



# Environmental Technology Verification Program

# QUARTERLY REPORT

July 1999

## Breakthrough Drinking Water Treatment Technology Verified



In May, the Drinking Water Systems Pilot, partnered by NSF International, issued its first verification statement and report for Calgon Carbon Corporation's (CCC) Sentinel™ ultraviolet (UV) radiation disinfection system. CCC is a world leader in medium-pressure UV disinfection technologies, with more than 250 UV systems installed worldwide. The Sentinel™ is a medium-pressure UV water treatment system designed to inactivate microbiological contaminants, such as *Cryptosporidium*. Traditional UV systems use low-pressure lamps which emit most of their energy at the 253.7 nm wavelength, whereas the Sentinel™ system produces a broad spectrum of UV light over a range of 200-300 nm, with a maximum output at 255 nm. Medium-pressure UV lamps also have a higher irradiance and operate at a higher temperature than low-pressure lamps. Therefore, they are able to inactivate microbiological contaminants at shorter exposure periods based on an equal feedwater flow rate through the reactor.



The verification of Sentinel™ involved rigorous microbiological challenge tests via seeding with live *Cryptosporidium parvum* oocysts along with peer reviews by experts in microbiology and UV disinfection. Testing indicated that Sentinel™ can obtain an estimated 3.9 log<sub>10</sub> inactivation of *Cryptosporidium* as determined by animal infectivity methods at an estimated UV dose of 20 mW-s/cm<sup>2</sup> (exposure time of 8.8 seconds) when fed finished (treated but not chlorinated) water that was seeded with *Cryptosporidium* at a flow rate of 215 gallons per minute.

CCC's Sentinel™ was introduced seven months ago and has already broken new ground as a disinfection technology for *Cryptosporidium*. Since the issuance of the verification statement and report, CCC is already expecting to receive one order for Sentinel™. In addition, CCC stated that "the phone has been ringing off the hook with inquiries since the verification statement was issued."

The effectiveness in eliminating *Cryptosporidium* is based on the ability of high-energy UV light to penetrate the cyst membrane and photochemically inactivate the cyst. While UV light is a proven method for inactivating bacteria, it was not a viable or proven option for *Cryptosporidium* until now. For more information, go to [www.epa.gov/etv/library.htm#verifications](http://www.epa.gov/etv/library.htm#verifications) on the ETV Program web page.



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# Pilot Points

## Advanced Monitoring Systems

- Completed the Ambient Particulate Monitor test plan.
- Completed the In-line Turbidimeter test plan.
- Prepared five NO/NO<sub>2</sub> verification reports.

## Air Pollution Control Technology

- Held Paint Overspray Arrestor-Manufacturers Meeting on May 20 to discuss what was learned during the first round of testing and to make plans for round two.
- Developing verification reports for the six Paint Overspray Arrestors which are expected to be completed in July.

## Drinking Water Systems

- Verified first technology - Calgon Carbon Corp.'s UV system.
- Completed testing of Pall Corp.'s Ultrabar Ultrafiltration system and Zenon's ZeeWeed Microfiltration system.

## Greenhouse Gas Technology

- Initiated the establishment of an Electric Utility stakeholder group.
- Completed the test protocol for Protecto Seal Inc.'s Pin Tech pressure relief valve system.
- Completed the Phase I testing for A&A Environmental Seals' Seal Assist system.
- Installed and began verification testing of France Compressor Products' static seal.

## P2 Innovative Coatings and Coating Equipment

- Formed two stakeholder subcommittees to focus on pilot marketing issues and curing emissions measurement methods for ETV CCEP.
- Completed its fourth verification test of HVLP paint spray guns on April 12.

## P2, Recycling & Waste Treatment Technologies

- Explored funding and sustainability issues for the pilot program through the Funding Focus Group meeting.

## P2 Metal Finishing Technologies

- Completed Job Training Analysis Plan for P2 Metal Finishing Technologies verification.
- Developed a verification plan for testing generic technologies in parallel with specific technologies.

## Site Characterization & Monitoring Technologies

- Began the internal and external peer review process for the six draft Decision Support Software Verification Reports.
- Scheduled demonstrations for the Groundwater Monitoring technology category and the Explosives Detection technology category for August-September.

## Source Water Protection Technologies

- Discussed several potential technologies for verification at the second Stakeholder Advisory Group meeting, including oil separation technologies; drainfield rehabilitation technologies; and effluent screens and pump filters.

## Wet Weather Flow Technologies

- Formed Technology Panels for the five technology categories.
- Beginning testing on the following technology categories: pressurized filtration devices, flow meters, and induction mixers for disinfection.

## Environmental Technology Evaluation Center (EvTEC)

- Seeking panelists to participate in an evaluation of a Low Range Differential Pressure (LRDP) leak detection system for underground storage tanks.

