Supply Lines

A newsletter of the NHDES Drinking Water and Groundwater Bureau Spring 2007
on the web at *www.des.nh.gov/dwgb*

Arsenic Report Card - Year 1

State enforcement of the new arsenic standard of 10 parts per billion (ppb) or 0.010 mg/L (ppm) began January 23, 2006. In New Hampshire, 56 percent of the impacted water systems have installed treatment, while another 21 percent have implemented a blending or non-treatment strategy to meet the new standard (Figure 1). Even so, the Drinking Water and Groundwater Bureau (DWGB) issued 210 notices of violation and 50 letters of deficiency in 2006, to systems serving water with arsenic concentrations above 10 ppb.

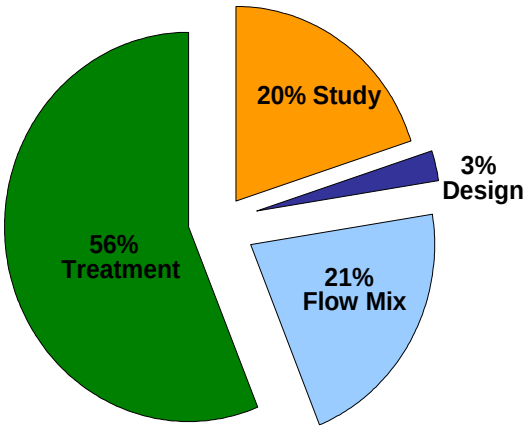

Figure 1 - NH Arsenic Compliance Strategies
191 total Community and Nontransient/Non Community water systems

Arsenic occurs naturally in New Hampshire's bedrock and is the 20th most abundant element in the earth's crust. A number of studies have documented the long-term health effects from arsenic exposure. Researchers at Dartmouth College and UNH are conducting studies to evaluate the health effects from arsenic in New Hampshire populations.

Most arsenic in groundwater is present as inorganic species, predominately a combination of arsenate (As V) and arsenite (As III) oxidation states. The relative concentration of each species, and the well water chemistry, are key to identifing treatment requirements. All treatment technologies are more effective for As V removal, because it is a negatively charged ion above pH 3. As III can only be weakly adsorbed or removed because it is an uncharged molecule in waters below pH 9. Pretreatment to convert As III to As V occurs within fractions of a second with a strong oxidant, such as chlorine or a manganese dioxide pre-filter.

DES recommends water systems exhaust all non-treatment options first, such as blending with existing or new water sources, because arsenic treatment involves significant capital and operational costs. If treatment is required, strategies to minimize costs and residuals handling include treating only a portion of the flow, lowering pH, and selecting technologies that produce the least residuals.

The DWGB has conducted several pilot tests to identify low cost alternatives to the traditional filtration technologies. These include:

- **Cartridge Filtration** – Achieved 10 percent average reduction and 22 percent average reduction when coupled with chlorination.
- **Blending with new or existing overburden wells** - If feasible, may require minimal capital and no increased operational costs compared to treatment.
- **Borehole modification for bedrock wells** – To seal off arsenic bearing fractures (see related article on page 5).

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Requirements for Discharges of Backwash Water from Arsenic Treatment Systems

Common design requirements for drinking water treatment systems that remove arsenic include frequent "backwash cycles" whereby treated water is pumped backwards through the arsenic treatment media in order to "fluff" the media or remove fine particles. "Fluffing" and removal of fine particles is done to improve overall system performance by reducing the amount of head loss across the treatment system, which has a tendency to build up over time.

After a cycle, water used for this purpose (referred to as backwash wastewater) is commonly discharged outside of the pump house or treatment shed onto the ground or into a small ditch or dry well. These types of backwash discharges are regulated under New Hampshire's Underground Injection Control (UIC) program and are required to be registered with the program as a non-domestically derived wastewater.

As part of a survey conducted in the summer of 2006, DES staff, through the UIC program, collected samples of backwash wastewater from numerous arsenic treatment systems in the state that use differing treatment technologies and media. The survey results indicated that backwash wastewater contains high levels of arsenic that is largely associated with fine particulate matter.

Therefore, as part of the UIC registration requirements for these types of discharges, backwash wastewater is required to be processed through a filter prior to discharge at the site in order to remove fine solids that contain arsenic. This also avoids the possibility of creating an arsenic "hot spot" and turning the backwash disposal site into a hazardous waste site. UIC registration requirements also require a one-time sampling of the filtered backwash wastewater to confirm that arsenic is below the acceptable discharge limits. The solids that are recovered from the backwash wastewater, along with spent treatment media, are required to be disposed of in an authorized solid waste facility.

