NewsLeaks
FALL 2005
Rural Water
Supporting Rural Water in Massachusetts, New Hampshire and Vermont since 1982

Improving Operations with SCADA

by Scott Clang

One of the most efficient tools that water systems and their operators use to provide drinking water service is the SCADA system. An acronym meaning Supervisory Control and Data Acquisition, SCADA is an electronically operated telecommunication and control system made up of controllers, data-logging memory, transmitters and receivers.

With SCADA, operators can monitor and adjust the operation of pumps, treatment processes and valve operation directly from a computer anywhere they choose. Security features and alarms can be built in. SCADA systems have seemingly unlimited capacity in retrieving data and controlling operations. It all depends on how many data or control functions or "I/O points" (input or output) you decide are needed in your particular situation.

The system has the ability to measure, track trends, alternate control functions and monitor operational parameters such as on/off events, level, and flow and pressure values. The controller can be set up to send e-mails, faxes, pagers or start a telephone tree notification based on any level of priority.

Software packages can easily store data-logging information. The system can have the ability to communicate alarm points based on the level of response needed, and it can be easily incorporated into your emergency response needs.

This SCADA system controls and monitors two well fields (total of 5 wells), two elevated storage reservoirs, a booster pump station, and incorporates some radio communication as well. Although this panel is up on a mountainside, the staff can remotely control and monitor the entire system from their office or home. (Photo courtesy of Ron Gehl, P.E., EOS Research)

SCADA provides all this capability while being easy to use. "These systems are designed so that operating SCADA doesn't overwhelm the user and keep attention away from actual system operation," says Ron Gehl of EOS Research Ltd.

Utilizing SCADA to track well production and consumer flows has been a huge success at Sunapee Hills Association in Newbury, NH. Jim McDonough, Director of the water system, says "SCADA has been a valuable asset in efficiently operating the water system."

For years the Association has been on water conservation programs to balance its fragile resources with consumer demands. With the addition of SCADA, they've been able to monitor real

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Preparing Your School Water System for the Year

by Paula Jackson

The fall 2005 school year is just around the corner. Many schools offer summer programs, which maintain a steady flow of water throughout the year. Others see a major reduction in water use in the summer, which leads to stagnation of water in water storage tanks and throughout the distribution system. What can you do as an operator to ensure that the water will be safe for students?

Inspect your water system

Start your inspection at your water source. Look for contamination issues such as a loose sanitary seal on your well head. If you have a spring, make sure the

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Kevin Colby stands with Paula Jackson outside of the water storage tank inspection hatch at the Waterford School in Waterford, Vermont. (Photo by Elizabeth Walker.)

A publication of:
- Massachusetts Rural Water Association
- New Hampshire Rural Water Association
- Vermont Rural Water Association

Who We Are

Rural Water started supporting water and wastewater systems in Massachusetts, New Hampshire and Vermont in 1982. We provide many services, including training, source protection planning, and onsite assistance through our experienced staff. Massachusetts Rural Water Association (MRWA), New Hampshire Rural Water Association (NHRWA), and Vermont Rural Water Association (VRWA) collaborate on this newsletter.

Publication Staff
John Lukin, Sarah MacMillan, Heather Shea and Michael Wood-Lewis

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Executive Notes

Surrounded by Good People!

The Rural Water Associations in Massachusetts, New Hampshire and Vermont each have something special going on.

Each is governed by a volunteer board of directors elected from the member water and wastewater systems. These are folks who know our industry firsthand and have decided to step up and make an extra contribution for the good of all. In these days of shrinking civic engagement, our directors often find themselves serving many volunteer roles... in their towns, churches, industry, schools... you name it. So hats off to our directors and a special thanks to Peter Leidt and Dave Brennan who should be drawing hazard pay for some recent duties.

Our staff in each state are the folks the reader is most likely to know... so 'nuff said. These are great people... hard working, willing to help. I'm in a good mood today... I'm even willing to say something nice about those crusty Circuit Riders. I'll stack up our New England field staff against any others in the country.

Of course, this trend isn't limited to Rural Water. We're lucky to work with an array of solid partners in our region at the agencies, vendors, other nonprofits, etc. It's wonderful to work with so many of you.

Finally, of course, the soil in which all of this good will grows is the backbone of the industry... the operators. Ruth Taylor, who retired from VT Water Supply Division last year, said it best when she wrote the local newspapers to say that by and large our operators are salt-of-the-earth kind of people... someone you'd be proud to call a neighbor and a colleague.

Michael Wood-Lewis, Executive Director, can b reached at ext. 304, or mwood-lewis@vtruralwater.org

A Warm Welcome to Our Newest Members

Dairy Center
East Thetford Water Company
Elm Brook Village
Harwich Water Department
Hemlock Ridge Water System
Sonnenberg Water Company
Town of Wayland
Waterbury Village
Whately Water District
Winnstock Condominium Assn.
Pike Water Works
Lake Bomoseen Campground
Sherburne School

"That'll stop that leak!" Circuit Rider Jay Matuszewski is on the scene after a hydrant in Lancaster, New Hampshire was struck by a truck in the wee hours of the morning.

Source Protection Specialists Rebekah McDermott (MA) and Jack Shields (NH) take a much needed break at the registration table of Rural Water's Trade Show & Training Event at Lake Morey Resort in Fairlee, Vermont last spring.

Letters

New Hampshire Rural Water Association has again provided the Town of Meredith Water Department with valuable assistance in protecting our surface water supply. With out their assistance and particularly Jen Palmiotto, I doubt the Waukewan Protection Plan would have gotten to the stage it is at now. Thanks Jen!

