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

Air Stakeholder Committee Meeting

April 20, 2005
San Francisco, California

Meeting Minutes

ATTENDEES

Stakeholder Committee Members:
Judy Chow, Desert Research Institute
Jeff Cook, California Air Resources Board
Jerry Hatfield, USDA National Soil Tilth Laboratory
Jim Homolya, EPA/OAQPS
Tom Logan, EPA/OAQPS
Will Ollison, American Petroleum Institute
Lindene Patton, Zurich North America
Donald Stedman, University of Denver

Observers:
Bill Buchan, Market Potential
David Cheng, Ontario Ministry of the Environment
Vladimir Kogan, Orange County Sanitation District
Joey Landreneau, MACTEC Engineering and Consulting, Inc.
Stephen Mandel, Spectra Environmental Division
Raymond Merrill, ERG
Kristi Savig, Air Resource Specialists, Inc.
Eric Winegar, Applied Measurement Science
Ricki Tropp, Desert Research Institute
Dick Valentinetti, Vermont Department of Environmental Quality
Jerry Winberry, Enviro Tech Solutions

EPA/Battelle ETV Staff:
Evelyn Hartzell, EPA
Gretchen Hund, Pacific Northwest National Laboratory, operated by Battelle
Tom Kelly, Battelle
Amy Dindal, Battelle

Open AWMA Session on ETV-AMS Air Program

The morning session of the AMS Center Air Stakeholder Committee Meeting began with a joint meeting/technical session with the Air and Waste Management Association (A&WMA) Symposium on Air Quality Measurement Methods and Technology. Gretchen Hund of Battelle facilitated the morning technical session.

ETV Program Overview and Accomplishments

Evelyn M. Hartzell, of EPA's Environmental Technology Verification (ETV) Program provided an overview of ETV accomplishments. To offer some background on ETV, Evelyn said the ETV Program was established in 1995 to evaluate the performance of innovative air, water, pollution prevention, and monitoring technologies that have the potential to improve human health and the environment. Stakeholders are an important "glue" of the program in that they provide technical expertise and links into their individual networks. In less than ten years, ETV has verified over 315 technologies and developed more than 80 testing protocols.

She went on to further describe that verified vendors have confirmed that they are using ETV information in marketing their verified products (as reported by vendors surveyed during the program's pilot period from 1995-2000) and that large and small firms participate in ETV, although a substantial percentage are small firms. She noted a 2004 Association of State Drinking Water Administrators (ASDWA) survey that indicated that results of the ETV Program are being used by state and other government agencies to support permit decisions and reduce pilot testing, and for a variety of other uses. ETV protocols and test plans are also being accepted and used nationally and internationally as the basis for verifying technology performance.

Evelyn stated that to ensure that ETV results makes their way to interested parties, all of ETV's products, including protocols, test/quality assurance plans, and verification reports and statements, are available on the ETV Web site (www.epa.gov/etv). The Web site receives over 1 million hits per year, approximately 10 percent of which are from international entities.

Evelyn pointed out that participation in the ETV Program is strictly voluntary as vendors are not required to submit technologies for verification. Interested vendors are required, however, to share the cost of verification with EPA. Since 1996 cost-sharing has grown steadily, with ETV vendors contributing more than $4.2 million to verification. Partners, private-sector organizations, and federal, state, and local government agencies have also shared the cost of verification through both monetary and "in-kind" contributions, such as the complimentary use of laboratory and test facilities. Cost-sharing by vendors and other collaborators has reached over 40 percent of program funding when in-kind and cash contributions are included. These factors contribute to a positive economic trend of other entities paying for verification testing.

Evelyn said the ETV Program is trying to get information disseminated to the public on the outcomes of verified technology use. As an example, she summarized the results of a draft case study on verified diesel engine retrofit technologies. EPA has responded to concerns about pollution from diesel engines by setting increasingly lower emission standards from new heavy-duty diesel engines, the most recent of which went into effect in 2004. EPA will establish even

more stringent emission standards for these engines beginning in 2007. Since these regulations do not affect existing diesel engines, the ETV program verified six diesel retrofit technologies in FY 2004. These diesel retrofit technologies were designed to reduce emissions for particulate matter (PM), although associated hydrocarbons (HC) and carbon monoxide (CO) reductions were also observed. If one assumes 10 percent market penetration, PM emission could be reduced by up to 55,000 tons, with consequent human health benefits.