For questions on the UIC discharge registration requirements, please contact Mitch Locker at (603) 271-2858 or mlocker@des.state.nh.us. For questions on the solid waste disposal requirements for special wastes generated by the arsenic treatment system, please contact Mike Guilfoy at (603) 271-6476 or mguilfoy@des.state.nh.us.

Water Supply Engineering Bureau Changes Name

The Water Supply Engineering Bureau's name has been changed to more accurately reflect its mission and responsibilities. The new name is the Drinking Water and Groundwater Bureau (DWGB). Programs within DWGB include Public Water Supply Supervision, Groundwater Withdrawal and Permitting, Water Well Board, Environmental Lab Accreditation, Groundwater and Surface Water Protection and Project WET (Water Education for Teachers). For more information on the DWGB; please visit us at www.des.nh.gov/dwgb or contact us at (603) 271-2513 or dwgbinfo@des.state.nh.us.

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Monitoring Updates

This spring, the Monitoring and Enforcement Section (MES) staff will be busy updating all systems' master sampling schedules to include sampling requirements through 2010. A postcard or email will be sent to systems when this project is complete.

We are working hard to save paper by increasing the use of electronic correspondence. If you have not already done so, please provide the Drinking Water and Groundwater Bureau (DWGB) with a new or updated email address. While enforcement actions must continue to be sent through the mail, we will try to communicate electronically whenever possible.

There will be some changes in the forms that accompany samples. First, the choices for sample types on the public water system analysis request form will change. In addition, since the chlorine residual must be measured at the time of a bacteria sample collection, a column will be added to document that information. We will notify you when these forms have been updated. Please remember to use them.

As more of your sampling data is transferred directly from DES lab and/or a private lab to DWGB database, it is becoming more and more critical that you report the sampling site name and site number accurately. If the lab does not have the exact name and site number, your data will not be transferred to our database. A rejection email will be sent back to the laboratory and the data will not be accepted until a correct match is found. While this transition time will be a challenge for all, MES will try to make the process flow smoothly.

DES OneStop web site allows you to obtain your updated schedule, make changes and/or updates to your system's contact list (see article below), determine whether we have given you credit for samples, and print out your analysis request forms. Please visit the OneStop website at www2.des.state.nh.us/OneStop/Public_Water_Systems_Query.aspx. If you have any questions about your system's monitoring schedule, please contact MES at (603) 271-2513.

Change of Address Form Goes Secure

Over the past few years, DES has been trying to make information more available to its stakeholders and clients, as well as to improve the quality of information. In the public water system realm, one way to improve the data accuracy is to allow system representatives to update data online. The Drinking Water and Groundwater Bureau has attempted this via the online *change of address* form, which has been somewhat successful.

However, a concern that has often been voiced is that the site is not secure. To address this concern and in hopes of providing PWSs more tools to update information, the *change of address* form is being moved to a secure location on DES OneStop website. Those opting to update data online will need to register as a OneStop data provider by applying for a PIN and password. If you are currently registered as a data provider, you will need to update your profile by adding "Update Public Water System Contacts" to your list of activities.

All data providers need to be approved by DES program personnel for specific activities. Once approved, you will receive notification through email. If approved, you will be able to immediately access this activity.

The new "Update PublicWater System Contacts" form replaces the *change of address* form and is the first of what we hope will be more tools for PWS representatives to update PWS information. The secure "Update Water System Contacts" form is available by visiting www.des.nh.gov/dwgb.

For more information or questions about this change, please contact Linda Thompson at (603) 271-3544 or lthompson@des.state.nh.us.

Security Corner

Install Security Measures for FREE

The Businesses United for Water Security Program has had two rounds of grants. Twenty systems have received approximately $94,868 in funds to install security measures. There is still money available and grant applications need to be submitted by May 1, 2007.

EPA has provided DES with $200,000 to protect small drinking water systems from intentional attacks. Water systems can receive up to $4,500 in grant funds to pay for installation of security measures. The grants do not cover materials. However, there are currently eight participating businesses that are providing anywhere from 10 to 25 percent off equipment and services. If one of the businesses is not in your area or does not fit your needs you can always present the Businesses United brochure to a business you have in mind and see if they would like to participate.

If you have any questions, please contact Johnna McKenna at (603) 271-7017 or jmckenna@des.state.nh.us. Applications and information regarding the program are available on the web at www.des.nh.gov/dwgb/buws.