Bob Hill
Water Department Superintendent, Meredith, New Hampshire

On behalf of the Planning Board of the Town of Worthington, Massachusetts, I'd like to express our appreciation of the process we went through with Rebekah McDermott, Source Protection Specialist with MRWA, in the development of a Source Water Protection Plan for the town.

Rebekah is highly organized and a very effective advocate for the importance of increased community awareness of the sources of our water supply, the existing and potential threats to its quality, and planning for its protection. She kept us on a rigorous work plan over the winter and early spring, which included a number of meetings with the Planning Board and with the larger Source Water Protection group, a tour of the Worthington Fire District Water System, and a public information SWPP workshop at the local school.

The process we went through with Rebekah, which we understand is being replicated all over the region, is immensely valuable in increasing consciousness of the significance and realities of our water supply, and in alerting us to the ongoing need for stewardship on a number of levels as we aim to protect one of our most vital natural resources. Now we must turn to the question of how to continue this important work.

Thanks to both you and Rebekah for the leadership you are providing in this area.

With best regards,

Jane Christensen
Worthington Planning Board Chair, Worthington, Massachusetts

This letter is in regards to Elizabeth Walker. I first had the pleasure of working with Elizabeth in the fall of 2003 when Beeman Elementary School applied for funding to upgrade our water system.

As an elementary school principal I feel very at ease with children and curriculum and quite inadequate in the area of facilities and most specifically in the process we were about to undergo at that time. From the first meeting to review the Drinking Water State Revolving Fund program, Elizabeth was there to support me; literally walking me through the process, assisting me in filling out forms, creating documents to ease the reporting requirements and calling often to check in to see how things were going. What an incredible asset you have in Elizabeth. I have found her to be very professional, highly knowledgeable, detail oriented, with a sense of humor and patience that immediately builds rapport with novices such as me. Your organization is lucky to have her!

Debora L. Price
Beeman Elementary School Principal, New Haven, Vermont

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Continued from page 1.

time well operation and system demands on a 24/7 basis and alternate their three wells throughout the day automatically.

This effort has resulted in a 25% increase in well yield because, with SCADA, they were able to plot out each well's flow and drawdown versus total system demands to come up with an alternating operation that provides enough water during high demands and reduces the number of hours the wells operate.

Chuck Dennehy, a Board member at Moody Point Association in Newmarket, New Hampshire relies on SCADA to give decision-makers better information to make those tough decisions for future growth. Shortly after their system was installed by Simpro, they found that the wells were being over-pumped and breaking suction at the well pump, indicated by a higher than normal amperage draw of that particular well pump motor circuitry. Each well is monitored for electrical demands as well as flow and drawdown. By customizing operation, the SCADA system now shuts down the well before water reaches a critical level in the well; it measures the recovery of water levels and automatically turns the pump back on at a safer level.

Do your water mains look like this after 112 years of service? (Photo courtesy of Dick Kilhart.)

Leak detection has also been priority at Moody Point, and reliance on SCADA to provide faster indications that flow is increasing saves precious resources. Before installing a SCADA unit, it could have taken up to 6 days to isolate leaks in the system. "Now it takes 3 hours," states Dennehy. Dennehy says keep it simple. "Why make life complicated?" SCADA certainly can make life less complicated, but it does not fully replace human contact with the system.

SCADA can reduce the overall operating expense of any system by reducing electrical costs, chemical demands, unaccounted-for water and wear and tear of pumps and motors and labor cost. Gehl indicates "operators can gain confidence in the system to manage on-site and remotely operated functions of daily operations."

SCADA cannot, however, completely replace on-site visits from operators. Physical inspection of the stations and operation of instruments still need periodic maintenance. Probes need calibration and chemical feed equipment needs cleaning, etc.

If you decide to "make life simpler" at your water system, then consider adding Supervisory Control and Data Acquisition. Do your homework and ask questions pertaining to your present situation and future goals. SCADA can make the operation of your system more efficient and save money down the road. But remember, it will not totally replace human interaction. There is nothing more valuable than a well-trained, experienced water system operator at the helm.

Scott Clang, NHRWA Water Systems Specialist can be reached at ext. 314, or at sclang @nhruralwater.org

Using Aeration for Treating Your Public Drinking Water Supply

by Heather Shaw

Aeration is a process that releases gases from drinking water by forcing them to have direct contact with air. Aeration is an effective treatment for removing radon and volatile organic chemicals (VOCs) such as petroleum products, MtBE and disinfection byproducts. Taste and odor problems caused by hydrogen sulfide or various organic materials (the latter more commonly associated with surface water sources) are also removed by aeration. Even lead and copper problems can be improved by aerating the water.

Aeration is probably the most effective means of treating for radon. Since radon is a gas, it would rather be in the air than in the water. Aerating the water and venting the gas effectively removes the radon from a water supply. Usually waterfall or bubble aerators are used for radon mitigation.

Hydrogen sulfide (rotten egg smell) is a gas often present in water from aquifers that have significant amounts of sulfur present in the bedrock. Since it is caused by bacteria that dwell there, many people will try to eliminate hydrogen sulfide by disinfecting their water system. Although disinfection will kill the bacteria that is causing the odor, it is often a short-term fix, because the odor-causing bacteria will return.

Since these bacteria are not known to cause any harmful health effects, aeration is often the best long-term treatment solution for constant removal of the hydrogen sulfide gas they produce.