Evelyn also said that ETV is introducing a new program in 2005, called Environmental and Sustainable Technology Evaluation (ESTE), that will expand ETV's ability to respond immediately and directly to high-priority Agency problems by collaborating directly with an EPA program office or regional office partners. Under ESTE, verification categories will be chosen by EPA. Verification activities, including the development of protocols and test plans, will be directed by ORD researchers using contractor support. ESTE will also maintain the quality assurance, cost-sharing, and stakeholder involvement of the original ETV Program. Another organizational change is that EPA does not plan to continue to fund four of the current ETV centers and to only fund two centers (AMS and the Air Pollution Control Technologies Center). The other four centers would have to become self-sufficient (operate without substantial ETV funding) to continue.

Donald Stedman asked why these four centers are being cut and a new one (ESTE) is being started. Evelyn stated that ETV responded to current funding limitations by focusing its efforts on high priority agency problems/needs. The ETV Program used a list of high priority technology needs produced by the EPA's Environmental Technology Councils to help decide which centers will continue to receive funding. This list included a large number of monitoring and air pollution technologies.

One stakeholder asked if the companies that went through ETV were small or large. Evelyn reported that she believes that approximately 60-70 percent have been small, but that she would have to confirm this statistic when she returned to the office. When asked whether EPA tracks these companies' business performance, she said that ETV is hoping to get approval to collect data on sales, etc., through surveys.

Collaboration: Key to Successful Technology Verifications

Amy Dindal of Battelle described some successful collaborations within the ETV Program. Since 1997, Battelle has managed the AMS Center in partnership with the EPA. Since its inception, cost-sharing with the program has grown progressively. Across the entire ETV program, vendors have contributed more than $4.2 million to verification testing. Within the AMS Center, over $700,000 in vendor and third-party funding contributions have been received. In addition, federal/state/local agencies, organizations, and associations have contributed over $3 million of in-kind support to the AMS Center by providing test sites, testing equipment, reference analyses, and technical support personnel. Collaborators are identified by stakeholders, vendors, the verification organization, and by EPA; multiple collaborators on a single verification test are not uncommon.

The AMS Center has on-going or recently completed testing collaborations with the U.S. Department of Agriculture, Illinois Clean Coal Institute, the Connecticut Department of Environmental Protection, EPA Office of Solid Waste, Chlorine Chemistry Council, DuPont

Company, the National Oceanic and Atmospheric Administration, EPA's Office of Air Quality Planning and Standards, the U.S. Department of Energy, the Massachusetts Department of Environmental Protection, the U.S. Army, the city of Columbus, OH, and the Electric Power Research Institute (EPRI). Amy noted these collaborations are mutually beneficial to both the ETV Program and its partners, leveraging the resources available for verification testing and providing test conditions which represent real-world applications.

Evaluation of Technologies for Ambient Air Monitoring at Concentrated Animal Feeding Operations

Jerry Hatfield of USDA gave a presentation on the evaluation of technologies for ambient air monitoring at concentrated animal feeding operations (CAFOs). Jerry said that his work deals with the ambient environment with a non-point source emphasis. USDA is one part of the puzzle; if they can help improve technologies that control emissions from agricultural systems then they are excited to make it happen. The USDA's Agricultural Research Service (ARS) has just over 100 locations, but is centered in Beltsville, Maryland.
Jerry explained that air quality surrounding concentrated animal feeding operations is becoming of increasing concern to nearby residents and regional air quality regulators. Animal feeding operations are unlike other sources of air quality constituents because of their variability in emission rate and differences in management among similar units. Studies on air flow surrounding animal feeding operations have shown the variation brought about by orientation of the building site relative to the wind direction and speed. These observations have shown the need for improved monitoring technologies for ambient air quality surrounding animal feeding operations. Jerry stressed the importance of knowing what is riding along on particulate matter (PM), not just the individual particles. There are odor compounds, toxins, and diseases that can move via airborne particles.

