NATIONAL WATER QUALITY LABORATORY
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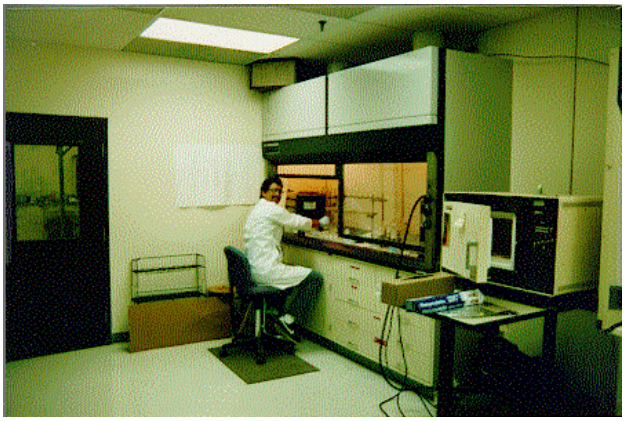
Organic Chemistry occupies expanded laboratory for NAWQA Program

The Organic Chemistry Program recently added a new sample-preparation laboratory as part of an expansion for the National Water-Quality Assessment (NAWQA) Program. The new laboratory adds about 2,300 square feet of workspace to the sample-preparation area, which originally was about 1,000 square feet. About 10 to 15 technicians will be using the new workspace.

The new laboratory features advanced design in ventilation for improved air distribution. "The lighting is excellent and the lab is comfortable to work in," according to Ron Brenton, supervisory chemist.



New Workspace *– Jeff Stewart prepares herbicide samples for analysis in Organic Chemistry's new sample preparation laboratory.*

The laboratory is the home of the robotics preparation instruments used in the newly developed solid-phase-extraction methods. It also houses gel permeation chromatographic (GPC) instruments used to prepare samples for the NAWQA sediment technique.

In addition, the laboratory is equipped with advanced extract-concentration units, which help to protect the environment by making use of solvent recovery systems. Traditional sample preparation equipment, such as continuous extractors, also are used in the new laboratory.

Organic Chemistry Moves to New Lab *– Jim Trumbo (left to right) and Bruce Anderson operate robotic sample-preparation instruments while Mike McGinley sets up a gel permeation chromatograph. The new laboratory is on the second floor of the NWQL in Arvada.*

Field matrix spike kits

Over the past few months, the NWQL Laboratory Operations Program, Supply Management Unit (SMU), has become more involved in the support of spike kits for Water Resources Division field activities. Specifically, SMU assumed responsibility from the Methods Research and Development Program for ordering parts to make up the kit and for completing the assembly. In addition to the packing and shipping, SMU also will maintain the stock of volatile organic compounds and pesticide-grade blank water, and acquire new lots as needed for analytical purposes.

Spike kits, mixtures, and other components needed to conduct onsite-sampling studies are listed in the NWQL catalog. Orders should be placed via EDOC to DENSUPPL. Be sure to specify the exact items needed. Refer any support questions to Densupply at 303-467-8071.

Disposal of spent ampules and bores should be coordinated through Carlos Arozarena, safety officer, at 303-467-8035. These spent materials must be clearly labeled so the NWQL can identify, pretreat, and properly dispose of them.

by Will Lanier

Profile of the National Water Quality Laboratory

The National Water Quality Laboratory (NWQL) serves the Water Resources Division (WRD) of the U.S. Geological Survey. The WRD gathers data for determining the location, amount, availability, and quality of ground and surface water throughout the country. Nearly all of the water-quality results used in this effort are produced at the NWQL.

The NWQL analyzes organic and inorganic constituents in water, fluvial sediment, and fish tissue. In water year 1993, the NWQL processed over 850,000 analytical results for over 70,000 samples. The NWQL also coordinates an extensive network of contract laboratories for the analysis of radiochemical and stable isotopes and Department of Defense Environmental Chemistry (DODEC) work.

To manage the workload, the NWQL employs approximately 180 full-time employees throughout its programs and support units. About 30 students are also employed part-time through Federal Stay-In-School and Cooperative Education Programs. The NWQL also brings in district personnel on detail to help with the busy season, and has provided NWQL personnel to assist districts when appropriate.

A number of programs or units within the NWQL must coordinate their efforts in order for the Laboratory to effectively receive, analyze, review, and release sample data. Initially, all samples must pass through the Login Unit, where they are unpacked, labeled, and sent to the analytical areas for analysis. Generally, the samples are sent to either the Organic Chemistry or the Inorganic Chemistry Program where the samples are prepared and analyzed according to the requests indicated on the Analytical Services Request Form.