Another application for aeration treatment you may not have heard of is for lead and copper. In most cases lead and copper do not naturally occur in the source water itself, but rather leach out of metal plumbing. This phenomenon is common with water sources that have low pH and/or alkalinity. Warmer temperatures increase the chemical reaction that causes the metal to leach into the water.

Since pH, alkalinity, and temperature are the main things that cause lead and copper problems in drinking water, those parameters are analyzed to determine what type of treatment is needed. Generally, systems add chemicals to raise pH and/or alkalinity to make the water less corrosive.

	Temperatures (C)						
pH	5	10	15	20	25	30	35
6.0	2.915	2.539	2.315	2.112	1.970	1.882	1.839
6.2	1.839	1.602	1.460	1.333	1.244	1.187	1.160
6.4	1.160	1.010	0.921	0.841	0.784	0.749	0.732
6.6	0.732	0.637	0.582	0.531	0.495	0.473	0.462
6.8	0.462	0.402	0.367	0.335	0.313	0.298	0.291
7.0	0.291	0.254	0.232	0.211	0.197	0.188	0.184
7.2	0.184	0.160	0.146	0.133	0.124	0.119	0.116
7.4	0.116	0.101	0.092	0.084	0.078	0.075	0.073
7.6	0.073	0.064	0.058	0.053	0.050	0.047	0.046
7.8	0.046	0.040	0.037	0.034	0.031	0.030	0.030
8.0	0.029	0.025	0.023	0.021	0.020	0.019	0.018
8.2	0.018	0.016	0.015	0.013	0.012	0.012	0.011
8.4	0.012	0.010	0.009	0.008	0.008	0.008	0.007

Factors for calculating carbon dioxide concentrations in water with known pH, temperature and alkalinity.

One thing that should always be tested for is carbon dioxide. Dissolved in water, CO2 produces a weak acid (carbonic acid), which will lower the water's pH. Often, water systems will install a chemical injection treatment system and will still not be able to make the water non-corrosive. Some systems spend a lot of time and money troubleshooting their treatment process to get it to "work properly" when it is already doing so based on the water quality information they have.

High levels of CO2 often go hand in hand with pH, alkalinity, and temperature problems. By doing some simple calculations using these values (data the system should have on file) and the chart in this article, you can determine if CO2 may be a significant corrosion factor. If it is, adding simple aeration will remove the CO2 and raise the pH.

Using the chart is simple. If a system's water has a pH of 6.2, a temperature of 10 degrees Centigrade, and an alkalinity of 9.2, the chart points to a "factor" of 1.602. To calculate CO2, multiply the alkalinity by this "factor." So, (9.2) (1.602) = 14.7 mg/L CO2.

If the raw water's pH and alkalinity aren't too low, aeration alone may be all that is needed to meet the lead and copper standards. Otherwise, aeration combined with chemical pH and alkalinity adjustment should do the job.

The nice thing about aeration is there are no chemicals to purchase or handle, and it is easy to monitor, run, and maintain. Downsides include electrical costs, space needed for installation, and the possibility of oxidizing metals such as iron and manganese.

Adding oxygen to water high in dissolved metals will cause the metals to form solid particles that discolor the water, coat plumbing fixtures and plug up pipes over time. For raw water with high metal concentrations (iron and manganese are very common in New England) a softener may be needed before aeration to remove any such hardness from the water.

Heather Shaw, NHRWA Water Systems Specialist can be reached at ext. 330, or at hshaw @nhruralwater.org

Efforts Under Way to Protect the Waukewan Watershed

by Jennifer Palmiotto

In June, the Waukewan Watershed Advisory Committee approved a watershed management plan to help protect water quality in the 8,275 acre (12.9 sq. mi.) Waukewan Watershed. Portions of five New Hampshire towns (Ashland, Center Harbor, Holderness, Meredith, New Hampton) make up the Waukewan and there are four active public water systems in the watershed. Meredith draws its drinking water directly from Lake Waukewan. Mayo Farm Camping Area, Waukewan Golf Course and Annalee /Main Plant pump their water from bedrock wells.

Used for fishing, boating and swimming, Lake Waukewan has been Meredith's drinking water source since 1895. The Meredith Water Department serves approximately 3000 people, with ten percent of its 990 service connections classified as commercial. The conventional filtration plant has a one million gallon per day capacity. Right now the system uses about 400,000 gallons per day (gpd) on average, increasing to 450,000 gpd during the summer months.

The timing for this watershed protection project was perfect because the lakes are still in a relatively healthy condition. Data provided by the Volunteer Lake Assessment Programs for Lake

The Waukewan Watershed Advisory Committee and Jennifer Palmiotto (right, front) at the watershed management plan signing.

Waukewan, however, show that changes are under way which raise concerns. These concerns include:

-Low dissolved oxygen concentrations in the lower layer of the lake (hypolimnion)
-Increasing phosphorus concentrations in the hypolimnion
-High conductivity values
-An increased occurrence of algae blooms and toxic algae
-Elevated sodium and chloridconcentrations.

Because ground water and surface water are connected, protection of the watershed benefits all types of drinking water systems, whatever their source. Protection efforts, such as watershed planning, help to minimize the likelihood that contaminated water will enter a drinking water system. NH DES recommends that source protection plans be implemented for all public drinking water supplies. These plans should include management activities such as public education and land protection. One of the goals of the Waukewan Watershed Management Plan is to reduce the risk of contamination entering drinking water systems.

