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## Lab achieves perfect score on performance evaluation

The NWQL has just received results from the recent U.S. Environmental Protection Agency (USEPA) Water Pollution Performance Evaluation Study. The Laboratory analyzed 69 ions and compounds. Of all tested analytes, 100 percent were within acceptance limits. (An analyte is a substance being determined in an analysis.)

One of the major benefits from participation in these studies is the assurance that data produced by the NWQL is comparable to other major laboratories and is scientifically defensible.

This evaluation is one of two USEPA water pollution evaluations in which the NWQL participates yearly. These studies are completed by the USEPA's Environmental Monitoring Systems Laboratory and are used to evaluate the performances of USEPA, State, and other selected laboratories that monitor ambient water and wastewater.

The water pollution studies cover trace metals, major cations and anions, residue on evaporation, nutrients, chlorinated pesticides, volatile halocarbons and aromatics, and other miscellaneous analytes.

The NWQL also participates in USEPA Water Supply Performance Evaluation Studies twice a year. The Analytical Contracting Unit analyzes eight samples a year for USEPA and two samples for the Department of Energy Quality Assessment Program. The NWQL also is involved in the annual Canadian National Water Research Institute performance evaluation study. These studies include determinations of low ionic strength ions, trace metals, and major ions. In addition, the NWQL participates annually in three intercomparison exercises with the National Oceanic and Atmospheric Administration: trace metals in tissue, organics in marine sediment, and organics in marine tissue.

Finally, the NWQL takes part in the round-robin performance evaluation program administered by the Branch of Technical Development and Quality Systems, which sends standard reference samples to about 150 laboratories.



*by Ann Watterson*

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## Methods Research Program changes leadership

Mark Sandstrom, Chief of Methods Research and Development Program (MRDP), asked to be relieved of his duties as program chief and be reassigned to his previous position as a GS 13 research chemist, effective May 25. After nearly 5 years as chief, Sandstrom wished to return to environmental chemistry research. "I have many creative ideas and exciting opportunities for methods

research and development that I would like to pursue, and feel that these efforts would be of great benefit to WRD as well as my personal goals," said Sandstrom.

According to Pete Rogerson, NWQL Chief, Sandstrom has done an excellent job. "He has provided leadership, been an outstanding spokesperson for the program, and has successfully brought many new methods to the Division," said Rogerson. Dave Rickert, Chief of the Office of Water Quality, noted that Mark's "persistence, creativity, and communication skills have led to development and operational use of new, cutting-edge methods which have fundamentally improved the way the U.S. Geological Survey does water-quality work."

Bob Hirsch, Chief Hydrologist, Water Resources Division, thanked Sandstrom and said "the accomplishments of your group have played a large part in the USGS' emergence as the leading organization in the world in water-quality assessment. I hear so much good feedback from inside and outside the USGS on the new low-concentration, high-accuracy procedures that we now use in the USGS. Thanks, and best wishes as you return to the bench," added Hirsch.

The NWQL is submitting a Bureau-wide vacancy announcement for the MRDP Chief's position. All qualified chemists are encouraged to apply. In the meantime, Bill Foreman has accepted a 120-day assignment as Acting Chief, effective May 25.

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## Prices up 4 percent for 1998

The Office of Water Quality has approved a 4 percent price increase for chemical analytical services offered by the National Water Quality Laboratory (NWQL) for 1998. These prices will be effective October 1, 1997, and are available now on the NWQL Home Page (URL: [http://wwwnwql.cr.usgs.gov/USGS/pricelist\\_main.html](http://wwwnwql.cr.usgs.gov/USGS/pricelist_main.html)).

Only in-house analytical chemistry prices are being raised by 4 percent from 1997 prices. Prices for all other analytical work -- such as analyses offered by Geologic Division; contract analyses for radiochemical parameters and the Department of Defense Environmental Conservation Program; and Biological Unit analyses -- will be announced as soon as they are available.



*by David Rickert*

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## New method for low-level volatile organic compounds developed by NWQL chemists

I am pleased to announce that the National Water Quality Laboratory (NWQL) has a new analytical method for the determination of 86 volatile organic compounds (VOCs) in water at low concentrations. This method has been developed in response to needs of the National Water-Quality Assessment (NAWQA) Program to determine low concentrations of VOCs in water samples. This method is available as Schedule 2020 which includes a search for nontarget compounds and as Schedule 2021 which does not include the search for nontarget compounds. Schedule 2020 was previously available as custom Lab Code 9090.

Schedule 2020 costs \$502.85; Schedule 2021 costs \$402.85 for fiscal year 1997. A complete listing of the 86 compounds offered as selected analytes and the current detection limits for them is available on the NWQL Home Page at <http://wwwnwql.cr.usgs.gov/USGS/2020.html>. This site includes a brief method description and information about data qualifiers that accompany data for several compounds that have substantially greater variability.