In the fall of 2003, an ETV test was conducted in collaboration with USDA on seven different ambient ammonia measuring systems at a swine production facility and a beef cattle feeding facility in central Iowa. The seven vendors and their respective technologies were:

1. Aerodyne Research, Inc.	Tunable Diode Laser Spectroscopy
2. Bruker Daltonics	Open-Path IR Spectroscopy
3. Molecular Analytics	Ion Mobility Spectrometry
4. Omnisens SA (Cattle Lot Only)	IR Laser Spectroscopy with Photoacoustic Detection
5. Pranalytica, Inc.	Near IR Laser Spectroscopy with Photoacoustic Detection
6. R&R Mechatronics	Membrane Diffusion with Conductivity Detection
7. Thermo Electron Corp.	Conversion to NO with Chemiluminescence Detection

These instruments were evaluated with a number of tests to determine their accuracy, linearity, precision, response time, calibration and zero drift, interference, data completeness, and ease of use. Analysis of the reference samples was measured with flow injection analysis (FIA) detection method.

One major problem in collecting data surrounding animal operations is choosing an appropriate location for the instrument so that a representative sample can be collected. Ambient ammonia concentrations observed around the swine facility (consisting of about 30,000 pigs) varied widely as differing winds affected ammonia emissions from the buildings. Jerry reported on related research where ammonia concentrations during the first sequence (when the pigs were first placed into the facility as part of the finishing cycle) exceeded 1,000 ppbv for short periods of time at the position closest to the building (16m away from the building) with concentrations at all other distances less than 200 ppbv during the observation period. Later in the production sequence, just prior to completion of the grow-finish cycle, when the pigs were removed from the building, there was a different pattern of ammonia concentration with height and distance from the buildings. Even though the pigs were 90 kg larger than in the first sequence and the manure was stored in the deep pit of the building during the production sequence, the overall ammonia concentrations were lower. There were no exceedances of 1,000 ppbv during this observation period, and most of the maximum values were near 300 ppbv. Another feature in this sequence was that the ammonia concentrations during portions of the days later in the production sequence were nearly the same. This can be attributed to a difference in the mixing conditions, and illustrates the problem of being able to observe an animal production facility with a single point monitor.

Jerry said that the seven different ammonia analyzers at both the swine facility and the cattle feedlot showed that the instruments could accurately and precisely detect changes in ammonia concentration and could adequately respond to the rapid changes in the temporal concentrations of ammonia. He said the problem is not the detection of ammonia concentration but the proper placement and sampling of air affected by these facilities. Jerry said that observations around the facilities would suggest that either an array of instrumentation, or open-path systems to measure along a substantial distance, may be the only possible solution to account for the spatial variation observed in ammonia concentration.

A question was raised on how to place a single point monitoring instrument. Jerry said that a single point monitoring instrument placed in a given location in an animal feeding operation may not adequately sample the ambient conditions created by the facility even though the instrument may produce very accurate readings. Data could be biased because of where the instrument is located.

Jerry also pointed out that even though these data are for ammonia, he would expect other gases and PM to behave in a similar manner. Jerry also said they plan on adding video cameras to record the movement of pigs, to add to the data they already have on ammonia to see if there are any possible connections.

Jerry then moved on to the topic of Light Detection and Ranging or LIDAR measurements. LIDAR has been used to characterize the three-dimensional structure of the atmosphere and the constituents surrounding livestock facilities. LIDAR allows for simultaneous measurement of different components across the landscape. USDA, the University of Iowa, and the Space Dynamics Laboratory (owned by Utah State University) have worked together studying LIDAR's performance in evaluating dispersion dynamics around swine-production facilities. LIDAR can allow them to view thermal and volume plumes. Jerry pointed out that LIDAR does not allow you to see through buildings. Even with an open-path system, biases can occur if the unit is placed on the leeward side of the building.