Following a water quality workshop facilitated by New Hampshire Rural Water Association, an advisory committee was appointed by the Meredith Board of Selectmen to address concerns in the watershed. The sixteen-member committee included a variety of interests, representation from all five communities, and members of municipal boards. Their charge is to:

1) Identify potential risks to water quality within the watershed;
2) Assess and prioritize potential risks;
3) Propose recommendations to address these risks;
4) Develop a watershed management plan which incorporates the previous three items, and
5) Present the watershed management plan to the Meredith Board of Selectmen and the watershed communities.

After developing an inventory of potential sources of contamination and a risk priority-setting process,

Continued on page 7.

$74,000 Water Bill

In the city of Mascoutah, Illinois, the utility department claimed resident Rose Mary Cook used 10 million gallons of water during the month of June, charging her $29,787 for water, $43,581 for sewer, plus $893 for municipal tax. A broken meter was found to be the reason for this snafu, and a corrected bill of $32.66 was promptly issued.

Said Cook, "I could have filled every pool in southern Illinois and still not used that much water."

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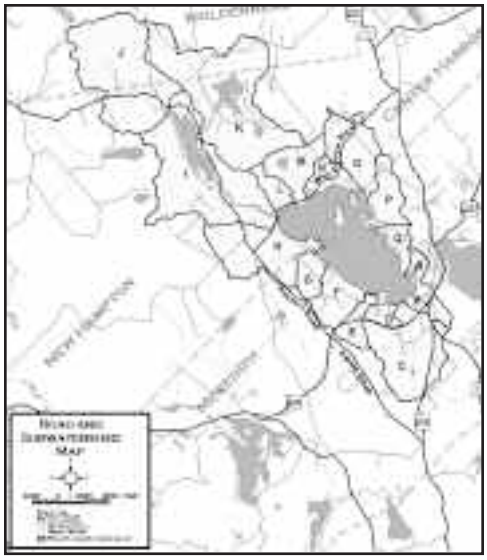
the committee developed a list of the following priority concerns:

-Site Development and Lot Conversion
-Agricultural Land Use
-Recreational Activities
-Residential Land Use
-Transportation Corridors
-Stormwater Management
-Utility Rights-of-Way

The Committee then came up with thoughtful recommendations to address the associated risks. For example, the members were worried about pollution from failing or malfunctioning septic systems. They recommended that a septic system inspection program be developed and implemented in the 250-foot shoreline around Lake Waukewan. The goal of this program is to identify failed systems in order to promote system repair or replacement.



A map showing the Waukewan Watershed.

Another concern was pollution from motorboat engines. Inefficient two-cycle engines in particular exhaust 30% of their fuel unburned directly into the water. The gasoline constituents of the exhaust include benzene, toluene, ethylbenzene, xylene and MtBE. The Committee recommended that "After careful consideration, implement a phased requirement prohibiting 2-cycle carburetored engines on Lake Waukewan."

"In my ten years of source protection work I have never seen a more dedicated, harder working local team," Paul Susca of NHDES commented about the advisory committee. "The WWAC has demonstrated what's possible when a local leader has the vision, determination and skill necessary to bring together an enlightened water supplier, a motivated and knowledgeable local group, and expert technical support such as NHRWA provided."

Jennifer Palmiotto, NHRWA Source Protection Specialist can be reached at ext. 325, or at jpalmiotto@nhrural

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cover is sealed to prevent contamination. Take a look at the "Big Picture". Has anything changed within your source protection area?

Inspect Your Water Storage Tank

Check your vent on your water storage tank. Is it screened properly? Next, open the inspection hatch and take a peak inside. Is your inspection hatch seal keeping insects out? If not, consider replacing the old seal with a new one that will.

Using a flashlight, check for sand/silt buildup on the floor of the tank. Even a small amount of sediment makes a great hiding place for bacteria. Consider having your tank cleaned if this is an issue.

If you have a cement water storage tank, look for pieces of cement or sealant that have fallen to the floor. If you see any, this indicates that repairs may need to be made to ensure no groundwater is entering your water storage tank. Water storage tanks are considered confined spaces and should only be entered by personnel with the proper training and safety equipment.

Inspect Your Distribution System

Start your inspection where your water line enters your building. Look at any pressure tanks, valves and meters. Any leaks? Any contamination issues? If you have a treatment or disinfection process, check out all the components and be sure they are working properly.

You may have a sprinkler above your boiler that is connected to your water distribution system. Is there a backflow preventer on this line? This is considered a dead end line as water sits in it without moving. If you lose pressure in your distribution system, this stagnant water may be back-siphoned into your drinking water distribution system, possibly causing contamination issues and discolored water. Walk through your school, looking at the water lines if possible.

Elizabeth Walker assists Kevin Colby with some sanitary survey paperwork. (Photo by Paula Jackson.)

What maintenance should you do to prepare for the new school year?

Any repairs to your source, storage tank and distribution system should be completed, including tank cleaning.

You should flush out your water system. If you have a large water storage tank, chances are this water may have been in there for a while. Open all fixtures, such as sinks and hose faucets, and let the water run until you think the water in the storage tank is fresh and the lines are flushed completely.

Collect a total coliform sample and send it in to the lab well in advance of school startup. When you get your negative results back, you are ready for a new school year!

If you have any questions or would like some assistance in preparing your school water system for the upcoming year, just call Rural Water!

Paula Jackson, VRWA Water Systems Specialist can be reached at ext. 332, or at pjackson@vtruralwater.org

NH Update

Private Water Systems Charge Higher Rates in New Hampshire

The Department of Environmental Services has released its latest rate survey and found that private water systems in New Hampshire tend to charge more than their public counterparts. This includes the higher than average rates charged by Pennichuck Water Works, which is currently fighting a proposed eminent domain takeover by a consortium of towns led by the city of Nashua.

