

Environmental Technology Verification Program

October 2002

QUARTERLY REPORT

US Coast Guard and ETV Collaborate to Advance Ballast Water Treatment Verification

Since signing the EPA/Coast Guard June 2001 Memorandum of Agreement, ETV and its partners, NSF International and USCG, have progressed in efforts to develop testing protocols and verify technologies designed to control invasive species in ballast water discharges. As part of the cooperative effort, USCG has inventoried potential locations for testing full-scale ballast water treatment technologies, and recently transferred funds to the ETV Program to assist with protocol development. Involvement of other federal agencies, including National Oceanic and Atmospheric Administration, US Fish and Wildlife Service and the US Navy, is also expected.

Biological contamination spread through ballast water discharge is a global concern and is now being addressed by many countries. The problems associated with invasive species are not unique to one country or geographic location. ETV is coordinating with other countries through the US Coast Guard's participation in the International Maritime Organization (IMO) and international conference venues. A recent newsletter of IMO's GloBallast Program included a brief on ETV's Ballast Water Program. Coast Guard representatives have also presented the Program at a recent meeting in Sweden of the International Council for the Exploration of the Seas where there were calls for international coordination of testing methods and treatment standards. ETV, through its broad-based stakeholder process and highly quality assured and peer-reviewed testing, will continue to provide input to the USCG and the IMO in their efforts to establish international protocol and treatment standards. More information on the most

recent stakeholder meeting for the Ballast Water Treatment Program held in June 2002 can be obtained from the ETV's Water Quality Protection Center, and is available on NSF's Web site at www.nsf.org/etv and EPA's ETV Web site at www.epa.gov/etv.

ETV Protocol Adopted as ASTM Test Method

In September, ASTM adopted a new test method for "Characterizing the Pressure Drop and Filtration Performance of Cleanable Filter Media." This method, designated as ASTM D6830, is closely based on the testing protocol developed by the Air Pollution Control Technology (APCT) Center's Baghouse Filtration Products (BFP) program. The protocol calls for the measurement of total mass and PM2.5 particle penetration, whereas the ASTM method requires the measurement of total mass, with PM2.5 being an option. The method was adopted very quickly - within 11 months after it was submitted to ASTM Committee D22. In addition, an international group, including representatives from Japan, Germany, and the US, has met twice to discuss developing an international method based on the ETV protocol and ASTM method.

In 1998, the APCT's Stakeholder Advisory Group agreed that a verification program for BFP would be valuable because vendors are rapidly developing improvements in fabric materials and the future market for baghouses is substantial. Unfortunately, no standard test method existed to test the filter material. A technical panel was set up to develop such a protocol. The resulting protocol was used to subsequently verify filtration fabrics designed to collect particles 2.5 micrometers and smaller in aerodynamic diameter (PM 2.5). Verification statements have since been issued for 14 BFPs.

The tests characterize the operational performance of cleanable filter media under specified laboratory conditions by determining airflow resistance, drag, cleaning requirements, and particulate filtration performance of pulse-jet cleaned filter media. The

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ETV Air Pollution Control Technology Center

- Solicited vendors of mobile source, NOX, and volatile organic compound emission controls and dust suppressants for unpaved roads.
- Presented a paper on baghouse filtration products verification testing at the Council of Industrial Boiler Owners, Emissions Controls 2002 Conference in July.
- Presented at the Department of Energy, 8th Diesel Engine Emissions Reduction Workshop in August.
- Presented a paper at the National Association of Fleet Administrators, Law Enforcement Conference in August.
- Held a meeting of the Stakeholder Advisory Committee on September 18.

ETV Drinking Water Systems Center

- Solicited vendors of technologies related to arsenic reduction using sorptive media, ion exchange, and activated alumina.
- Completed revisions of a number of Test Plans and revised Protocols for removal of microbial contaminants, disinfection by-product precursors, arsenic, nitrate, volatile organic compounds, synthetic organic chemicals, radioactive chemicals, and inorganic constituents.
- Completed verification testing of the US Filter 3M10C Microfiltration Membrane technology.
- Held a meeting to discuss a cooperative arsenic treatment technology study with the Pennsylvania Department of Environmental Protection in July.
- Completed a Product Specific Test Plan for Separmatic's Pressure Precoat Filtration System.
- Sent a news bulletin about ETV arsenic projects in Pennsylvania and Alaska to over 200 editors of various water related journals and news organizations including Web-based waster newsletters and journals.