This method has been tested for the past year to determine how it behaves in production at the NWQL. On the basis of extensive internal quality assurance and expert technical review, data

produced by Schedule 9090 after October 1, 1997, will be considered approved and can be entered into WATSTORE (Water Data Storage and Retrieval System). Publication of the supporting Open-File Report is expected before January 1, 1998. If you have additional questions, contact Brooke Connor (303-467-8170).



*by Pete Rogerson*

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## **Analytical Contracting Unit supports DODEC program**

A primary responsibility of the Analytical Contracting Unit (ACU) at the NWQL is to support the Department of Defense Environmental Conservation (DODEC) program. One of the areas in which the ACU supports DODEC is by providing sampling and on-site analyses assistance to District personnel.

In June, Bob Brock, a chemist with ACU, worked with Greg Mayer, Lisa Stewart, and Judy Scholz of the Georgia District Office at a DODEC site in Marietta, Ga. Groundwater samples were collected from discrete fractures in a crystalline rock formation using a straddle-packer system and analyzed in the field with a portable gas chromatograph. The results from this sampling effort were used to identify fractures that will be subsequently sampled as required under the Resource Conservation and Recovery Act. In addition to the sampling effort, Brock conducted training sessions on operation of the gas chromatograph so that the District could develop its own expertise in the area of on-site sample analysis.



*by Bob Brock*

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## **Wolfe addresses seminar**

Alex Wolfe, Postdoctoral Research Associate from the Institute of Arctic and Alpine Research, University of Colorado, gave a talk April 11 entitled "Freshwater diatoms and paleolimnology in the eastern Canadian Arctic." Wolfe explained some of his research on the formation of lakes in the low Arctic (Baffin Island), using multiple lines of evidence, including diatoms deposited in lake sediments.

Wolfe's presentation drew an audience of Biological Unit staff, NWQL chemists, and several visiting phycologists from the Federal Center, the Academy of Natural Sciences of Philadelphia, and the University of Louisville.

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## **Polish scientists visit Lab**

The international Water Resources Program coordinated a study tour for two scientists from the Polish Geological Institute-USGS Radon Project. Drs. Ryszard Strzelecki and Stanislaw Wolkowicz arrived in the United States May 31 and began their study tour in Virginia. They spent two days in Denver with the National Water Quality Laboratory hosting part of their stay, including tours of the radionuclide laboratory and discussions about the radon program.

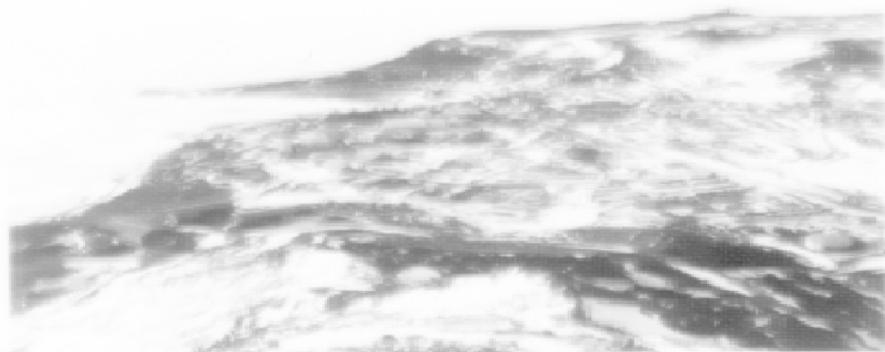
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## **Working in Antarctica**

*by Sabrina De Russeau* The U.S. Antarctic Program, administered by the National Science Foundation (NSF), maintains three scientific research bases in Antarctica. There are bases at the South Pole, Palmer Land (near South America), and McMurdo Bay (closest to New Zealand). I took leave from my job at the National Water Quality Laboratory to be employed at the largest base, McMurdo Station, as a chemist, from October 8, 1996, to February 14.

McMurdo Station is on Ross Island in McMurdo Bay. Ross Island was formed by the active volcano Mt. Erebus. The station was carved out of the resultant lava rubble. Mt. Erebus, at 14,000 feet, is a massive, snow-covered volcano. McMurdo Bay remains covered with an 8-foot-thick ice sheet for most of the year; only during the height of the summer does the ice sheet begin to melt and expose the deep blue ocean underneath. At the head of McMurdo Bay lies the expansive Ross Ice Shelf which stretches to the horizon. Where the shelf has been pushed up against the Island, huge compression waves in the 150-foot-thick ice have formed. This part of Antarctica is a cold, dry, and pristine desert of ice and snow.