Certification Exams

Water Works Operators
October 13, 2005
Health & Human Services Building, 6 Hazen Drive, Concord
(Registration deadline: 30 days prior)

Wastewater Operators
December, 2005
Franklin Wastewater Treatment Center, Franklin
(Registration deadline: TBA)

For more information:

Water: Contact the Water Supply Engineering Bureau at 603-271-2410 or visit their website at www.des.state.nh.us/wseb (exam applications may be downloaded from website).
Wastewater: Contact Brian Hilliard at the Wastewater Engineering Bureau, 603-271-2586.

VT Update

Vermont Water System Rule Update and Sampling Seminar

by Shaun Fielder

VRWA continues to offer the Water System Rule Update and Sampling Seminar for community and non-transient non-community water systems. Water operators receive five training contact hours and all systems with a service population of

VRWA Circuit Rider, Brent Desranleau uses a leak correlator to help a water system in Manchester, VT. This piece of equipment was funded by a grant from Efficiency Vermont.

3,300 or less receive a one-time $500 testing voucher. Any (and only one) representative from the system is eligible to attend in order to take advantage of the training and to receive the voucher. This one-day training focuses on recent changes in the Safe Drinking Water Act and Water Supply Rule. In addition, hands-on sampling techniques are presented. Officials from the Water Supply Division, VT Department of Health and independent labs participate in the training, which VRWA appreciates. To check on opportunities to attend this training as well as others, please refer to our online training calendar at www. vtruralwater.org.

Certification Exams

Water Operators
November 2, 2005
- Cyprian Training Center, Waterbury
- Howe Center, Rutland

Class 2: 9:00 AM - 12:00 PM
(Registration deadline: Oct. 28)
Class 3, 4, D: 1:00 PM - 4:00 PM
(Registration deadline: October 14)
Wastewater Operators
October 5, 2005
- Holiday Inn, Rutland
-St. Leo Hall, Waterbury

For more information, contact VT DEC:

Water: Bryan Redmond, Water Supply Division: 802-241-3415, bryan.redmond@state.vt.us. Water exam applications can be downloaded from www.vtdrinkingwater.org.
Wastewater: Carole Fowler, Wastewater Management Division: 802-241-2369

MA Update

by Lynda Laine

The water operators renewal application for the 2006-2008 period will be coming due by the end of 2005. The new requirement for the renewal process is to include proof of the required amount of training credit hours (TCHs) or Continuing Education Units (CEUs) for your certification level. If you are a VSS level then copies of certificates exhibiting ten TCHs need to be attached to your renewal application or it will be rejected. Please take the time now to find your TCH certificates or find out the locations of trainings in your area this fall that you could attend. View MRWA's online training calendar at www.neruralwater.org/train_sched-ma.php. The end of the year will be here before you know it.

The Copper and Lead Program critieria has been updated. Your plan site selections will have to be submitted to your regional DEP Program Coordinator and approved prior to the next sampling round in 2005-2007. DEP has held training sessions in the regions and on-site trainings can be requested from MRWA if you have any questions or clarifications concerning your sample plan. New forms, education materials and criteria handouts are available from the DEP web site (http://www.mass.gov/dep). Call your local DEP office or MRWA for additional information.

Certification Exams

Drinking Water Operators
November 5, 2005
- Boston, Worcester, Fall River Areas (exact locations TBA)

Wastewater Operators
November 19, 2005
- Northeast, Southeast, Central & Western locations

(Registration deadline: Oct. 5, 2005)

For more information:

Drinking Water: Contact Professional Credential Services, 877-887-9727 or pcshq.com/pcsweb/pcspages.nsf.
Wastewater: Call NEIWPCC at 978-323-7929 or visit www.neiwpcc.org or www.mwpca.org

Wastewater Treatment Hurdles Overcome in Bristol, NH

by Vinnie Melendez

The Town of Bristol, NH Wastewater Treatment Plant and collection system was built in 1969-70 to handle an average daily flow of 250,000 gallons. During the mid 1980's, the plant was approaching its design capacity. Repairs to the collection system had been made to reduce infiltration. The Town was also working with the local industry to reduce their flows by conserving water. Nonetheless, flows continued to threaten the capacity of the facility.

The Town hired a consulting firm to address the needs of Bristol's system. In 1989, a design to upgrade the system was completed and construction started. This upgrade would enable Bristol to double its capacity by installing a larger clarifier with a new pump room and by increasing pump sizes at the lift station and on their oxidation ditch rotors.

Prior to the upgrade, Bristol disinfected its effluent with chlorine gas. To eliminate the safety concern with the swapping of the cylinders as well as with potential chlorine leaks, a "state-of-the-art" ultraviolet light disinfection system was installed. All the new equipment made operation safer and more efficient, and the Town of Bristol seemed to be set with the new upgrade in place.

As time passed however, flows decreased due to the local industry cutbacks that had been requested. The decreased flows made the new clarifier difficult to operate as designed. Also, the lost flows were heated water and so the winter months brought on freezing problems in the clarifier.

Bristol Public Works Department staff (left to right): Joe Sarto, Jesse Lamos, and Jeff Chartier. (Photos by Vinnie Melendez)

The absence of warm flows also impacted the oxidation ditch rotor, causing ice to form more rapidly on the support structure. This created more work for the operator chipping ice. Over the past several years, attempts to reduce ice buildup had been made, such as erecting a slick surface splashguard and running heat trace wires along

Continued on page 13.

