

## **New techniques in explosives analysis at National Water Quality Laboratory**

Chemists at NWQL have compared methods for determining nitroaromatic explosives, to concentrations as low as 9 nanograms per liter (ng/L). Nitroaromatic explosives, such as 2,4,6-trinitrotoluene (TNT), and their degradation products are important environmental contaminants in soil, surface water, and ground water at contemporary and historical munitions plants and military installations.

The production, storage, and disposal of nitroaromatic and nitramine explosives and propellants at military installations began as early as the pre-World War I era, although the majority of these installations dates from World War II. Discharge of contaminated manufacturing waste streams into rivers or ground water, burial of obsolete munitions, and training exercises increase the availability of explosives for migration into water supplies. The identification and quantitation of complex mixtures of nitroaromatic compounds at environmentally relevant concentrations is a difficult analytical challenge.

Chemists at the NWQL recently compared analytical techniques for the determination of explosives. "Determination of nitroaromatic explosives and their degradation products in unsaturated-zone water samples by high-performance liquid chromatography with photodiode array, mass spectrometric, and tandem mass spectrometric detection," by Paul Gates, Ed Furlong, Tom Dorsey, and Mark Burkhardt, was published in August 1996 in a special issue of Trends in Analytical Chemistry.

It was demonstrated that the multiple analytical methods were complementary. High-performance liquid chromatography/mass spectrometry (HPLC/MS) techniques offer a selective and sensitive method to identify and quantify explosives and explosives degradation products, down to concentrations as low as 9 ng/L. Several previously hypothesized explosives degradation products were identified in the presence of much more abundant, better known explosives degradation products.

This paper shows how HPLC/MS and tandem mass techniques can be applied to water analysis. These types of methods will be important to the USGS and the larger scientific community as the focus of environmental organic chemistry moves toward polar, less-easily analyzed compound classes. Readers interested in obtaining explosives analysis from the NWQL, should contact Ed Furlong (303-467-8080; Geomail: [efurlong](mailto:efurlong)).



*by Ed Furlong*

---

## **Daddow takes on new assignment**

Richard L. Daddow has joined the Branch of Technical Development and Quality Systems. Daddow's major responsibilities are to manage the Quality Systems section of the Branch and to serve as chief

of the Standard Reference Sample Project. He also will continue to spend some of his time working with John Powell in providing quality-assurance training in support of the Department of Defense Environmental Conservation Program.

Bill Shampine, Branch chief, says Daddow's previous work experience in quality assurance, data-base management, and hydrologic projects will serve him well in this assignment. For the last 5 years, he has been the quality-assurance manager and data-base manager for a large superfund project in the Wyoming District.

---

## Patterson joins OWQ

Glenn Patterson is joining the Office of Water Quality in Reston to coordinate drinking-water activities and the Water Quality Information Initiative for the U.S. Geological Survey. In his new position, Patterson will coordinate activities and opportunities pertaining to the quality of the Nation's sources of drinking water.

Patterson began his career with the USGS in 1976 as a laboratory assistant in the National Research Program in Menlo Park.

---

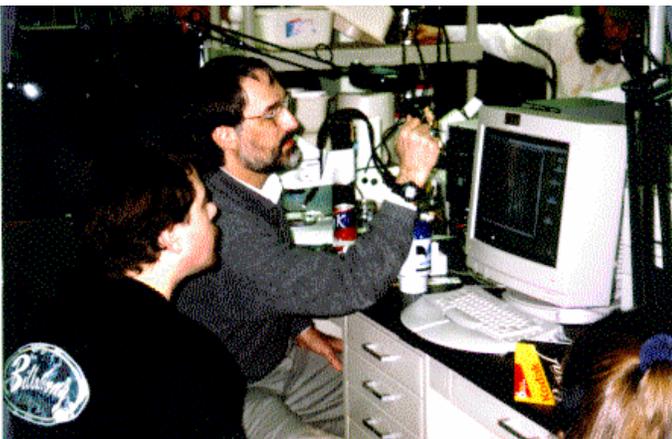
## Expert "worms" his way into Biological Unit

The Biological Unit (BU) participated in a multifaceted "worm" workshop taught by Mark Wetzel, research scientist at the Illinois Natural History Survey, March 3-6, at NWQL. Wetzel is a distinguished Annelida (segmented-worm) expert, whose particular specialties are the classes Oligochaeta and Hirudinea (leeches).