The weather in Antarctica is extremely harsh. Normally, the humidity is about 5 percent. During the austral summer, between November and February, the continent receives 24 hours of light and then, during the winter, between June and August, there is 24 hours of darkness. Daily spring and fall temperatures are around -15°F. The constant, and sometimes ferocious, winds provide a windchill factor of -35 to -80°F. Winter temperatures are much more extreme and summer conditions are mild. Severe Antarctic storms roll in from the Ross Ice Shelf and can threaten lives with decreased visibility.



*McMURDO STATION – Sabrina DeRusseau recently took a leave of absence from NWQL and spent about 4 months working as a chemist for the National Science Foundation at McMurdo Stations, a research base on Ross Island in Antarctica. Ice-covered McMurdo Bay is shown on the left. NSF employs some 800 people at this station.*

Occasionally, emperor and Adelie penguins visit the base and surrounding areas. Also, Weddell seals are commonly seen sleeping near holes and cracks in the annual ice sheet near McMurdo. There are only two inland antarctic birds-the antarctic skua and the snow petrel. Once the ice sheet begins to melt, killer whales can be seen breaching in McMurdo Bay. Underneath the ice sheet or the ocean surface in McMurdo Bay is an extremely colorful and productive marine ecosystem. Plants and animals are uniquely adapted to survive in frigid ocean water at 28°F.

The NSF employs approximately 800 people at McMurdo Station. These employees are all support staff for the nearly 100 research projects and related personnel. I worked in the research lab at McMurdo analyzing field samples using various instruments including total organic carbon and dissolved organic carbon analyzer, a gas chromatograph with carbon/nitrogen/sulfur detector and with a flame ionization detector, and nutrients analyzer.

Some of the NSF research projects at McMurdo are involved with studying physiological adaptations of marine life to extreme cold, impact of the sewage outflow on marine life, ecological modeling of the Dry Valley ecosystems, monitoring of the ozone hole and locating and studying meteorites. I had the unique opportunity to participate in a few field trips with a science project headed by Bill Baker of the University of Florida. Project members are looking for new biochemicals that can be used in medicines to cure cancer. Rainforest and Antarctic species have the potential to provide these new biochemicals.

My time spent in Antarctica will always be one of the most memorable and treasured experiences of my life.

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## Lab tests experimental method for ultralow-level blank water

In an effort to reduce district expense and hassle in obtaining blank water for ultralow-level analyses, the NWQL is investigating a process for preparing one source of equipment blank water for pesticides and volatile organic compounds (VOCs). This new blank water is unique because it is used for the ultralow pesticide and VOC analyses outlined in sampling and analysis protocols of the National Water-Quality Assessment (NAWQA) Program.

Most commercially available water is suitable for the higher detection methods where certified levels will be typically greater than the detection limits desired for pesticides and VOCs by the NAWQA Program. Manufacturers have, for the most part, had trouble providing blank water that is acceptable for both pesticides and volatiles at these low detection limits. NWQL has developed a plan to resolve this issue by removing volatiles from pesticide-grade blank water by using an active nitrogen purge prior to resale to the districts.

Reasons for the proposed change are as follows:

1. To reduce contaminant levels of VOCs in blank water;
2. To lower the overall cost for blank water used by the districts;
3. To allow VOC and pesticide samples to be collected at the same time; and
4. To provide customers with a reliable source of blank water in the absence of commercially available supplies.

Following receipt of an order for blank water at DENSUPPLY, the water will be sent to the volatiles laboratory, purged for 2 hours, resealed, and shipped immediately. The NWQL is capable of processing nine cases of water a day.

If this proposed procedure proves reliable, the NWQL will issue a technical memorandum. Customers also should read NWQL Technical Memo 92.01, which describes the procedures for supplying blank water (see Home Page Web site at [http://www.nwql/USGS/nwql\\_memo.html](http://www.nwql/USGS/nwql_memo.html)).

The outcome of this simple process should reduce overall costs for blank water used for analysis of VOCs and pesticides and improve overall data quality.



*by Brooke Connor and Tom Maloney*

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## NWQL chemists identify diuron transformation products

Chemists from the Organics and the Methods Research and Development Programs (MRDP) have identified breakdown products or thermostable derivatives of diuron. The research is part of a special NWQL project to identify unknown compounds in Schedule 2010 sample extracts from Oregon. Chauncey Anderson, the Project Chief in Oregon, was concerned about high concentrations of interferences that prevented quantitation of some of his samples submitted for Schedules 2010 and 2051. Anderson contacted the NWQL and a project was developed to examine the extracts by full-scan mass spectrometry (MS).

The full-scan MS analysis conducted by Frank Wiebe, Organics Program, and Tom Leiker, MRDP, identified 3,4-dichloroaniline and a dichloro-3-isocyanato benzene isomer as major compounds in the chromatograms of the Schedule 2010 extracts from two sites. The source of these compounds was unknown, so Anderson discussed the results with Mark Sandstrom, MRDP. Sandstrom said he was curious about the source of the compounds that were identified, and whether they could be environmental or instrumentally derived transformation products of pesticides.