As a final update, Jerry said they are about to start a new test under ETV to test hydrogen sulfide analyzers at a swine finishing farm starting on April 18. The test will be a collaboration among the AMS Center, the USDA National Soil Tilth Laboratory, and Applied Measurement Science (funded by the American Petroleum Institute) and will last about 5 weeks at a farm near Ames, Iowa. This is the same site where the swine farm portion of the ambient ammonia test was conducted. Jerry said that the state of Iowa has a hydrogen sulfide standard and this test will help the state understand what is going on. The producers are excited that EPA and USDA are involved because they want the most reliable data they can for their facility.

ETV Verification Testing of Dioxin Emission Monitors

Tom Logan of EPA gave a presentation on an upcoming ETV verification test of dioxin emission monitoring systems (EMSs). To provide some background, Tom Logan said that about 38 percent of total environmental releases of dioxin are from municipal waste incinerators. Dioxin is traditionally measured using Method 23 (involving time-integrated extractive sampling, sample cleanup and preconcentration, and high resolution mass spectrometry) which is both labor intensive and expensive. He said that alternative methods have been developed that allow for automated, long-term cumulative sampling, followed by laboratory analysis. Semi-continuous sampling and *in-situ* analysis are other techniques that have been developed.

Examples of Dioxin EMS technologies that Tom Logan listed are the:
Automated Sampling Systems:

- AMESA (Becker-Messtechnik, GmbH)
- Dioxin Monitoring System (MonitoringSystems, GmbH)

Semi-continuous Sampling, In-situ analysis Systems:

- RIMMPA-TOFMS (IDX Technologies, Inc.)
- JET-REMPI (SRI/EPA, Installed but not verified)

Tom Logan then provided an overview of the verification test of dioxin EMSs to be conducted at a pilot incinerator facility at EPA. The purpose of the verification test is to generate performance data on dioxin emission monitoring technologies so organizations and countries interested in installing and operating dioxin EMSs on their municipal waste incinerators and industrial plants can be assured of their benefit.

The test will be conducted over a period of one to two weeks and will involve the continuous operation of several dioxin EMSs at a well-controlled, simulated incinerator facility located at EPA laboratories in Research Triangle Park, North Carolina. The accuracy, precision, detection limit, durability, range, and ease of use of the EMSs will be determined and compared to standard EPA integrated sampling methods for dioxin. Co-funding for the test has been received or is expected from several sources including EPA's Office of Solid Waste, EPA's Office of Air Quality Planning and Standards (OAQPS), the Chlorine Chemistry Council, and EPA's Office of Research and Development (ORD) National Risk Management and Research Laboratory. In-kind support will be provided by EPA ORD for experimental design, testing, and reporting. Tom Logan reviewed the test schedule and said that testing is expected to start at the end of August

and run into September. ETV reports are anticipated to be finalized and available by the end of this December.

A question was asked if PM would be separated from gases. Tom Logan said they were not going to be separated. A follow up comment was that this might be a limitation.

Performance Testing of Continuous Emission Monitors (CEMs) for Mercury in EPA's Environmental Technology Verification (ETV) Program

Tom Kelly of Battelle described the mercury CEM technology testing effort. He summarized results from past ETV/AMS Center tests of mercury CEMs, and described the mercury CEM tests ongoing and planned under ETV and other EPA programs. To provide some initial background, Tom Kelly said that global total emissions of mercury are about 5,000 tons per year, 40 percent of which are man-made. Man-made emissions in the U.S. are about 3 percent of that global total; coal- and oil-fired power plants are the largest man-made sources in the U.S., emitting about 48 tons of mercury per year (approximately one percent of the global total). There is concern about the health effects of mercury, especially the consumption of mercury-laden fish.

On March 15, 2005, EPA reversed its decision to regulate mercury from power plants under the Clean Air Act (CAA) Section 112, and issued the Clean Air Mercury Rule (CAMR). CAMR aims for a 70 percent reduction in mercury emissions initially as a co-benefit from reduction methods for SO_2 and NO_x. CAMR also provides a cap-and-trade system for mercury reduction patterned after the Acid Rain (SO_2) program.