New National Security Guidelines Available

The American Society of Civil Engineers (ASCE) and the American Water Works Association have released draft national standard guidelines for utilities to enhance their physical security. Two documents (one for drinking water and one for wastewater and stormwater) have been published for trial use and comment. The public comment period closes on June 30, 2007. The guidelines include recommendations for physical and procedural security improvements, as well as design and construction options for raw water facilities, wells, pump stations, treatment plants, water storage facilities, distribution systems, and support facilities. To view these documents, go to the ASCE website at www.asce.org/wise.

New Emergency Planning Software Tool

A new software tool, ICWater, can be used by incident commanders, water utility managers, and others to protect community drinking water sources from contamination during emergencies. If a chemical, radioactive or biological contaminant were accidentally or intentionally introduced into a surface water source, knowing what threat it posed to the public would be essential for incident commanders who direct first responders to mount an effective emergency response. ICWater is a computer–based tool that integrates multiple information sources and data for incident commanders at the scene of a surface water contamination. With this information, it quickly produces maps, tables, and charts that tell incident commanders if drinking water intakes are in the contaminant's path, and when and in what concentration the contaminant will reach the intakes. To learn more about ICWater and how it works visit http://eh2o.saic.com/icwater.

Emergency Interconnection Grants

For the past several years EPA has assisted states with security grants. Each state had to develop their own work plan to address their state's security and emergency planning needs and how they would spend the money. Some of the money that was received was used to award grants to water systems that wanted to conduct emergency interconnection and mutual aid studies. DES has awarded a total of ten grants over the past three years for such studies. Some studies involved two systems and others involved several communities. Grant money is still available for these types of studies. The grant funds can be used for planning only, not for actual construction. If your system is interested, please contact Bob Mann at (603) 271-2853 or rmann@des.state.nh.us or Johnna McKenna at (603) 271-7017 or jmckenna@des.state.nh.us.

Deepening of Community Public Water Supplies

In accordance with Env-Ws 378.24, "*Deepening a Small Bedrock Production Well to Regain Lost Well Capacity*," a water system must obtain approval from DWGB prior to deepening a small bedrock well that serves a community water system. Failure to obtain this approval may result in enforcement action by DES. Please contact Diana Morgan at (603) 271-2947 or dmorgan@des.state.nh.us for more information about bedrock well deepening requirements.

Arsenic Report Card continued from page 1

Backwash from arsenic filters must be treated to remove arsenic laden solids prior to onsite discharge. Arsenic residuals must be tested using the toxicity characteristic leaching procedure and handled as a special waste, per Env-Sw 903 rules (see related article on page 2).

For additional information please visit www.des.nh.gov/dwgb/capacity or contact the DWGB at (603) 271-2513 or dwgbinfo@des.state.nh.us.

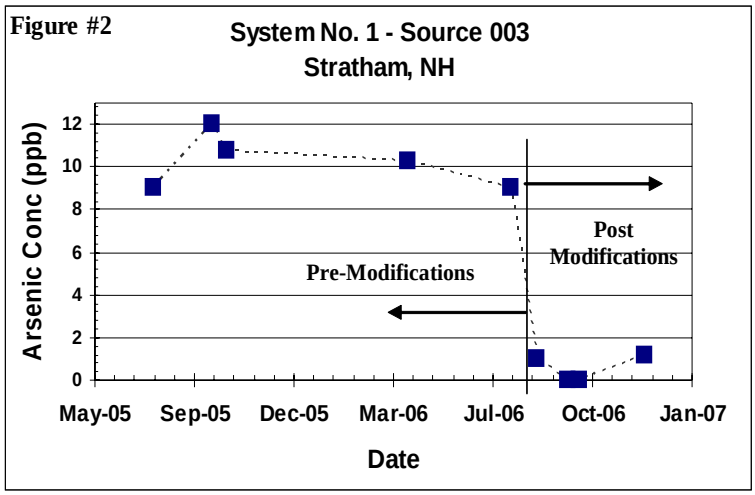
Borehole Modification: A Potential Geologic Solution For Arsenic Compliance

After a review of historic water quality from community water systems with multiple bedrock wells, DES decided to undertake a project (funded through EPA) that examined whether different water-bearing fractures in a borehole (well) produce differing arsenic concentrations, and, if so, whether water-bearing fractures with particularly high arsenic concentrations could be blocked off, resulting in a well that produces water in compliance with the 10 ppb arsenic standard.