Wetzel brought his expertise to the NWQL to teach the taxonomy, ecology, and distribution of these often abundant and unappreciated aquatic organisms. Knowledge of their distribution and abundance provides useful information in water-quality-monitoring studies since they are distributed in all aquatic habitats, including hyporheic and ground-water systems.

The workshop consisted of three sections: distribution; morphology and identification; and practical, hands-on experience. Eighteen members of the Biological Unit took part.

Wetzel illustrated the minute, diagnostic characters needed for identification using 35-mm and microscope slides with a computerized, video-imaging system. Lab instruction on slide preparation and light microscopy techniques was particularly helpful for getting the most information from preserved specimens. Live organisms were also collected from nearby ponds to observe characters not noticeable in preserved specimens.



**TAXONOMY OF WORMS** – Mark Wetzel (right), research scientist at the Illinois Natural History Survey, manipulates the video imaging system used in a workshop on the taxonomy, ecology, and distribution of segmented worms while David Feldman looks on. Feldman, a member of the Biological Unit at the National Water Quality Laboratory, was one of 18 staffers who took part in the recent four-day workshop.

The knowledge gained during this workshop will be applied as the BU continues to process benthic macroinvertebrate samples for the National Water-Quality Assessment program.



*by David Stagliano*

---

## **Biological Unit reorganized**

The unexpected addition of production work in NWQL's Biological Unit (BU) has resulted in a change in the organization to separate quality assurance/quality control (QA/QC) from its new emphasis on production.

In keeping with existing NWQL operational programs, Allison Brigham remains in the Quality Management Program, where she will be responsible for biological QA/QC issues. Gary Cottrell, supervisory chemist, was reassigned February 10 as acting BU supervisor while the unit itself was placed organizationally in the NWQL Production Program.

The original operational intent of the BU was to contract out species identification and enumeration work with the unit providing oversight for QA/QC. Unfortunately, the production contracts covering this work were defaulted or have not provided all the services desired. Consequently, all production work related to invertebrate sample processing, initial species identification, and species enumeration have been brought into the NWQL. Also, consideration is being given to conduct initial algal sample processing, slide preparation, species identification, and enumeration at the NWQL.

Allison Brigham's Geomail address is [abrigham@usgs.gov](mailto:abrigham@usgs.gov) or call 303/467-8268; Gary Cottrell can be reached at [cottrell@usgs.gov](mailto:cottrell@usgs.gov) or call 303/467-8248.



*by Pete Rogerson*

---

## **QC sample design offered**

A short course entitled "Quality-Control Sample Design and Interpretation" QW2034TC (G0342-B) is scheduled July 14-18, at the U.S. Geological Survey, National Training Center, Denver. Terry Schertz is the course coordinator. Applications are due by May 23.

This 5-day course will introduce techniques for incorporating quality-control (QC) samples in QC projects. The techniques include (1) the objectives of collecting environmental samples; (2) use of each QC sample type; (3) hydrologic, statistical, and cost considerations of designing QC samples; (4) analysis of QC data; (5) use of QC analyses in the interpretation of environmental data; and (6) managing and publishing QC information.

The course is designed primarily for hydrologists responsible for implementing QC data-collection programs and projects and interpreting data.

---

## **New titles in print**

Foreman, W.T., and Gates, P.M., 1997, Matrix-enhanced degradation of *p,p'*-DDT during gas chromatographic analysis-A consideration: *Environmental Science & Technology*, v. 31, no. 3, March 1997, p. 905-910.

Moulton, S.R., II, 1996, Neotype designations and synonyms of some Texas caddisflies (Trichoptera): *Journal of the Kansas Entomological Society*, v. 69, no. 3, November 1996, p. 272-273.

Moulton, S.R., II, and Stewart, K.S., 1996, Caddisflies (Trichoptera) of the interior highlands of North America: Memoirs of the American Entomological Institute, v. 56, 313 p.