Legislative Update

by Katie Maurizi

Water-related bills that have been introduced into our federal and state legislatures are listed below. For a complete listing, visit www.maruralwater.org, nhruralwater.org, and vtruralwater.org.

Rural Water sent a group of representatives to Capitol Hill last spring to carry out their annual lobbying effort.

Federal Bills

S-689/HR-2417 Community Drinking Water Assistance Act
Status in House: Referred to the Subcommittee on Environment and Hazardous Materials.
Status in Senate: Read twice and referred to the Committee on Environment and Public Works.
Main Sponsor in House: Heather Wilson
Main Sponsor in Senate: Pete V. Domenici
Description: Amends the Safe Drinking Water Act to establish a program to provide assistance to small communities for use in carrying out projects and activities necessary to achieve or maintain compliance with drinking water standards.

S-728/HR-2864 Water Resources Development Act of 2005
Status in House: Passed/agreed to: Yeas and Nays: 406 - 14.
Status in Senate: Placed on Senate Legislative Calendar
Main Sponsor in House: Don Young
Main Sponsor in Senate: Christopher S. Bond
Description: To provide for the conservation and development of water and related resources, to authorize the Secretary of the Army to construct various projects for improvements to rivers and harbors of the United States, and for other purposes.

Massachusetts Bills

H-3225 An Act Further Regulating Water Companies
Status in House: Referred to the committee on Telecommunications, Utilities and Energy
Status in Senate: concurred
Main Sponsor: Garrett J. Bradley
Description: Corporations and companies shall be liable for the repair and maintenance of main shut off valves no matter where located.

H-2633 An Act to improve the oral health of children and other residents of the Commonwealth
Status in House: in committee on Public Health
Status in Senate: concurred
Main Sponsor: Kathleen M. Teahan
Description: The department shall promulgate regulations to provide for the addition of fluoride to all municipal water supplies by the owners or official custodians thereof wherever the fluoride content of public water supplies serving 5,000 or more persons supplies less than the minimum concentration of fluoride established by regulation.

New Hampshire Bills

HB-45 Relative to Combining Water Department Funds and Sewer Department Funds
Status in House: In Municipal and County Government Committee
Status in Senate: none
Main Sponsors: Burton W. Williams, Margie Maybeck, Andrew L. Dorsett, Carl R. Johnson
Description: This bill allows a municipality to combine water department funds and sewer department funds.

SB-104 Relative to the Tax Exemption for Water and Air Pollution Control Facilities
Status in House: In Municipal and County Government Committee
Status in Senate: Passed/Adopted
Main Sponsors: Richard Green, John T. Gallus, James E. Twombly, Martha S. McLeod
Description: This bill removes the tax exemption for pollution control facilities, devices, appliances, or installations that are only partly for the purpose of reducing pollution, or are installed as part of privately-owned landfills.

Vermont Bills

H.114 Establishing Minimum Waterfront Protection Standards
Status in House: none
Status in Senate: none
Main Sponsors: David Deen
Description: This bill proposes to establish minimum waterfront protection standards that would apply to lands located within the protected waterfront, which is defined as being that area within 250 feet from the ordinary or mean high watermark of the navigable public waters of the state. The standards include provisions that prohibit certain activities within the protected waterfront.

Stormwater Utilities Help Reduce Pollution

by Liz Royer

Stormwater runoff consists of excess rainwater and snowmelt which is not absorbed by the soil or vegetation. This runoff can carry or dissolve nutrients, sediments and other contaminants from the land. Soil and vegetative surfaces slow the flow, filter out sediments, and can break down or trap pollutants in the root zone.

Surfaces covered with impenetrable materials like asphalt and concrete prevent rainwater from soaking into the ground. Buildings, roads, parking areas, and exposed bedrock increase the volume and speed of stormwater runoff, which carries whatever pollutants it picks up to lakes, rivers, wetlands, coastal waters and even ground water. Stormwater pollutants are diffuse and difficult to pinpoint, but they frequently degrade water quality.

Because it can be a transportation system for pollutants, stormwater is a real concern for protecting drinking water sources. Controlling runoff is challenging for communities, since corrective measures cost real money.

One option for funding stormwater management that is being considered more and more all across the country is forming a stormwater utility. The idea is to have the properties that contribute stormwater runoff and pollutant loads pay for the program via user fees. The revenue is used to maintain and upgrade existing storm drain systems, develop drainage plans, construct flood control measures, and cover administrative costs.

Over 400 communities in the U.S. have created stormwater utilities and the number is expected to grow to as many as 2,500 within ten years. Stormwater utilities provide a predictable and dependable amount of revenue that is dedicated to the implementation of stormwater management.

In 2002, the Vermont Legislature gave municipalities the authority to create stormwater utilities. South Burlington is the first to create its own utility. Experiences in other states indicate that programs involving education and incentives are helpful in getting stormwater utilities started. These might involve regional workshops to teach municipalities how stormwater utilities work, why they are useful, how revenues are generated and used, and what the program would cost.

In New Hampshire, an alternative to private ownership with public oversight is for the municipality to take on ownership and maintenance responsibility for all stormwater Best Management Practices (BMPs), assessing an annual fee to pay for all costs - maintenance, repair, etc. The enabling legislation for village districts (RSA 52:1) allows the formation of districts for the purposes of water supply (including the protection of water supply sources) and the construction and maintenance of drains or common sewers. Such districts have the ability to raise money by taxation and other means and to establish capital and non-capital reserve funds.

Chicopee, Massachusetts has a municipal stormwater utility funded partially by an EPA 319 (Clean Water Act) grant. In addition, Massachusetts passed enabling legislation last year to encourage further development of these types of utilities.