ETV Greenhouse Gas Technology Center

- Completed the test/QA plan for the Ingersoll-Rand Energy Systems IR PowerWorks 70 kW Microturbine System.
- Completed field testing of the Ingersoll-Rand Energy Systems IR PowerWorks 70 kW Microturbine System at the Crouse Community Center in Morrisville, NY.
- Presented on heat and power performance verification at the Animal Waste Treatment Technologies Workshop in September.
- Published an article on the performance verification of a microturbine-based cogeneration system in *Power Engineering* in September.

ETV Advanced Monitoring Systems Center

Advanced Monitoring Systems

- Solicited vendors of technologies that detect ammonia "slip" emissions.
- Completed Phase II verification testing of five mercury continuous emissions monitors (CEMs) at a US Department of Energy Toxic Substance Control Act incinerator in Oak Ridge, TN.
- Completed generic verification protocols for ambient fine particle monitors, mercury continuous emissions monitors, optical open-path monitors, on-board vehicle emissions monitors, portable water analyzers for metals and other inorganics, and long-term deployment of multi-parameter water quality probes/sondes.
- Completed a test/QA plan for the Verification of Multi-parameter Water Probes.
- Presented on field demonstration of mercury continuous emissions monitors at the Air Quality III Conference in September.
- Completed verification testing of two multi-parameter water probes.

Site Characterization and Monitoring Technologies

- Held a conference call with vendors of additional lead detection technologies to discuss possible verification.

ETV Water Quality Protection Center

- The new ETV Water Quality Protection Center was established on August 6.

Source Water Protection Technologies

- Held a vendor meeting with DynamOx.
- Completed verification testing of Triton Systems LLC.'s animal waste treatment solids separation technology.
- Presented at the WateReuse Association Symposium in September.
- Presented at the USDA Agricultural Research Service Workshop in September.
- Completed verification testing of Septitech, Inc.'s residential nutrient reduction system.
- Held a meeting of the Watershed Protection Technologies Stakeholder Advisory Group on September 11.

Wet Weather Flow Technologies

- Presented at STORMCON in August.
- Presented a paper and poster at the ASCE 9th International Conference on Urban Drainage in September.

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results obtained from this test method will be useful in the design, construction, and selection of filter media. While the results obtained by the test method should not be used to predict absolute performance of full-scale fabric filter facilities (baghouses), these results will be useful in selection of proper filter media and identification of recommended operating parameters for these full-scale facilities.

Performance Verification Test of Field-Portable Technologies for Measuring Lead in Dust

The Site Characterization and Monitoring Technologies area, in cooperation with Oak Ridge National Laboratory, recently completed verification reports and statements for five field-portable technologies for the

measurement of lead in dust. A technical panel of national experts, with representation from the US Department of Housing and Urban Development, the National Institute for Occupational Safety and Health, the National Institute of Standards and Technology, Research Triangle Institute, the American Industrial Hygiene Association, the Massachusetts Childhood Lead Poisoning and Prevention Program, and several EPA offices, including the Office of Pollution Prevention and Toxics (OPPT), assisted with the design of the verification test, the reporting of results, and the technical peer review of each report. This test provided information on the potential applicability of field technologies to measure EPA standards for dust clearance testing. The experimental design was built around the three clearance standards of 40 µg/ft² for floors, 250 µg/ft² for window sills, and 400 µg/ft² for window troughs that are outlined in 40 CFR Part 745.227(e)(8)(viii).

The primary objectives of this verification were to evaluate the field analytical technologies in the following areas: (1) how well each performs relative to a conventional, fixed-site, analytical method for the analysis of dust wipe samples for lead; (2) how well each performs relative to results generated in previous rounds of ELPAT (Environmental Lead Proficiency Analytical Testing), and (3) the logistical and economic resources necessary to operate the technology. Secondary objectives for this verification were to evaluate the field analytical technology in terms of its reliability, ruggedness, cost, range of usefulness, sample throughput, data quality, and ease of use. This verification test did not provide an assessment of the selection of locations for the collection of dust samples in a facility nor an assessment of the way in which dust samples are collected.