The Organic Chemistry Program receives samples for the determination of insecticides, herbicides, and industrial organic compounds. The program consists of three units: (1) Sample Preparation and Carbon; (2) Gas Chromatography (GC) of Water, Sediment, and Tissues; and (3) GC/Mass Spectrometry and High-Performance Liquid Chromatography. Samples requiring extraction are sent to the Sample Preparation Unit where water is extracted within 2 working days of receipt at the NWQL. Samples that can be analyzed without the preparation steps are sent directly to the analytical unit. Once samples are prepared for analysis, they, too, are delivered to the appropriate unit for analysis. After the analytical work has been completed, the results are delivered to the Computer Services Unit for processing.

The Inorganic Chemistry Program receives samples for the determination of metals, major anions and cations, nutrients, and physical properties. The program consists of five units: (1) Metals, (2) Plasma, (3) Majors, (4) Low Ionic Strength, and (6) Nutrients. Samples submitted for nutrient determinations are typically analyzed within 8 days of receipt at the NWQL. Requests for other determinations are processed by the units, and when completed, they are sent to the Computer Services Unit.

Analytical results for all of the samples received and analyzed at the NWQL are processed by the Computer Services Unit using the NWQL Laboratory Information Management System (LIMS). All field and laboratory data related to each sample are entered into the LIMS computer. Once all of the required information has been entered into the LIMS, the completed sample is automatically run through the quality- control (QC) data review program, which will review the data and verify ionic balance, compare field and laboratory values, compare results for dissolved and total constituents, and indicate if a

constituent concentration exceeds allowable standards. If a sample fails to pass any one of the prescribed QC requirements, it is automatically flagged by the system and passed on to the Quality Management Program (QMP) for review.

Field supplies for low-level inorganic protocol

Field supplies soon will be available from the NWQL to support the low-level inorganics protocol. New specifications for ultrapure ampules were developed by the Methods Research and Development Program and the Quality Management Group. An order for the new ampules was placed in August with Eagle Picher Environmental Services, which currently supplies all of the Laboratory's ampule needs. The ampules are expected by the end of October in time for a comprehensive quality analysis to ensure that NWQL specifications were met.

The standard 250-milliliter acid-rinsed polyethylene bottle will be used for the low-level sampling. An internal study was conducted by the NWQL, and concluded that these bottles are adequate for the new program. One obvious change is the clear cap that replaces the red cap previously used to designate acid-rinsed bottles.

Initially, the bottles will be packed in a box of 15 with a Ziplock plastic bag. The Ziplock bag should help reduce contamination by making it easy to reseal the bag after removing bottles.

by Will Lanier

Student intern shares enlightening experience

(EDITOR'S NOTE: The following article was prepared by Patrick Rasmussen, who recently completed a 1-month detail at the NWQL. Patrick has earned a bachelor's degree in civil engineering at the University of Kansas and is working on a master's in water- resources engineering at Kansas.)

I have been on detail working with the Quality Management Group (QMG) from August 17th to September 17th. On the first day of my tour, Tom Maloney, acting chief, QMG, introduced me to everyone in the group and to some of the people in the Inorganic Chemistry laboratory. Since then, I have worked with Kim Pirkey, QMG chemist. Other than a tour of the Organic Chemistry laboratory, Kim and I have worked diligently creating control charts and meeting deadlines. I have learned some methods of application for quality-control data, especially in relation to organic chemistry. My experience working with Kim has made me more aware of the importance of quality control.

On the next to last day of my detail, I am scheduled to work in the Organic Chemistry laboratory. It will be an enlightening experience to work in the lab and see what happens to samples after shipment. The quantity of samples that the NWQL handles this time of year is quite impressive.

When not on detail, I am a Student Hydrologist. Before I arrived in Colorado, I spent the summer collecting water samples from reservoirs and landfills.

This detail has been a valuable experience in meeting some of the people who work here and knowing what the Laboratory looks like and how it functions. Everyone I met was friendly and more than willing to explain their task and the equipment they use. I have gained appreciation for the work and the services that the Laboratory provides. I believe that my experience at the NWQL will make me a more competent hydrologist.