Liz Royer, on site in Hancock, Vermont. (Photo courtesy of Kevin McGraw.)

Liz Royer, VRWA Source Protection Specialist can be reached at ext. 336, or at lroyer@vtruralwater.org

More information on stormwater utilities can be found at the following Web sites:

Massachusetts:
www.mass.gov/dep/brp/stormwtr/

New Hampshire:
www.des.state.nh.us/stormwater/

Vermont:
www.vtwaterquality.org/stormwa-

Continued from page 10.

the wall. It seemed that for every attempt that was made, the ice prevailed. Chopping of ice became one of the operator's most unloved pastimes.

In the late 1990's, problems arose with the UV light disinfection process that resulted in numerous violations. Many attempts were made to resolve the matter, including various suggestions from NH DES staff. The final reality was that the percent light transmittance through their effluent was less than necessary for continuous effective operation of the UV system.

A temporary chlorination/ dechlorination system was set up to supplement the UV, but a permanent solution was still needed. Placed under Administrative Order by NH DES to correct the deficiencies at the facility, Bristol hired an engineering firm to address the problem, and by 2003 a new chlorination/ dechlorination system was up and running. Since its completion, the system has not had any violations.

Bristol was also required to have a consulting firm perform a study based on the report from NH DES that pointed out other deficiencies within the facility that contributed to BOD and TSS violations. The consultant's recommendations were incorporated into a March 2005 Town Meeting warrant article, asking voters for $600,000 to address the priority concerns of the facility.

During and prior to the study taking place, the department's operators instituted several low-cost improvements to the facility. A sight gauge was installed on the sludge holding tank, which enabled them to better track wasted and decanted volumes. Operator procedures were evaluated and adjustments were made. The waste line was excavated and the pipe reset with a new pitch that allowed the pipe to drain completely and thus, prevent freezing.

The catwalk wall last year (above) and the same catwalk wall under similar temperatures with the addition of the heated splashguard (below).

This brings us back to Bristol's cold weather concern: ice on the clarifier. The report showed a need for the clarifier to be covered, which almost seems obvious in New England. Failed attempts for a temporary cover had been made in the past and Bristol would welcome something more permanent. The cost had held them back the previous winter, and they settled to have the clarifier "shrink wrapped," which proved to be effective in preventing freezing and was expected to inhibit the growth of algae.

The cost to shrink wrap the clarifier was around $1,500 total, including the framework. This temporary structure will remain in place until a more permanent cover is obtained. Within a half hour of being totally enclosed, the temperature inside the clarifier increased from 30 degrees to 47 degrees, and the ice on the surface of the clarifier's beaching plate melted. The cover also sheds snow adequately.

The other freezing issue was the rotor on the oxidation ditch. Bristol decided to combine past experimental devices to see if they would work to prevent ice buildup. They designed a heated splash guard that is suspended from the support structure, allowing the spray from the rotor to come in contact with the guard. Power to the splashguard is supplied through a thermostatic switch which reduces the power consumption during the warmer winter days.

This heated splashguard has eliminated many hours spent chipping ice. Furthermore, the splashguard prevents large ice chunks from forming, which could fall and damage the rotor blades. The cost to fabricate the splashguard was less than $500. Monies spent were recouped within the first month of operation. The system boasts great success with this device.

Bristol continues to work on plant improvements and system upgrades. The Department hopes to extend its collection system towards Newfound Lake to protect one of New Hampshire's natural assets.

Vinnie Melendez, Wastewater System Specialist can be reached at ext. 319, or at vmelendez@vtrural water.org

Rural Water News

Palmiotto Receives National Award for Source Water Protection

Jennifer Palmiotto, Source Water Specialist for the New Hampshire Rural Water Association, was named the 2005 U.S. Source Water Specialist Peer Leader of the Year by the National Rural Water Association. The award recognizes Palmiotto's outstanding efforts to protect public drinking water supplies across New Hampshire.

Working closely with community stakeholders, Palmiotto crafts community and watershed-wide protection plans that help ensure that drinking water remains uncontaminated while balancing the concerns of residents, farmers, businesses and others. As a representative of NHRWA, Palmiotto handles the technical aspects of the plan, acts as liaison for the community's steering committee, and assists with plan implementation. The Peer Leadership Award was presented at the National Rural Water Association's annual event held recently in Nashville, Tennessee.

NHRWA Source Water Specialist Jennifer Palmiotto (right) receives the 2005 U.S. Source Water Specialist Peer Leader of the Year Award from NRWA. The award was presented by the 2004 award recipient, Pepper Herman of Wyoming Rural Water.

Palmiotto has worked with communities across New Hampshire since she began developing plans to protect public water supplies in 2002. She earned her Masters in Forest Science and Doctorate in Ecosystem Ecology from Yale University.

