facilities, and systems have also been installed in Canada.

Rudy Eden and Raul Dominguez of the South Coast AQMD and the AMS Center participated in a teleconference with OdoTech in April to discuss potential verification approaches. One potential approach is to compare the OdoWatch readings and OdoTech olfactometry results to

those of two other human olfactometry laboratories on the same air samples from the field site. The goal would be to measure the variability and consistency of the OdoWatch calibration and response over time. Dr. Stedman said that ASTM has an olfactometry standard for H₂S and ammonia. He said the procedure sounds like it works quite well if the odors are stable.

Dr. Kelly noted that OdoTech is eager to provide in-kind support and there is the potential for collaboration with ETV Canada. The range of facilities could be expanded to include CAFOs, but OdoTech is currently only focused on wastewater treatment plants. Collaborator financial support needs to be identified as well.

Selected Ion Flow Tube Mass Spectrometers

Dr. Kelly provided an update on the Selected Ion Flow Tube Mass Spectrometer (SIFT-MS) technology. Syft Technologies of New Zealand is interested in verification of its SIFT-MS technology, the Voice200, a smaller, quieter, more sensitive (50 ppt detection limit claimed), and less expensive instrument than the Voice100, the technology that Syft Technologies initially envisioned as being verified. Syft described the technology as utilizing precisely controlled chemical ionization reactions to detect and quantify trace amounts of volatile organic compounds (VOCs). It is applicable to alkane, alkene, and aromatic hydrocarbons, and oxygen-, sulfur-, and halogen-containing organics, as well as ammonia, hydrogen cyanide, hydrogen sulfide, nitrogen dioxide, and phosphine. Stakeholders requested more information on the technology. Ms. Sell said she would send stakeholders more information on the SIFT-MS. Syft remains interested in ETV verification, but cannot fully fund a test. Until collaborators and co-funding is found, no additional action is planned for this category.

Discussion of Evolving Technology Categories

Ann Louise Sumner provided an update on five technology categories still under development, and reviewed slides from a PowerPoint presentation distributed to stakeholders before the teleconference.

Baghouse Filtration Continuous Monitor (Leak Detection)

Ernie Bouffard recently suggested this new technology category for the AMS Center to test. During the ETV AMS Center Air Stakeholder Committee Informal Update at 2008 SES Conference March 3, 2008, the mini-stakeholder group was very interested in verifying technologies in this area. Following the March meeting, Chuck Dene looked into EPRI's interest in providing co-funding for a verification test, but said there is not a lot of interest in leak detection monitoring of baghouse filtration because the electrical generating industry is using other types of instruments that can help narrow down leaks. Dr. Stedman asked if vendors were interested in ETV verification. Ms. Sell said that it sounded like stakeholders were not interested in pursuing a verification test of baghouse filtration monitors unless vendors and collaborators were identified that were interested in ETV verification.

Ozone Detector Card

Enviroscan has interest in ETV verification of their semi-quantitative ozone detector cards, but doesn't have the funding to support a test but could provide in-kind support. The AMS Center could test these cards very efficiently, if there is an organization with an interest and funding.

Stakeholders were quick to provide concurrence on pursuing a verification test for ozone detector cards. Dr. Stedman said there was no argument in testing these cards; however humidity will be a factor to consider when testing them (e.g., hot dry city versus hot wet humid city). Will Ollison said that wind speed and direct sunlight should also be considered. Rudy Eden said the American Lung Association or the Natural Resources Defense Council may have interest in this type of verification. He said the South Coast AQMD had the number of the Public Advisor's Office for the American Lung Association. Mr. Eden also offered to provide in-kind support (i.e., air monitoring station) to help test these cards. Dr. Sumner agreed to follow up with Mr. Eden following the call to obtain contact information for the American Lung Association.

Fungal Contamination Field Monitors

Dr. Sumner said that Mycometer, Inc. of Tampa, Florida approached the AMS Center with interest in verification of its fungal contamination technology. Their technology, the Mycometer®-test, is a versatile tool for investigating mold in buildings allowing analysis of air, surface, and bulk samples. The field portable system allows users to determine total fungal biomass on-site in less than one hour and has a detection limit reported in nanograms.