Not just another day on the job for NWQL chemist

(EDITOR'S NOTE: *Frank Wiebe, chemist in the Organic Chemistry Program and a NAWQA coordinator for NWQL, prepared the following report.)*

As one of the NWQL coordinators for the National Water-Quality Assessment Program (NAWQA), I had the opportunity to visit the Connecticut Valley drainage study-unit area this summer. The first half of this trip was spent in the Hartford, Conn., area where I saw the "field office" and spent a couple days learning about groundwater sampling. I met with a team from the Marlborough, Mass., office in White River Junction, Vt., for the second half of this trip to do some surface-water work in Vermont and New Hampshire.

I developed an appreciation of the work that goes into getting a sample to the NWQL: walking through poison ivy and pricker bushes; dealing with ticks and paper wasps that built their nest on a well cover; the "slow" well; the Teflon stainless steel bailer that wasn't working correctly; trying to find enough streambed material to go through a 65-micrometer screen; and shocking enough "target" fish for a good environmental sample when everyone's waders are leaking (actually I had the only pair without holes). Even after the old blue Suburban caught on fire, my thoughts always came back to getting the sample to the Laboratory.

The professionalism shown in following the protocols while dealing with the realities in a practical manner continues to amaze me as I think back on this adventure. I would like to thank everyone involved in making this trip come together and hope to be able to participate in similar projects in the future.

USGS methods of analysis published by Laboratory

The following approved methods were published within the past year by the NWQL. Other recent publications of interest also are listed:

Brenton, R.W., and Arnett, T.L., 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory--Determination of dissolved organic carbon by UV-promoted persulfate oxidation and infrared spectrometry: U.S. Geological Survey Open-File Report 92-480, 12 p.

Faires, L.M., 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory--Determination of metals in water by inductively coupled plasma- mass spectrometry: U.S. Geological Survey Open-File Report 92-634, 28 p.

Fishman, M.J., ed., 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory--Determination of inorganic and organic constituents in water and fluvial sediments: U.S. Geological Survey Open-File Report 93-125, 217 p.

Patton, C.J., and Truitt, E.P., 1992, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory--Determination of total phosphorus by a Kjeldahl digestion method and an automated colorimetric finish that includes dialysis: U.S. Geological Survey Open-File Report 92-146, 39 p.

Pritt, J.W., and Raese, J.W., eds., 1992, Quality assurance/quality control manual: U.S. Geological Survey Open-File Report 92-495, 33 p.

Sandstrom, M.W., and others, 1992, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory--Determination of organonitrogen herbicides in water by solid-phase extraction and capillary-column gas chromatography/mass spectrometry with selected-ion monitoring: U.S. Geological Survey Open-File Report 91-519, 26 p.

Watterson, C.A., and Kashuba, A.T., 1993, 1993 National Water Quality Laboratory services catalog: U.S. Geological Survey NWQL Technical Memorandum 93.04, 115 p. (Write directly to NWQL for copies of this catalog.)

Seminar announcements

Dr. Fritz Frimmel, University of Karlsrue, Germany, "Characterization of CODOC-- A Key for Understanding Aquatic Systems," July 21; Elizabeth Ann Rieke, Assistant Secretary for Water and Science, U.S. Department of the Interior, Robert M. Hirsch, Acting Director, USGS, and Bonnie A. McGregor, Acting Associate Director, USGS, "Comments on the Future of the U.S. Geological Survey and Transition Management," August 5; Hazel Ford and Sharon Johnson, NWQL, "Review of National Urban League Conference (Washington, D.C.) and FEW National Training Program (Las Vegas)," August 10; Kathryn M. Kuivila and Kathryn L. Crepeau, California District, USGS, "Pesticides in San Joaquin-Sacramento River Delta and San Francisco Bay," September 27; Sharon A. Fitzgerald, USGS hydrologist, Wisconsin District, "NOAA Cruise in the Gulf of Mexico and Manned Submersible Research in Lake Michigan," October 12.

Career/job fairs attract students

Doug Manigold, chief, Organic Chemistry Program, and Mary Owens, Administrative Division, attended the Career and Job Fairs, September 21-22, at New Mexico State University in Las Cruces, NM. Meanwhile, Ron Brenton, Bruce Anderson, and Cyrissa Adamson--all with NWQL--and Pat Pieti, Administrative Division, visited the Auraria Campus in Denver for the Campus Job Fair, September 22.

In addition, Ralph White, NWQL chemist, was invited by Marilyn Zimmerman, University of Colorado, to speak to students at the University of Colorado in Boulder for Career Week, September 27. The Career Fairs dealt with job opportunities with USGS and offered counseling to college students interested in careers in the earth sciences.

Newsletter Staff

Jon Raese, Editor

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