New England Events/Trade Shows

October 2005

4 Comprehensive Environmental Inc. Stormwater Workshops, Taunton, MA
5 A Global Water Resources Symposium, Colchester, VT
6 MWWA Fall Golf Tournament, Lakeville, MA
9-12 National Rural Water Assn. Conference, Sacramento, CA
13 New Hampshire Geological Society Annual Meeting, TBA, NH
13 Maine Water Utilities Assn. Bi-Monthly Meeting, Augusta Region, ME
20 NEWWA Laboratories Symposium, Holliston, MA
20 MWWA Membership Meeting, Northboro, MA
20 NEWEA Plant Operations Specialty Seminar & Exhibit, Worcester, MA
25-26 Northeast Recycling Council Fall Conference, Northampton, MA

November 2005

2 New Hampshire Drinking Water Exposition & Trade Show, Manchester, NH
4 MWWA Presidents Night & Members Reception/Awards Banquet, Boston, MA
6-10 AWWA Water Quality Technology Conference, Quebec City, Quebec
10 Green Mountain Water Environment Assn. Fall Trade Show, Burlington, VT
14 Water Systems Council New Hampshire Water Well Symposium, Portsmouth, NH
15-16 The New England Residuals and Biosolids Conference, Westborough, MA
16-18 NH LGC Annual Conference and Exhibition, Manchester, NH
17 New England Water Works Assn. Membership Meeting, TBA, MA
11/30-12/1 Maine Rural Water Assn.'s 25th Annual Water & Wastewater Technical Conference, Exhibition and Meeting, Freeport, ME

December 2005

8 Maine Water Utilities Assn. Bi-Monthly Meeting, York Region, ME
15 New England Water Works Assn. Membership Meeting, Randolph, MA
16 Maine Wastewater Control Assn. Monthly Meeting Augusta, ME

Thank You

Rural Water in Massachusetts, New Hampshire and Vermont would like to thank each of our Directors for the countless hours they've donated to furthering our mission and for their outstanding leadership.

MRWA Directors: Paul Cook, Duane Knapp, Peter Leidt

NHRWA Directors: Dave Brennan, Ed Betz, Mike Lavalla

VRWA Directors: Ed Savage, Mike Sullivan, Dick Desautels, Gilles Blais

Quiz Corner

by Vinnie Melendez

Test Your Knowledge of Water/Wastewater

True or False

1. T or F? A sample for chlorine residual may be taken and refrigerated for up to 4 hours before analysis.
2. T or F? Settleable solids are measured in a Mallory Settleometer.

3. T or F? In order to sterilize equipment, an autoclave must be run for 20 minutes at 20 psi @ 220F

Multiple Choice

4. For regulatory purposes, a _____ sample is taken for fecal coliform analyses.
 a. Composite
 b. Grab
 c. Manual composite
 d. Composite of grabs of 1 per shift

5. What is the BOD of the following sample, using 25 mls of sample in a 300 ml bottle?
Initial D.O = 9.20 Final D.O. = 2.10
 a. 28 mg/l
 b. 85 mg/l
 c. 58 mg/l
 d. 106 mg/l

6. What is the term for the process by which water vapor passes into the atmosphere from living plants?
 a. Transpiration
 b. Percolation
 c. Condensation
 d. Perspiration

7. What is the term for using treated municipal wastewater to supplement a community's drinking water supply by blending the wastewater with raw water resources?
 a. Nonpotable reuse
 b. Indirect potable reuse
 c. Direct potable reuse
 d. Direct nonpotable recycling

8. A primary sludge pump is pumping 5% solids at 250 gal/min. If the pump operates for 65 minutes in a 24 hour period, how many pounds of solids are pumped?
 a. 1948 lb/d
 b. 4828 lb/d
 c. 6776 lb/d
 d. 9742 lb/d

9. A tank is 30ft x 20ft x 10ft deep. Calculate the pumping rate if the pump fills the tank in 4 hours.
 a. 255 gal/min
 b. 515 gal/min
 c. 187 gal/min
 d. 287 gal/min

10. Polishing ponds are an example of:
 a. Aerated lagoons
 b. Aerobic lagoons
 c. Facultative lagoons
 d. Anaerobic lagoons

11. The chemical formula for copper sulfate is:
 a. CaCO
 b. CaCO3
 c. CuSO4 * 5H2O
 d. NaF

12. Stabilization loagoons are generally used for systems serving populations of:
 a. Less than 100 people
 b. Less than 20,000 people
 c. Less than 80,000 people
 d. Less than 1,000,000 people

13. The acceptable oxygen level range for confined spaces set by OSHA is:
 a. 19.5% to 23.5%
 b. 19.5% to 22%
 c. 17.5% to 23.5%
 d. None of the above

14. A flammable/explosive atmosphere could contain:
 a. Methane or acetylene gases
 b. Solvents or fuel vapors
 c. Coal or grain dust
 d. Any of the above

15. Atmospheric hazards should be checked in the following order:
 a. Oxygen, toxic gases, combustible gases and vapors
 b. Combustibles, toxic substances, oxygen levels
 c. Oxygen, combustible gases and vapors, toxic gases and vapors
 d. The order is not significant, but all three areas must be checked

References: "Wastewater Laboratory Study", New England Water Environment Association. GuideWEF/WE&T Operations Forum, Water Environment Federation "Confined Space Handbook", J. J. Keller & Associates, Inc.

Answers

1. F
2. F
3. F
4. B
5. B- (Initial DO-Final DO) x 300 ml bottle divided by ml of sample,(9.2-2.1) x 300 divided by 25= 85 mg/l
6. A- Transpiration
7. B - Indirect potable reuse
8. C- 6776 lb/d, 250 gal/min x .05= 12.5 gal/min of solids x 65 min/d= 812.5 gal/d x 8.34 lb/gal= 6776 lb/d
9. C- 187 gal/min, 30ft x 20ft x 10 ft=6000 cu/ft x 7.48 gal/cuft= 44880 gals divided by 240 min= 187 gal/min
10. B- Aerobic lagoons
11. C- ($CuSO_4 * 5H_2O$)
12. B- Less than 20,000 people
13. A- 19.5% to 23.5%
14. D- Any of the above
15. C- Oxygen, combustible gases and vapors, toxic gases and vapors

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