The fungal contamination field monitors could be used for applications such as new facility diagnostic assessment, contamination and remediation assessment, disaster response damage assessment, rapid remediation and clearance testing, pre/post HVAC cleaning documentation, and healthcare documentation.

Dr. Stedman asked if other vendors existed besides Mycometer. He encouraged the AMS Center to explore EPA contacts to see if PCR technologies were available that could determine total fungal biomass. Will Ollison said he was interested in verification of this technology category and wondered if Lindene Patton or the insurance industry would have interest. Ms. Sell said she would take the action item to contact Ms. Patton after the teleconference regarding her interest level in this opportunity. Dr. Sumner took the action item to follow up with EPA to determine if additional technologies or vendors existed. In summary, stakeholders provided their concurrence for proceeding with this verification test.

Cavity Ringdown Spectroscopy

During the December stakeholder teleconference meeting, Will Ollison mentioned a new technology developed by Picarro, Inc. based on Cavity Ringdown Spectroscopy (CRDS) technology. Picarro offers portable trace gas analyzers that have application in many industrial process applications, ambient air monitoring, and other applications. The vendor claims that the analyzer offers parts-per-trillion level detection sensitivity, high selectivity, very low drift, and fast response time. Picarro has analyzers for greenhouse gases, methane, ammonia, hydrogen sulfide, CO₂, and other gases. Dr. Sumner noted there is interest from API, as indicated by former ETV collaborator Eric Winegar (in an area of API other than Will Ollison's) and Picarro to proceed with a verification test, but additional collaborators are required to share the cost of verification. Chuck Dene said that he is very interested in a verification test of this technology. Dr. Sumner said that she would set up a teleconference with him following the stakeholder meeting to discuss EPRI's interest and role in supporting a test. Stakeholders provided

concurrence on pursuing a verification test for this technology category. Other potential vendors include Tiger Optics (Warrington, PA).

Personal Sampling Pumps

Dr. Sumner described the performance parameters and characteristics of personal sampling pumps. She noted that two vendors, Casella and SKC, have been identified as having technologies that were suitable for this technology category. During the February 2007 stakeholder meeting, Jeff Cook had identified battery-powered personal sampling pumps, with a focus on sustainability criteria (e.g., toxicity reduction, power requirement, etc.). The AMS Center is working with Mickey Leland National Urban Air Toxics Research Center (NUATRC) to identify co-funding for a test of sampling pumps and to leverage the resources of NUATRC.

Cliff Glowacki thought there were additional vendors for this technology category. He is attending the American Industrial Hygiene Association (AIHA) in Minneapolis, Minnesota from May 31 to June 5, 2008 and could gather some information on additional vendors. Stakeholders said the industrial hygiene market would be the target market for these pumps. Dr. Sumner indicated she would follow up with Mr. Glowacki after the AIHA meeting.

Ms. Sell said that it sounded like stakeholders were not interested in pursuing a verification test of personal sampling pumps unless vendors and collaborators were identified that were interested ETV verification.

Update on Non-Air AMS Technology Categories

Water update

Ms. Dindal provided an update on additional AMS Center activities. Sixty-nine of the AMS Center's 129 verifications have been completed in the water area. An international joint verification of a passive groundwater sampler is being planned with the Nordic Water Technology Verification Center (NOWATECH) in Denmark. Four immunoassay test kits from Abraxis will be tested for their ability to detect and quantify endocrine disrupting compounds (including hormones and alkyl phenols). The test is being planned in collaboration with EPA National Risk Management Research Laboratory. Several water categories are also under development, including chemical oxygen demand techniques, automated pathogen concentrators, lead in drinking water test kits, and water infrastructure inspection technologies.