Three forms of mercury from coal combustion are elemental mercury vapor (Hg^0), oxidized mercury vapor (e.g., $HgCl_2$), and particulate mercury, all of which are captured differently in a plant. The mercury concentration in flue gas is far lower than SO_2 and NO_x levels which make mercury sampling and measurement more challenging. In order to take mercury CEMs measurements, all vapor phase mercury is converted to elemental mercury (Hg^0).

Tom Kelly explained that two rounds of mercury CEM testing have been completed under the AMS Center for determining mercury in combustion emissions. The first mercury CEM test (round 1) took place at a pilot-scale incinerator in January 2001 in collaboration with EPA ORD and the Massachusetts Department of Environmental Protection. Three vendors participated with four technologies:

- Nippon Instruments (had two CEMs tested)
- PS Analytical
- Ohio Lumex

These instruments were evaluated to determine flue gas concentrations of total mercury, in the face of realistic concentrations of SO_2, NO_x, hydrochloric acid (HCl), and PM. Along with the relative accuracy (RA) of elemental mercury, oxidized mercury and total mercury, these instruments were evaluated with a number of tests to determine their linearity, precision, response time, calibration and zero drift, interference, data completeness, and ease of use.

The second mercury CEM test (round 2) was carried out over six weeks during the summer of 2002 at a hazardous waste incinerator in Tennessee in collaboration with the U.S. Department of Energy. Four vendors participated with five technologies:

- Nippon Instruments (had two CEMs tested)
- PS Analytical
- Opsis AB
- Envimetrics

The percent RA was measured for total and elemental mercury, along with calibration and zero drift. ETV reports from rounds 1 and 2 are located on the ETV Web site at http://www.epa.gov/etv/verifications/vcenter1-11.html.

A third round of ETV/AMS Center mercury CEM testing is planned for late summer 2005 at a coal-fired power plant in Illinois. The power plant has an electrostatic precipitator (ESP) and selective catalytic reduction (SCR) system, which may oxidize some flue gas mercury. Sampling will occur at elevated stack locations. The CEMs evaluated in these tests are all commercially available, and employ a variety of approaches for sampling and analysis of total and speciated (i.e., distinguishing elemental and oxidized) mercury. It is expected that Horiba Instruments will participate with two CEMs (Nippon Instruments), and others are being pursued.

Tom Kelly concluded by noting that EPA OAQPS and ORD are also evaluating mercury CEMs at two coal-fired power plants and those tests involve vendors not tested in ETV:

- Thermo Environmental (recently gotten into mercury CEM market)
- Tekran
- Genesis Laboratory Systems

Tom Kelly said there is a trend towards thermal conversion instead of wet chemical conversion as the latter can be problematic for operators because of the need for aqueous reagent solutions. He said the success of the mercury CEM market will depend on technical capabilities of the CEM technology and on the effects of EPA regulatory actions such as the CAMR. Speciation can be important for plants interested in measuring the effectiveness of their control technologies.

A comment was made that law suits have been filed and states are initiating their own regulations to require mercury reductions.

ETV-AMS Air Stakeholder Committee Meeting

The afternoon session of the AMS Center Air Stakeholder Committee Meeting was open to the A&WMA Symposium on Air Quality Measurement Methods and Technology attendees.

Stakeholder Introductions and Insights

Gretchen Hund welcomed the committee stakeholders and observers. For the benefit of the observers, each stakeholder introduced him or her self and described his or her role within his or her organization and interest in air monitoring. Gretchen asked the full group to report on what their network has been saying about ETV and whether ETV's visibility seems to be improving or not. Jeff Cook said that ETV is hitting the radar screen and that if something has been tested by ETV the instrument is considered for purchase. Another benefit is that ETV tests are reproducible. A comment was made that ETV testing is not just beneficial in the U.S., but also abroad; ETV brings credible results overseas.

