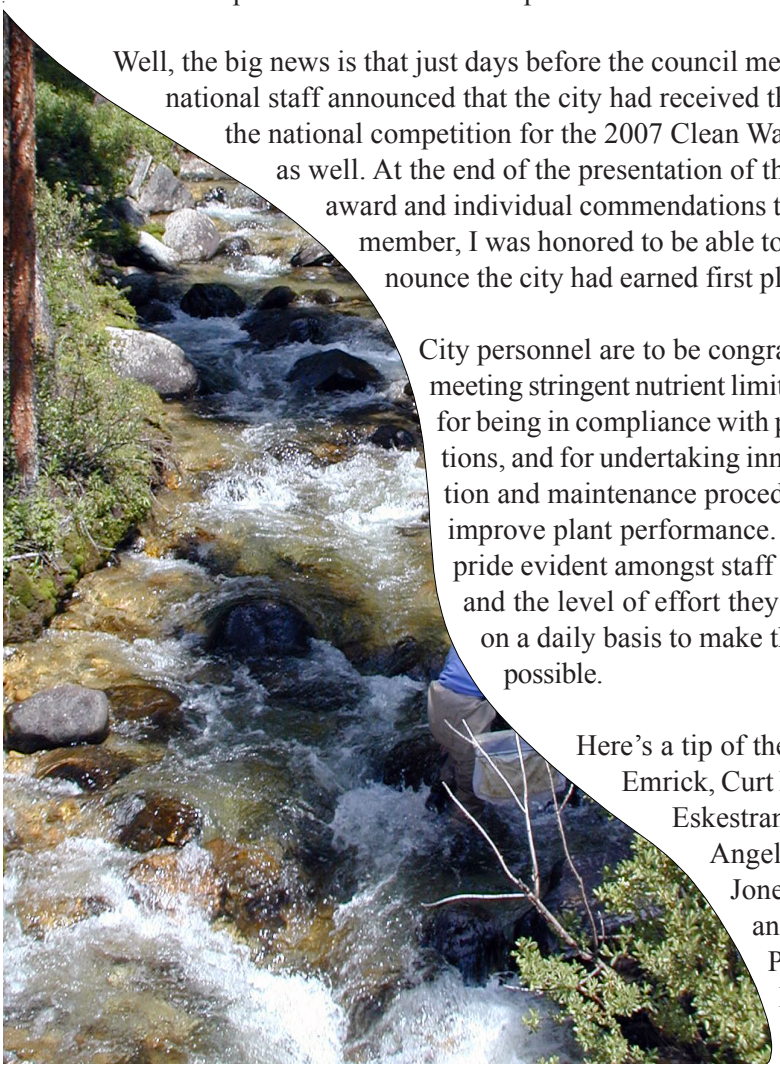
Volume XXXV11, Issue 2 — Fall 2007

Reflections in the Ripples

By Bill Bahr – DEQ

City of Kalispell – The Advanced Wastewater Treatment Plant serving the City of Kalispell earned first place in the 2007 Environmental Protection Agency (EPA) Clean Water Act award competition for Region VIII for medium advanced treatment plants. I was fortunate to be able to present the regional award to the city staff at the city council meeting on October 1. Kalispell has won the Region VIII award twice before, 1996 and 2003. In 2003, the facility also received first place in the national competition.



Well, the big news is that just days before the council meeting, the EPA national staff announced that the city had received the first place in the national competition for the 2007 Clean Water Act award, as well. At the end of the presentation of the regional award and individual commendations to each staff member, I was honored to be able to, finally, announce the city had earned first place nationally.

City personnel are to be congratulated for meeting stringent nutrient limits consistently, for being in compliance with permit conditions, and for undertaking innovative operation and maintenance procedures that improve plant performance. There is great pride evident amongst staff at the facility and the level of effort they each put forth on a daily basis to make this plant the best possible.