Soil Rapid Toxicity Technologies

In addition to the joint verification with NOWATECH, a second international technology verification currently in progress is the development of a joint protocol for rapid whole soil and soil extract toxicity with Environment Canada and ETV Canada. The joint protocol for soil toxicity technologies builds on a generic protocol that the AMS Center completed in 2007. The generic protocol was developed with co-funding from EPA's Office of Solid Waste and Emergency Response (OSWER). With participation from Environment Canada and ETV Canada, this protocol has been expanded to include whole soil testing in addition to soil extract testing. The protocol is undergoing final review with the U.S. EPA and Canadian ETV programs, as well as with peer reviewers. Once the protocol is finalized, the AMS Center and the ETV Canada program will recruit vendors and collaborators to participate in a verification test. The final protocol also will be posted on the ETV website (www.epa.gov/etv).

Spot Test Kits for Lead in Paint

EPA's Office of Pollution Prevention and Toxics is currently funding the development of an AMS Center protocol for testing the performance of lead-based paint test kits. A technical panel has been established to assist with the development of the protocol, which is expected to be finalized towards the end of the summer.

Radio Frequency Identification Devices for Hazardous Waste Package Tracking

The AMS Center is pursuing a verification test of radio frequency identification (RFID) devices for hazardous waste package tracking. A test plan was developed under ETV's ESTE program that will serve as the basis for the test. Ten vendors are interested in participating in the test. Co-funding and in-kind support are being sought.

Introduction of New Stakeholder and Discussion of EPA's Advanced Technology Initiative

Ms. Sell introduced a new stakeholder, Dennis Mikel, to the Air Stakeholder Committee. Mr. Mikel is a physical scientist with EPA's OAQPS Air Quality and Assessment Division (AQAD). One of his primary roles within the AQAD is to work closely with the Ambient Air Monitoring Group. Additional experience includes the operation and maintenance of state and local air monitoring stations, including many ambient air monitoring instruments (e.g., Ozone, Carbon Monoxide, Sulfur Dioxide, Oxides of Nitrogen, Filter Based Samplers for Lead and PM_{2.5}).

Mr. Mikel explained that a new project is underway at EPA called the Advanced Technology Initiative (ATI). Funding for new technology development is decreasing and for some compounds, analytical instruments do not exist or the methods are outdated. This initiative seeks to create a well thought out plan for finding, funding, and adapting new and advanced technologies, essentially "finding the right instruments for the right job." One stakeholder asked if there were regulations in place to drive the development of these kinds of technologies.

Mr. Mikel said that the source monitoring community utilizes technologies that could be transferred to the ambient community and vice versa. The idea is to achieve greater consistency between ambient and source methods, by working with the vendor/developer and user/regulator communities.

ATI dovetails into other EPA programs such as Small Business Innovative Research (SBIR) and Science to Achieve Results (STAR) grants, and can utilize ETV technology verification as a means to leverage funding.

Mr. Mikel said that a benefit of the ATI would be the availability of instrumentation that has undergone evaluation/verification. Use of such technologies could improve emission inventories, enforcement, and control equipment and strategies. Mr. Mikel described the roadmap for the ATI, showing a clear vision of long and short-term goals for fiscal years 2008 and 2009. He encouraged stakeholders to contact him with questions.

Recap of Priorities - What's on the Horizon?

Ms. Sell restated that stakeholder concurrence had been received for three technology categories: ozone detector cards, fungal contamination field monitors, and cavity ringdown spectroscopy instruments. Two stakeholders ranked CRDS instruments as having the highest priority for

verification testing, including Chuck Dene who indicated that EPRI has funding to support such a test. Don Stedman prioritized the fungal contamination field monitor as being the highest priority.

In terms of other technologies on the horizon, Chuck Dene asked whether metals analyzers existed other than Cooper Environmental Services (John Cooper) technique. Mr. Mikel said that X-Ray Optical is developing a continuous XRF instrument within the SBIR program and could forward contact information to Ms. Sell after the teleconference.

Next Meeting and Action Items

Ms. Sell thanked all of the stakeholders for attending the meeting and for their continued input and contributions to the ETV program. She said that she would distribute meeting minutes to review and said the next stakeholder teleconference would be planned for the September timeframe. The call adjourned at 3:00 pm *EDT*.