Stakeholder Jeff Cook made the comment that PM vendors who went through ETV told him that they would do it again and pay for the verification. It was definitely helpful to their business. One observer said that he had spoken to one vendor who felt like they had to pay twice for a particular application. But it was also mentioned that ETV data on one device has been helpful to evaluating another device.

Dick Valentinetti who is the State and Territorial Air Pollution Program Administrators (STAPPA) Chair for the Monitoring Committee said that air toxics is a big issue and asked how to get new technologies out there that can be used by field monitoring folks buying the equipment. Jeff Cook suggested that a link onto the STAPPA- Association of Local Air Pollution Control Officials (ALAPCO) Web site might help. Dick also said that ETV needs to be more performance oriented from a consumer point of view (or something equivalent to Consumer Reports). With the present data, the third party draws its own conclusions. Amy Dindal responded that technologies cannot be compared under ETV in a Consumer Reports like format.

Integration of Source and Ambient Monitoring Technologies

Jim Homolya from EPA OAQPS spoke about this topic. Jim said that he was recently assigned the job at EPA of exploring the integration of ambient and source technologies, which from a vendor perspective is a win for everyone.

Jim described an example of a project underway that looks at the integration of ambient and source technologies. Cooper Environmental Service (http://cooperenvironmental.com/air.html), a small company located in Portland, Oregon offers the Xact multi-metal CEM that can accurately measure metals in stack gas emissions. Using x-ray fluorescence, Xact is able to measure vapor and particulate phase metals that have been collected on a reactive filter tape. The Xact has been tested and installed for various source applications (e.g. incinerators, coil-fired boilers, etc.). Eli Lilly has provided funding for the project and a field test at their facility has been planned.

However, other potential applications of the technology could be for ambient air toxics monitoring. Another company, Met One Instruments (MetOne) in Grants Pass, Oregon, (www.metone.com) has experience addressing needs in ambient PM monitoring environments. Jim said they are trying to marry the Cooper measurement system for source needs with a beta attenuation monitor tape transport system that MetOne offers for ambient PM monitoring needs. It was noted that such a project has been launched in Bakersfield, CA.

Emergency Air Monitoring During Wildfires

Jim Homolya of EPA also gave this presentation. The purpose of the project is to develop consistent fine particulate (PM2.5) air monitoring guidance to be used by EPA, State and Local agencies, and Federal Land Managers (FLMs) during wildfire emergency monitoring episodes. Jim is involved in discussions with a stakeholder group whose membership consists of States (New Mexico, Arizona, California, Oregon, Washington, Alaska, Montana, Colorado, Idaho, and Nevada), the U.S. Fish and Wildlife Service, and the U.S. Forest Service, as well as some Regional EPA offices and OAQPS.

Jim said that in 2004, EPA provided funds for the purchase of nine portable beta attenuation monitors. Each state listed above is to receive one, however two are going to be collocated in Arizona. The monitors will be tied to satellite modem data telemetry systems with a link to AIRNOW Tech for the Stakeholders to view.

EPA has funded Battelle to provide documentation preparation support as well as provide comparative assessments of FRM data and results from field deployment trials.

Jim said that a benefit of the program is that Federal, State, and Local agencies will be better prepared to provide decision makers and the public timely and reliable information on short term air quality impacts of PM2.5 produced by wildfires. He said there are also plans to have several training sessions across the U.S. to nationalize the guidance. He mentioned that it could also benefit the Blue Sky Range Program as data can be shared with them. Infrastructure and how they communicate is the overall issue; monitors are secondary. Use is not compliance but high particle measurement could be used for prescribed fires. It was also mentioned that this approach could be used to measure hot spots. Stakeholder Will Ollison commented that the device could be useful for tracking plumes of ozone. Jim commented that he would like to see them used in outlying areas where there is limited monitoring.

Progress Update of Air Activities

Tom Kelly reported on the status of the upcoming Mercury CEM test at a power plant in Illinois. Given the co-funding Battelle has received, it is necessary to have a plant that burns Illinois coal. The plan is to test the CEMs at the end of the summer SCR period.