Follow-up experiments are planned to determine if 3,4-dichloroaniline is extracted from water and is stable by GC/MS analysis; if so, said Sandstrom, "we can add this to our GC/MS methods as an environmental transformation product of diuron and linuron (linuron has a similar structure). We could also look for the isocyanate compound as an indicator of the presence of diuron in analytical extracts."

According to Anderson, "it helped confirm that the primary compounds in the sample (potentially causing interferences) were in fact compounds or derivatives of compounds for which we were already sampling. In other words, we weren't missing much with the 2010 and 2051 analysis."



by Mark Sandstrom

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## Untangling the Web

The World Wide Web is a powerful information distribution tool. The NWQL maintains statistics of WWW usage to help predict the volume of traffic and to determine the usefulness of pages maintained by the Laboratory.

Various statistics are tracked by the Web Server, including hits, page hits, and visitors. A "hit" is the basic statistic of the WWW. A "hit" counts any file downloaded from the site. A "page hit" represents an entire page being served. A "page hit" is produced by several "hits" representing access of the page plus graphics. The "page hits" help to determine the most useful or popular information at the site. "Visitors" let us know where our customers are coming from.

The accompanying histogram represents the number of hits/day the NWQL server received during the last quarter. The maximum number of hits on a single day was 2,922 on March 27. The Biological Unit uses the WWW for data entry and retrieval and their pages receive the most "hits." However, the catalog and the price list are also popular followed by the Technical Memorandums. The MTBE Fact Sheet has produced the most hits from the public. You may visit our WWW site and view the monthly statistics at the following URL: <http://wwwnwql.cr.usgs.gov/USGS>



by Sandy Turner



**ENVIRONMENTAL CHEMISTRY** – Bill Foreman, research chemist in the Methods Development and Research Program, makes a point during a short course on "Environmental Chemistry of Organic Pollutants, I-Controlling Processes," offered May 16-23, at NWQL. Forman organized and taught the course along with Gregory Foster, George Mason University, Fairfax, Va., George Aiken, USGS-NRP, Boulder, and Mike Godsy, USGS-NRP, Menlo Park.

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## Lab tours prove popular

A total of 144 visitors toured the NWQL during 1996, including students from middle schools, water-quality classes from the USGS Training Center, government budget analysts, and representatives from the U.S. Environmental Protection Agency. Tour groups from outside the United States also found the Lab to be of interest, particularly for water-quality specialists from Jordan, Thailand, China, and Egypt.

Thus far in 1997, 174 visitors toured NWQL. As the *Newsletter* deadline approached, tours were scheduled for a laboratory manager from the Union of South Africa, a group from Chile, and a delegation from the 3rd International Symposium on the Analysis of Geological Samples.

If interested in Lab tours, contact Dennis Markovchick (303-467-8220, markovch) or Gary Cottrell (303-467-8248, cottrell).

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## Method detection limit team recommends modified USEPA procedure to report data

The method detection limit quality improvement team (MDL team) was formed to address issues related to the determination of MDLs for analytical methods used at the NWQL. Recommendations were developed as a result of team meetings, which included suggestions from USGS District personnel and the Office of Water Quality, and from pilot studies conducted on selected analytical methods currently used by the NWQL. The main recommendations involve modifying the U.S. Environmental Protection Agency's (USEPA) procedure for determining MDLs and the concentrations that will be reported to NWQL customers.

The USEPA procedure for determining MDLs offers a "snapshot" of method performance, does not account for the long-term effects of multiple instruments, operators, analytical and preparation batches, and may not even be achievable by the laboratory during day-to-day operations. Modification of this procedure to include sources of long-term variance will provide NWQL customers with a detection limit that is more indicative of laboratory performance.

Finally, the MDL team has recommended that all analytical concentrations be reported as long as all quality-control and method-specific criteria are met. In some cases, analytical data will be reported with an "E" data qualifier to indicate its uncertainty. However, when an analyte is not detected in a sample, the team has recommended the use of a "less than nondetection value" (<NDV), which will be established from the MDL studies and historical analytical method performance. The NDV will be set at a level that minimizes the chances of false-positive data (the analyte is reported by the laboratory when it is not present in the sample) and false-negative data (the analyte is present in the sample but it is not reported by the laboratory).

The team's recommendations are expected to be implemented in phases beginning this year.



*by Bob Brock*

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**TANKS FOR  
THE MEMORIES**  
– New contracts  
for bulk nitrogen  
and argon gas  
have resulted in  
recent  
replacement of  
storage tanks at  
the National  
Water Quality  
Laboratory.

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Jon Raese, Editor

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