The test included vendors of commercially available technologies capable of measuring lead on dust wipe samples operating their equipment in a field setting. The technologies that participated included x-ray fluorescence (XRF) instruments (KeyMaster Technologies and Niton Corporation) and anodic stripping voltammetry (ASV) systems (Monitoring Technologies Inc. and Palintest). The vendors blindly analyzed approximately 150 dust wipe samples containing known amounts of lead, ranging in concentration from 2 to 2000 µg/wipe, with multiple concentrations centered around the clearance levels of 40, 250, and 400 µg/ft². Archived samples from the ELPAT program were utilized. A suite of the ELPAT samples was also sent for analysis to a fixed-site laboratory that was accredited by the National Lead Laboratory Accreditation Program (NLLAP). Performance characteristics for each of the participating technologies were evaluated, including accuracy, precision, and comparability to the NLLAP-recognized laboratory performance.

AMS Center Verifies Four Arsenic Monitors

The Advanced Monitoring Systems (AMS) Center, operated by Battelle, conducted verification tests to evaluate the performance of four portable devices for determining total arsenic in water. The technologies were submitted by Peters Engineering, Graz, Austria; TraceDetect, Seattle, WA; Industrial Test Systems, Inc., Rock Hill, SC; and Envitop Ltd., Oulu, Finland. Three of the technologies are test kits that determine arsenic by producing a color change that is visually or electronically compared to a standard reagent color chart. The fourth device is a portable analyzer that determines arsenic by using an electrochemical technique called anodic stripping voltammetry. The devices were tested for monitoring arsenic in the 1 to 100 parts-per-billion (ppb) range in fresh water, untreated and treated well water, and public drinking water in three central Ohio counties. All samples were also analyzed for arsenic by a laboratory reference method for comparison to the results from the portable devices. Performance parameters included accuracy, precision, linearity, method detection limit, matrix interferences, operator bias, and the rate of false positives/negatives. While the verification test of the arsenic

monitoring devices was being conducted, the US EPA announced a new 10 ppb federal standard for arsenic in drinking water to be met by 2006. US EPA estimates that 4,000 of the 74,000 drinking water systems currently regulated by the new standard will have to install treatment devices or take other steps to comply. These devices are critically needed in countries such as India and Bangladesh, where shallow drinking water wells expose millions of people to arsenic poisoning from naturally contaminated groundwater. The AMS Center plans to conduct a second test in the next several months for additional portable arsenic water analyzers.

ETV Centers Verify a Total of 194 Technologies

Four ETV Centers recently completed 17 verifications, increasing the total number of verified technologies to 194.

The ETV Advanced Monitoring Systems Center, operated by Battelle, verified the performance of four portable devices that can determine total arsenic in water, bringing to 41 the total number of technologies verified by the ETV AMS Center. The verified technologies are: Envitop Ltd.'s As-Top Water Arsenic Test Kit; Industrial Test Systems, Inc.'s Quick; Peters Engineering's AS 75; and TraceDetect's Nano-Band Explorer.

The ETV Advanced Monitoring Systems Center also verified the performance of Cooper Environmental Services' XCEM Multi-Metals Continuous Emissions Monitor. The verification test was designed to quantitatively evaluate the performance of the XCEM under real-world conditions. The verification testing took place at the Tooele Army Depot (TEAD) Building 1320 deactivation incinerator in Tooele, UT. The XCEM was tested for its ability to measure the concentrations of antimony (Sb), barium (Ba), cadmium (Cd), chromium (Cr), and lead (Pb), as well as arsenic (As), mercury (Hg), nickel (Ni), and zinc (Zn) in the feedstream.

The ETV Advanced Monitoring Systems Center, Site Characterization and Monitoring Technologies, in cooperation

Web Watch

- ETV** ✓ The September 2002 ETV Greenhouse Gas Technology Center Fact Sheet is available at http://www.epa.gov/etv/pdfs/fs/03_fs_ghg_rev.pdf.
- ETV** ✓ The ETV Air Pollution Control Technology Center Stakeholders List has been updated and is available at <http://www.epa.gov/etv/centers/stakeholder05.pdf>.
- ETV** ✓ The Winter 2002 edition of the quarterly ETV water newsletter ETV Update featuring activities of the Drinking Water Systems Center and the Water Quality Protection Center is available at <http://www.epa.gov/etv/pdfs/newletters/nsf/win2002.pdf>.