## International Activities of ETV Program Continue to Grow

The ETV Program has continued to diversify and grow its activities in the international arena. These activities have been primarily in response to interest from foreign countries in technical cooperation. In recent months, ETV representatives attended a two-day meeting on verification sponsored by the United Nations Environmental Program (UNEP) and have continued ETV activities in Taiwan and the Philippines.

**U**NEP. On May 5-6, the ETV Program hosted a two-day workshop for representatives from UNEP's Industry and Environment Division in Washington, DC. UNEP is undertaking a consultation process to examine the strategic issues, benefits, and limitations of a process and framework for technology assessment and verification that might be implemented on a global basis. UNEP's plan is to organize a series of three workshops - one in North America, one in Europe, and one in Asia - to discuss mechanisms to enhance the delivery of quality data and environmental information on technologies, with a particular focus on delivering information about those technologies to developing countries. To initiate the series of workshops, representatives from EPA's ETV Program, the Interagency Environmental Technology Office (IETO) of the White House Council on Environmental Quality, and Environment Canada participated in a meeting to examine North American experience with respect to environmental technology assessment and verification. ETV pilot partners - Battelle, CERF, SRI, and NSF International - also attended the meeting.

**T**aiwan. In late May, Penelope Hansen, the ETV Program Coordinator, participated in the 1999 Environmental Analytical Chemistry Conference in Taiwan. There she gave the keynote address entitled "Emerging World Interest in Environmental Technology Verification" and met with government officials interested in extending an already existing Memorandum of Understanding (MOU) with EPA to include environmental technology verification activities. The Taiwanese government is starting an environmental technology verification program through the Industrial Technology Research Institute and will focus its initial efforts on recycling technologies.

**P**hilippines. Also in May, Will Kirksey of the Civil Engineering Research Foundation's (CERF) Environmental Technology Evaluation Center (EvTEC) traveled to the Philippines to continue discussions with government officials involved with the Philippine environmental technology verification program. EvTEC's MOU with Clark Development Corporation (CDC), an executive agency of the Philippine government, is the basis for the creation of a large scale, integrated verification program in that country. The Philippine Industrial Technical Development Institute (ITDI) joined the effort by signing an MOU with CERF and the U.S. Asia Environmental Partnership (U.S. AEP) which aims to provide a pathway for the use of innovative technologies from the private sector to meet CDC's immediate need - the cleanup of identified contaminated sites and wells - and also to demonstrate the use of other environmental technologies in the development area.

**U**.S. AEP. At the request of U.S. AEP, Penny Hansen briefed 14 representatives from India, Indonesia, Thailand, and Malaysia on the ETV Program in June in Washington, DC.

## ETV Quality Assurance Committee Group Receives Honors



The members of the ETV Quality Assurance Committee received EPA Bronze Metals for outstanding contributions to the role of quality assurance in technology verification through the development of the ETV Quality Management Plan (QMP) and implementation of quality assurance throughout the program.

In 1998, after almost two years of developmental work and consensus seeking across the broad array of organizations covered by ETV, the Quality Assurance Committee completed and published the *ETV Quality and Management Plan for the Pilot Period (1995-2000)*. It articulates the roles and responsibilities of all participants; defines terms and procurement procedures; stipulates record keeping, computer software, and personnel training standards; and sets planning and work implementation standards. Most importantly, the document establishes the data quality assurance procedures and standards to be used by all program participants. The ETV QMP has been distributed to numerous countries around the world and has become a world standard for such quality documents.

The ETV Quality Assurance Committee members who wrote the plan are Nancy Adams (NRMRL), Sam Hayes (NRMRL), Lora Johnson (NERL), Ann Kern (NRMRL), Linda Proter (NERL), Shirley Wasson (NRMRL), and Jeff Worthington (NRMRL). Penny Hansen supervised the process and wrote the introduction to the QMP.

## Catalog of Environmental Technology Verification Programs in North America



Pacific Rim Enterprise Center, a nonprofit business assistance organization, has developed a *Catalog of Environmental Technology Verification Programs in North America*. This catalog represents the first overview of the environmental technology verification field and the 23 major state and federal verification programs.

Pacific Rim developed the catalog to serve as a single source of information about the value and uses of verification for technology providers, end users, regulators, consultants, and engineers. Verification can increase deployment and market opportunities for new technologies and accelerate the commercialization process by providing credible information to regulators, technology buyers, and the public. Pacific Rim believes that verification can significantly improve technology deployment in federal and private sector environmental markets, as well as meeting international market requirements. The catalog includes a discussion of regulatory reciprocity issues and current efforts to overcome existing barriers. The authors created a matrix and program profiles that review the following key aspects of the programs: nature and scope of the program; technologies verified; collection and review of data; process and costs; and results and products.

Copies of the catalog are available for \$15 per copy. Please contact Pacific Rim Enterprise Center at 206-224-9934 or [kscott@pacific-rim.org](mailto:kscott@pacific-rim.org) to obtain a copy.