To do this, DES first chose three water systems with histories of water quality results indicating a stable arsenic concentration in excess of the 10 ppb standard. Then, a geophysical profile of each system's water supply well was recorded and used to generate a vertical "map" of the location of fractures in each water well. Once the fracture locations were known, DES staff collected groundwater samples from each well at discrete depths, consistent with the fracture locations, in order to identify those fracture zones where arsenic was at its highest concentration.

At two of the three water systems tested, fractures that produced high arsenic concentrations were blocked off using standard well seal materials. The well at the third system tested was not modified due to its low water yield. The results at one of the two systems where the well was modified (see Figure #2) indicate that the method successfully reduced arsenic concentrations produced by the well to below the drinking water standard. However, the second system's results do not appear successful, implying that this method will not work in all geologic environments.

For further information regarding the borehole modification pilot test and results, and to discuss whether or not this may be worth evaluating at your system, contact Stephen Roy (603) 271-3918 or sroy@des.state.nh.us.



Moving On with DBP2 and LT2 Rules

In recent issues of *Supply Lines* it was mentioned that two new federal rules, DBP2 and LT2, will become effective soon. Implementation has started with the state's largest water systems, and deadlines are now on the horizon for smaller systems.

The LT2 (Long Term 2 Enhanced Surface Water Treatment Rule) and the DBP2 (Stage 2 Disinfectants and Disinfection Byproducts Rule) will be adopted into New Hampshire state rules over the coming months. Requirements of these rules are phased in over a period of years according to system service population and type (community or non-transient non-community). The LT2 Rule applies only to systems with a surface water source, while the DBP2 applies to all systems which add a chemical disinfectant.

DBP2 monitoring for most systems will begin in 2013. Disinfection byproducts monitoring continues under the current DBP1 protocol until that time. However, certain DBP2 implementation activities are required earlier, with the state's surface water supplies affected most. Surface water systems serving more than 500 need to prepare an initial distribution study evaluation (IDSE) to determine the locations of the highest Total Trihalmethanes (TTHM) and Haloacetic Acidds (HAA5) in the distribution system.

Groundwater systems will also have some DBP2 Rule requirements. However, they will be relieved of the IDSE requirement through either a very small system waiver (for systems serving fewer than 500) or a '40/30 certification' for systems with TTHM and HAA5 consistently less than 40 mg/L and 30 mg/L, respectively, over an 8-quarter period.

The LT2 Rule will require source water monitoring for *Cryptosporidium* and *E. Coli* for systems serving more than 10,000 and *E. Coli* monitoring for smaller systems.

The Drinking Water and Groundwater Bureau mailed information packets to surface water systems informing them of required activities to be completed in the near future. The packet included an invitation to a workshop on April 17 from 8:30 to 12:30 in the DES auditorium in Concord. The workshop will include valuable information on rule implementation plus technical sessions on disinfection byproduct reduction strategies for systems serving fewer than 50,000 people. To register, please contact Kathy Drake at (603) 271-2513 or kdrake@des.state.nh.us. If you have specific questions on the DBP2 and LT2 rules, please contact Bob Mann at (603) 271-2953 or rmann@des.state.nh.us.

CCR Data Changes

The 2007 Consumer Confidence Report (CCR) reminder letters are being mailed to all community water systems in mid March. Please remember that sampling data from outside labs will not be available on DES OneStop website. You will need to use the hard copies of sample results sent to the water system by the laboratories. Water systems are required by Env-Ws 304 to retain their sampling results for five to 12 years depending on the contaminant. For more information, please visit www.des.nh.gov/dwgb/ccr.htm or contact Richard Thayer at (603) 271-2950 or rthayer@des.state.nh.us, or Rebecca Presby at (603) 271-2516 or rpresby@des.state.nh.us.

Annual Workshop Announced

On May 23, 2007 the DES Drinking Water Source Protection Program will hold its annual workshop at the Sweeney Auditorium at the New Hampshire Technical College in Concord at 9 a.m. The workshop is geared for local officials and water supply managers to get the latest information on how to better protect water supplies from existing or potential pollution sources.

For more information or to register, please visit www.des.nh.gov/dwspp or contact Pierce Rigrod at (603) 271-0688 or prigrod@des.state.nh.us.

Drinking Water Enforcement Activity in 2006

Ensuring that public water systems stay in compliance with state and federal regulations is an important role. To help systems remain in compliance, the Drinking Water and Groundwater Bureau (DWGB) offers many types of assistance such as technical training seminars, telephone and field technical assistance, fact sheets, monitoring reminder postcards, financial assistance, and more. Occasionally, however, contamination issues or repeated violations of regulations require DWGB to take enforcement action.