Tom Kelly reported that EPA/OAQPS is also conducting mercury CEM tests. Will Ollison asked if that EPA mercury testing would result in an ETV- like verification. Tom responded no, that the testing would not be the same as ETV because participants are given opportunity to modify their system if it fails to operate as expected. Donald Stedman asked if they were commercially available units. Tom Kelly said they were, but their configuration was different.

Tom Kelly noted that three vendors have been identified for the upcoming dioxin EMS verification test and that the test/QA plan is being finalized and testing will take place later this summer.

Tom Kelly provided an update about the Personal Cascade Impactor Sampler (PCIS) verification. Staff at the Mickey Leland National Urban Air Toxics Research Center (NUATRC) in Texas approached Battelle with the verification idea. There are only a few vendors with personal impactor sampler systems however most declined to participate because they are unprepared to support the test or have the opinion that the market is not large enough. SKC, Inc. is the only vendor participating in the test with their Sioutas Personal Cascade Impactor with Leland Legacy Personal Sampling Pump technology.

Discussion of Status and Future Technology Categories

Gretchen Hund facilitated a discussion on future technologies the AMS Center may want to consider for verification. Tom Kelly said that past recommendations included:

- Leak detection monitors (Smart LDARs)
- Vapor intrusion (TCE) in buildings
- PM Monitors
    - Continuous PM2.5 (Round 2)
    - Ambient coarse PM
    - Fine PM for combustion sources
    - Portable direct PM mass monitors (not surrogates)
- On-board diesel emission monitor (O-Tech)

1. Leak Detection Monitors

The discussion started with a review of the expert contacts made and vendors identified. At the time that the inquiries into this technology category were made, only two monitors appeared to be commercially available: GasVue by Laser Imaging System and the Sherlock by Pacific Advanced Technology. A comment was made that only the monitors would be verified; not verifying service providers. Donald Stedman said that including service providers might mean more players interested in being tested. There was debate about whether ETV should be testing service providers versus manufacturers of an instrument. Evelyn Hartzell from EPA commented that it could be a problem to test providers. Evelyn said she would follow-up on this issue.

A rule change is needed to provide industry with an alternative to Method 21 and to spur on the market. A comment was made that a rule change may come about this summer. It was also reiterated that Karen Ritter with American Petroleum Institute has a stakeholder group with international folks involved and would be the best point of contact in this area.

2. Vapor Intrusion

A vendor approached the AMS Center with an interest in ETV testing. The system is called the AIRXPERT 7000 Multi-point Monitor, a large manifold system sampler that can draw air or measure pressure from up to 48 different points in a building. It can be used to screen vapor intrusions as well as optimize ventilation performance. Pollutants measured could include tetrachloroethylene (TCE), hydrocarbons, and other volatiles (e.g., “volatile PCBs”). Lindene Patton said there is a huge market for vapor intrusion technologies because it is based on a corrective action. You could use these technologies to determine whether you could re-occupy a building.

Tom Kelly acknowledged the need to identify devices (detectors) that can measure indoor intrusion instead of a manifold system such as the AIREXPERT 7000 that has no inherent monitoring capability. An example technology described was the portable UV spectrometer made by CEREX called the UVHound. It provides a fast response and can operate in a fixed or mobile mode. Will Ollison said that this would be a worthy technology to test.

3. VOC Monitors

EPA’s Environmental Technology Council (ETC) approached the AMS Center with an interest in projects involving VOC monitors for landfills, municipal waste facilities, and wastewater treatment plants in support of enforcement actions. The main point is that if commercially available technologies are available and the vendors interested, tests could be co-funded from these enforcement actions to support the testing. A question was raised if methane would be the

primary compound measured. Tom Logan stated that DOD's Strategic Environmental Research and Development Program (SERDP) is spending funds in this area and will be issuing a protocol this summer which could spur the market. Donald Stedman said a number of research projects are underway in this area looking at two methods, both of which have been viewed as the best. More homework is needed to start looking for available VOC monitors.