## Web Watch

- ✓ The first verification statement and report for the Drinking Water Systems Pilot are on the ETV web site at <http://www.epa.gov/etv/library.htm#verifications>.
- ✓ The revised Arsenic Removal Protocol for the Drinking Systems Water Pilot is available at <http://www.epa.gov/etv/library.htm>.
- ✓ Summaries of the Air and Water Stakeholder Meetings of the Advanced Monitoring Systems Pilot are posted at [http://www.epa.gov/etv/07/07\\_ann.htm](http://www.epa.gov/etv/07/07_ann.htm).
- ✓ A summary of the Vendor Meeting of the P2 Metal Finishing Technologies Pilot is posted at [http://www.epa.gov/etv/10/10\\_ann.htm](http://www.epa.gov/etv/10/10_ann.htm).

## 34 Technologies Verified

### Cone Penetrometers

- ✓ Fugro Geosciences, Inc.; Houston, TX
- ✓ U.S. Navy, Naval Command, Control, and Ocean Surveillance Center, Research, Development, Test and Evaluation Division; San Diego, CA

### Field Portable GC/MSs

- ✓ Brucker Analytical; Billerica, MA
- ✓ Viking Instruments; Chantilly, VA

### Field Portable X-ray Fluorescence Analyzers

- ✓ Metorex, Inc.; Princeton, NJ (2 technologies)
- ✓ Scitec, Inc.; Kennewick, WA
- ✓ HNU Systems, Inc.; Newton Highlands, MA
- ✓ Niton Corporation; Bedford, MA
- ✓ TN Spectrace; Round Rock, TX (2 technologies)

### Emulsified Fuels

- ✓ A-55 Clean Fuels, Inc.; Reno, NV

### Soil/Soil Gas Sampling Devices

- ✓ W.L. Gore & Associates, Inc.; Elkton, MD
- ✓ Art's Manufacturing and Supply; American Falls, ID
- ✓ Geoprobe Systems, Inc.; Salina, KS
- ✓ SimulProbe; Novato, CA

- ✓ Quadrel Services, Inc.; Clarksburg, MD
- ✓ Clements & Associates, Inc.; Newton, IA

### PCB Analyzers

- ✓ Dexsil Corporation; Hamden, CT
- ✓ Hach Company; Loveland, CO
- ✓ Electronic Sensor Technology; Newbury Park, CA
- ✓ Strategic Diagnostics, Inc.; Newark, DE (3 technologies)
- ✓ Evirologix, Inc.; Portland, ME

### Well-Head Monitoring Devices

- ✓ Electronic Sensor Technology; Newbury Park, CA
- ✓ Inficon, Inc.; East Syracuse, NY
- ✓ Innova AirTech Instruments; Denmark
- ✓ Perkin-Elmer Corporation; Wilton, CT
- ✓ Sentex Systems, Inc.; Ridgefield, NJ

### Pollution Prevention Technologies

- ✓ Smart Sonic; Newbury Park, CA
- ✓ Rayovac; Madison, WI

### Fuel Cells

- ✓ International Fuel Cells Corporation; South Windsor, CT

### Drinking Water UV Radiation/Disinfection

- ✓ Calgon Carbon Corporation; Markham, Ontario

# ETV Events

<u>Date</u>	<u>Location</u>	<u>Event</u>
July 6-9	Nashville, TN	Source Water Protection Pilot Presentation - National Environmental Health Association Annual Educational Conference and Exhibition
Aug. 1-4	Salt Lake City, UT	Wet Weather Flow Pilot - Collection Systems Rehabilitation and O & M Conference
Aug. 2	State College, PA	Drinking Water Systems Pilot - Presentation at PA Water Works Operators Conference
Aug. 24	Ann Arbor, MI	Drinking Water Systems Pilot - Executive Stakeholder Committee Meeting
Aug. 30	Owensboro, KY	Drinking Water Systems Pilot - Kentucky Rural Water Association Meeting
Sept. 15	Dallas, TX	Site Characterization and Monitoring Pilot - Vendor Meeting for Total Petroleum Hydrocarbon (TPH) Detection
Sept. 20	Dallas, TX	P2 Coatings and Coating Equipment Pilot - Stakeholder Meeting
Sept. 21-24	Dallas, TX	P2 Coatings and Coating Equipment Pilot - Coating '99 Conference
Sept. 21-24	Dallas, TX	ETV Program - Waste Combustion in Boilers and Industrial Furnaces Meeting
Sept. 28	Providence, RI	Source Water Protection and Wet Weather Flow Pilots Presentation - Innovative On-Site Wastewater Technologies Trade Show
Sept. 30	Manchester, NH	Source Water Protection and Wet Weather Flow Pilots Presentation - Innovative On-Site Wastewater Technologies Trade Show

For more details on ETV Events, check out our online calendar at <http://www.epa.gov/etv/highup.htm>

**GOAL: 300 Technologies  
Verified by 2005**



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