ETV Calendar

Date	Location	Event
Oct 7-9	Spokane, WA	ETV Drinking Water Systems Center - Presentation at the National Rural Water Association Annual Leadership Forum and Technology Exhibit Center
Nov 3-7	Washington, DC	ETV Program - ETV exhibit at the ASCE Washington 2002 Civil Engineering Conference and Exposition
Nov 10-14	Seattle, WA	ETV Drinking Water Systems Center - Exhibit at the American Water Works Association Water Quality Technology Conference and Exhibition
Nov 13-15	Charlotte, NC	ETV Program - ETV exhibit at the Brownfields 2002 "Investing in the Future" Conference
Nov 17-20	Winston-Salem, NC	ETV Drinking Water Systems Center - Presentation at the North Carolina Water Environment Association 82nd Annual Conference
Nov 19	Ann Arbor, MI	ETV Drinking Water Systems Center - Annual Stakeholder Group Meeting
Dec 3-5	Washington, DC	ETV Program - ETV exhibit at the SERDP/ESTCP 2002 Partners in Environmental Technology Symposium and Workshop.

For more details on ETV events, check out our online calendar at <http://www.epa.gov/etv/calendar/02-07.html>.

with Oak Ridge National Laboratory (ORNL), verified the performance of five lead in dust detection technologies. The five technologies verified are: KeyMaster Technologies' Pb-Test XRF Instrument; Monitoring Technologies International's PDV 5000 Trace Element Analyzer; NITON Corporation's XL-300 and XL-700 Series XRF Instruments; and Palintest's Scanning Analyzer SA-5000 System.

The ETV Pollution Prevention Metal Finishing Technologies pilot, operated by Concurrent Technologies Corporation (CTC), has verified the performance of an electrocoagulation wastewater treatment system developed by Kaselco, Inc. The Kaselco POSI-FLO Electrocoagulation Treatment System is a series of tanks and associated equipment used to process industrial wastewater containing dissolved metals and organics. The verification test evaluated the ability of the combined treatment system to remove regulated contaminants from the wastewater and recover the wastewater for reuse.

The ETV Pollution Prevention Metal Finishing Technologies pilot also verified the performance of KCH Services, Inc.'s Automatic Covered Tank System for Energy Conservation (ACTSEC). The ACTSEC technology removes air contaminants from the workplace while reducing the overall exhaust volume and power consumption. The ACTSEC system was tested on a metal wash and acid etch line at an aerospace manufacturing facility. Power consumption of the scrubber pump motor, induced draft fan, lid actuator motors, and the immersion heaters was measured.

Lobo Liquids, Inc.'s Rinse Water Recovery System was also verified by the ETV Pollution Prevention Metal Finishing Technologies pilot. The verification test evaluated the ability of the ion exchange system to remove regulated pollutants from the wastewater and recover the wastewater for reuse. The Lobo Liquids rinse water reuse system is equipped with a

PC-based control system that automates the recycling process, regenerating when the ion exchange columns are exhausted.

The ETV Greenhouse Gas Technology Center, operated by Southern Research Institute (SRI), verified the performance of COMM Engineering, USA's Environmental Vapor Recovery Unit (EVRU). The EVRU is a non-mechanical eductor or jet pump that recovers vent gas by using a high-pressure motive gas to entrain hydrocarbon vapors emanating from condensate storage tanks. The verification test was conducted at the TotalFinaELf (TFE) - El Ebanito site located near McAllen, Texas.

The ETV Water Quality Protection Center, Source Water Protection Technologies, operated by NSF International, has verified the performance of Dental Recycling North America, Inc.'s Mercury Removal Unit (MRU). The MRU is designed to remove mercury from dental wastewater using a two-step process to address both the soluble and insoluble mercury present in wastewater. The verification testing of the MRU was conducted during a seven-week period, at a dental office in Michigan.

The ETV Water Quality Protection Center, Wet Weather Flow Technologies, also operated by NSF International, verified the performance of two chemical induction mixers: The Masterr Company's GAS MASTRRR Series 32 Submersible Chemical Induction Mixer and USFilter/Stranco Products' Water Champ F Series Chemical Induction System. Both induction mixers are designed to inject and disperse gaseous and liquid chemicals into potable water, process water, or wastewater.

The Verification Reports and Verification Statements for these technologies are available on the ETV Web Site at <http://www.epa.gov/etv/verifications/verification-index.html>.

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