Copies of these articles and other NWQL publications are available by contacting Korey Williams [kcowill] by Geomail, telephone 303/467-8006, or fax 303/467-8240.

---

## **Project takes democracy into cyberspace**

The International GovNews Project has announced a special government category on the Internet's Usenet news system. The creation of this new category lays the groundwork for the wide, cost-effective electronic dissemination and discussion by topic of large amounts of public government information.

Through the Usenet system, GovNews will be distributed through thousands of linked Internet servers throughout the United States and the world. Millions of people will now be able to follow and comment on government activity in selected areas of interest without extensive surfing on the Web. Schools, businesses and households, without powerful computers and high-speed connections, will now be able to use less complex systems to get rapid access to Federal agency information through newsgroup servers in their own communities.

The project is the result of a collaborative effort between international public and private sector volunteers seeking to make government more open and accessible to the people.



*by Beth Gaston,  
National Science Foundation*

---

## **Wershaw honored for geochemical research**

Robert Wershaw, hydrologist with the National Research Program in the NWQL building, received the U.S. Department of Interior Meritorious Service Award from Dr. Gordon P. Eaton, Director, USGS, at an awards ceremony January 16. Wershaw was honored for his outstanding contributions to the Survey in the field of organic geochemical research as one of the Nation's foremost authorities on the organic geochemistry of humic substances in coal, soil, sediment, and water; and interactions of trace metals with natural organic substances.

Wershaw's research on water-solubility enhancement partitioning of various pesticides into dissolved humic substances is a classic study. His model of aggregate humic structures in soils and sediment is being accepted as the standard model to explain contaminant interactions. He conducted pioneering research on the application of nuclear magnetic resonance spectrometry to the solution of difficult analytical problems related to humic substances and coal.



*by Colleen Rostad*

---

## **Students matriculate at Lab in Water-Quality Principles**

About 60 staff members from the National Water Quality Laboratory have completed training courses in Water-Quality Principles this year. So far, the course has been offered twice, January 13-16 and March 17-20, at the Laboratory.

The U.S. Geological Survey course was taught in-house by Roger Lee (Texas District), Bob Broshears (Central Region water-quality specialist), George Ritz (Colorado District water-quality specialist), and Steve Moulton (NWQL Biological Unit).

The class was designed as a general introduction to water quality. It was both a terminal course for those whose main interest is outside of water quality and a first-level course for those interested in additional water- quality courses, according to Stephen Glodt, course organizer.

Course instructors focused on terminology and underlying concepts, and connected areas of hydrology, chemistry, geology, and biology. Topics included the history of water quality, introduction to chemistry and aquatic ecology, biogeochemical cycles, and the behavior and chemistry of water itself. Instructors also discussed water-quality constituents, applying principles to USGS studies, and related human and aquatic health concerns.



**FOCUSING ON A PROBLEM** – Instructor Roger Lee (left), research hydrologist in geochemistry from the Texas District, observes students at work on a challenging problem set. Concentrating on the problem at hand are Mark Cree, Beth Kellogg, Max Stroppel, Lee McElhinney, and Ken Werner. The in-house introductory course on Water-Quality Principles was the first of two this year to review the physical, chemical, and biological attributes of water.



**BACK TO SCHOOL** – Richard Franz (left to right), Tom Bushly, and Dennis Markovchick solve a problem in the January course on Water-Quality Principles. Student teams worked together to solve problem sets, propose a plan of action, and present solutions.

## Newsletter Staff

Jon Raese, Editor

The National Water Quality Laboratory Newsletter, is published quarterly by the National Water Quality Laboratory, U.S. Geological Survey, Box 25046, MS-407, Denver Federal Center, Denver, CO 80225-0046. For copies, call Jon W. Raese (303) 236-3464.

The purpose of the *National Water Quality Laboratory Newsletter* is to improve communications on water-quality issues in the U.S. Geological Survey. The Newsletter is for administrative use only. It should not be quoted or cited as a publication. The use of trade, product, or firms names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. Geological Survey. Visit the NWQL Home Page Web site at <http://wwwnwql.cr.usgs.gov/USGS>.