4. PM Monitors

The discussion immediately started with a review of available portable monitors for various applications.

a. Example technologies listed specific to **smoke monitoring** include:

- EBAM (vendor is MetOne)
- Nephelometers
- DustTrak
- DataRam (vendor is Thermo Electron Corporation)
- E-Sampler
- Battelle has a controlled wind tunnel to do smoke monitoring.

b. Example technologies listed specific to **on-board diesel monitoring** include:

- Sensors Inc.
- Horiba

c. Example technologies listed specific to **ultrafine (<0.1 um) monitoring** include:

- Dekati (Swiss company) has the Electrical Low Pressure Impactor (**ELPI**)
- TSI
- Grimm
- Nano-MOUDI (MSP)
- SMPS+OPC

Judy Chow said there is no gold standard (reference method) for this type of monitoring and furthermore the ones available may not be ready for primetime, but it is still an area of significant interest.

Jim Homolya said there is very little technical information available for **passive monitoring**. Various EPA Regions have an interest and conduct passive ozone monitoring studies. There are hundreds of stations set up in Alberta, Canada for this monitoring. There is also broader international interest. Judy Chow said that she and one of her graduate students could give a talk on this at the next meeting.

Everyone agreed that **PM monitors for CAFOs** are worth conducting.

5. Natural gas detection

It was noted that this could include monitors to measure methane leaks. The question was raised whether there were detectors for methane leaks on the road? Donald Stedman suggested contacting Tim Hansen at the ETV Greenhouse Gas Technology Center who might know of at

least one vendor. Other vendor names listed to consider included: Scott Instruments, Apogee, Aerodyne, and Kodak.

Next Steps/Next Meeting

Gretchen Hund thanked all of the stakeholders and observers for attending the meeting and contributing so much to the program. The meeting finished around 3:30 p.m. and the committee agreed to re-convene next in the winter timeframe (January - March 2006) and not in conjunction with a large conference. A site in Alabama was suggested as the potential location of the next AMS Center meeting.

Air and Waste Management Association Conference Session on

U.S. EPA Environmental Technology Verification (ETV) Program
Advanced Monitoring Systems (AMS) Center – Air Program
& ETV-AMS Air Stakeholder Committee Meeting

Wednesday 20 April 2005
Cathedral Hill Hotel
San Francisco, California

FINAL AGENDA

Open AWMA Session on ETV-AMS Air Program

8:30 a.m.	ETV Program Overview and Accomplishments USEPA	Evelyn Hartzell,
8:55 a.m.	Collaboration: Key to Successful Technology Verifications	Karen Riggs, Battelle
9:20 a.m.	Evaluation of Technologies for Ambient Air Monitoring at Concentrated Animal Feeding Operations	Jerry Hatfield, USDA
9:45 a.m.	Dioxin Emission Monitors – Status and Testing	Tom Logan, USEPA
10:10 a.m.	Break and Exhibition Viewing	
10:40 a.m.	Verification Testing of Mercury Continuous Emission Monitors	Tom Kelly, Battelle
11:05 a.m.	Break	

ETV-AMS Air Stakeholder Committee Meeting

11:20 a.m.	ETV Air Stakeholder Committee Welcome Agenda and Meeting Objectives	Gretchen Hund, Battelle
11:25 a.m.	Stakeholder Introductions and Insights	Gretchen Hund/Stakeholders
11:45 a.m.	Integration of Source and Ambient Monitoring Technologies	James Homolya and Tom Logan, USEPA
12:15 p.m.	***Adjourn to new meeting room (Cathedral Hill B)***	
12:30 p.m.	***Lunch with presentation:*** Fine Particulate Air Monitoring Guidance and Protocol Development for use During Wildfire Emergency Air Monitoring Episodes	James Homolya, USEPA
1:30 p.m.	Progress Update of Air Activities	Tom Kelly
1:50 p.m.	Next Technology Categories to Consider	All Stakeholders
3:15 p.m.	Next Steps/Next Meeting	Gretchen Hund
3:30 p.m.	Adjourn	