In 2006, DWGB issued 225 letters of deficiency (LODs) to public water systems. An LOD is a formal letter, sent by certified mail, that identifies violations of specific regulations and requests the water system owner to bring the system back into compliance within a specified time period. As in past years, the largest group of LODs (70) was issued in response to repeated bacteria maximum contaminant level (MCL) violations. Another large group of LODs (43) was issued for exceeding the Arsenic MCL (see related arsenic article on page 1).

DWGB also issued three administrative orders (AOs) in 2006. An AO is generally issued in response to particularly serious violations or when a system continues to incur violations after receiving an LOD. An AO is a legally enforceable document that requires the water system owner to accomplish specified actions within a specific timetable. Failure to comply with an AO may result in an administrative fine (AF) or the referral of the case to the Attorney General's Office. Most AOs are recorded with the proper county registry of deeds to alert potential property buyers and financial institutions of compliance issues at a water system. The three AOs issued in 2006 were in response to repeated sampling and public notice failures, recurring chemical MCL violations, and the failure to maintain chemical treatment equipment resulting in additional MCL violations.

DWGB issued five administrative fines (AFs) in 2006. An AF imposes a monetary penalty for regulatory violations and is generally reserved for more egregious violations. The five AFs were issued to water well contractors for violations pertaining to the Water Well Program within DWGB. The AFs issued in 2006 involved drilling wells without a license, well placement violations, well construction violations, and submitting well completion reports late. Two of the fines were settled through supplemental environmental projects. In these cases, DES and the licensed water well contractors worked in conjunction with the Alstead flood relief volunteers to secure new wells for families that needed assistance.

DWGB also has the authority to require public water systems to issue boil water orders for a variety of situations, with the discovery of *E. coli* or fecal bacteria being the most common reason. In 2006, DWGB required 24 water systems to institute boil water orders. As in the previous year, two additional municipal systems voluntarily instituted boil water orders when they discovered situations that could lead to bacterial contamination, even though contamination had not been found.

For more information on enforcement issues, please contact Alan Leach at (603) 271-2854 or aleach@des.state.nh.us, or Emily Jones at (603) 271-0659 or ejones@des.state.nh.us. LODs, AOs, and AFs issued by DES programs can be viewed on-line at www.des.nh.gov/legal/documents.

Assistance When You Need It

National efforts have been underway to establish statewide Water and Wastewater Agency Response Network (WARNs) systems that create a formalized system of utilities helping utilities during emergencies or disasters. California, Florida, Texas and Louisiana have already formed state WARN systems and many more states have started the process to create their mutual aid networks. New Hampshire already has its own mutual aid network which was developed in 1998 and currently has 90 member communities. The New Hampshire Public Works Mutual Aid program is coordinated by the UNH Technology Transfer Center. The program was used most recently during the October 2005 floods and the August 2006 storm in North Hampton. Water systems are urged to participate in this important program. More information can be found at www.t2.unh.edu/ma. In addition, EPA has also recently initiated an effort to develop a New England WARN.

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Chemical Monitoring Waiver Program Revamped

Over 76 percent of community and non-transient, non-community systems participate in the Chemical Monitoring Sampling Waiver program, which can reduce volatile organic compound (VOC) and synthetic organic compound (SOC) sampling requirements. This program can save water systems hundreds of dollars per year in reduced sampling and helps minimize the risk of future contamination. Part of the program's requirements involve renewing the waivers every three years and distributing educational materials to businesses and homeowners within the system's drinking water protection area to educate them on how to protect their drinking water.

Sample year has always been based on the last year the system sampled, and the waiver renewal year was based on the initial date that the system applied to the program. Consequently, many systems' VOC/SOC sampling schedules are out of sync with their waiver renewal schedule. In an effort to synchronize the two schedules the Drinking Water and Groundwater Bureau is allowing some systems more than three years before a renewal is due, while some will have a little less and some will not see a change. It will take three years to get all the systems on this new schedule. With all the changes, please read the applications and approval letters carefully. The applications and educational materials have been updated. Also, in the near future applications will be available for download on the website. We appreciate your patience during this transitional period and hopefully this will reduce confusion and unnecessary sampling in the future.

More information regarding the waiver program can be found on the program website at www.des.nh.gov/dwspp/waivers.htm. If you have any questions, please contact Johnna McKenna at (603) 271-7017 or jmckenna@des.state.nh.us.