Here's a tip of the hat to Joni Emrick, Curt Konecky, Louis Eskestrand, Phil Lauman, Angela Brooks, Jesse Jones, Jason Wisher, and Jim Hansz, Public Works Director.

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Inside This Issue

Big Sky Clearwater

Volume XXXVII, Issue 2

Fall 2007

The ***Big Sky Clearwater***,
a publication of the Montana Department of Environmental Quality,
is for water and wastewater operators and managers. The Department welcomes articles of interest and suggestions for articles related to water quality, water and wastewater treatment and the water environment. Articles may be about your treatment plant experiences, or those of others, technical papers or any information that may benefit other operators or managers.

Please submit articles 30 days before publication (*August 1 and February 1*) to:

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Reflections in the Ripples - *continued from page 1*

Don't Dump it Down the Drain
Recently, one of Montana's smaller communities was negatively impacted by what we hope was the unintentional dumping of pesticides down the drain leading to the wastewater treatment lagoons. The community has a lagoon wastewater treatment system. The treated wastewater contains nutrients, nitrates and phosphates, that are valuable to plant growth, so the community practices beneficial reuse of the water by land applying the effluent on agricultural land. The community has a long term agreement with a local landowner to grow alfalfa.

The treated effluent can only be applied during the growing season, so the water is stored during the cold weather, non-growing, period. The crop must be harvested annually to prevent the nutrients, primarily the nitrates, from leaching through the root zone to ground water.

The land owner noticed earlier this summer that the alfalfa crop seemed stunted. Sampling of the storage cell water showed elevated levels of five different pesticides. The community consulted with the state Department of Agriculture and a private consultant that specializes in agricultural systems. These folks advised that as little as five pints of pesticides could have resulted in the concentration levels discovered during analysis.

With the help of the ag specialists, the waters were 'neutralized' and the effects on the crop were mitigated. The sewer district board will send out information about the proper disposal of these chemicals and remind those on the system that certain classes of chemicals are never suitable for disposal in wastewater treatment plants. When the effects of this small amount of pesticides are considered, it is obvious that these products should not be sent down the drain.

It is unlikely that these chemicals would have been discovered in a different type of facility, since the effects were noticed due to the stunted growth of the crop. Other plants that discharge to surface or ground waters would not have seen that effect and the pesticides could end up in drinking water wells, rivers, lakes or streams. Wastewater treatment plants do not remove all pollutants. Many pollutants either pass through untreated or have a negative effect on the microbiological treatment processes in the plant, causing the plant performance to suffer. Or, both impacts can occur.

Be sure to enforce sewer use ordinance rules against dumping hazardous, toxic, and flammable materials in the wastewater collection system. Inform and educate citizens in your communities to the problems associated with these illegal dumping practices.

In this case we need to protect the integrity of the system to allow beneficial reuse of treated wastewater and to maintain good relations with those whose land we are using for disposal of our effluent. In all other systems, pesticides can not be disposed of and would have negative impacts on our environment and on our public health.

Standard Process Control Procedures
Part of every discharge permit includes language requiring that all treatment processes within the system be properly operated and maintained in order to be compliant with permit conditions. Considering the variety of types of treatment plants in the state, process control tests that make up the heart of proper operations at any facility, will probably vary somewhat from plant to plant.

For example, an aerated lagoon system may have and aeration system much like a larger activated sludge facility, but the two types of plants are not very similar in most aspects. Activated sludge facilities, or mechanical wastewater treatment plants, need to have recycled biomass into the reaction basin to maintain a population of microbes adequate to remove organic pollutants. Lagoon systems utilize bacteria and other microscopic life forms, as well, but don't need to have recycled material.

Process controls for aerated lagoons, then, will be different than those necessary to monitor the treatment processes in mechanical facilities. There are differences between non-aerated lagoons, or facultative pond systems, and the aerated lagoon facilities, too. There are a variety of large and small mechanical treatment plants, and each facility will have different tests to run and measurements to take in order to check out how the plant is working.

Process control test data does not always end up being reported to the DEQ Water Protection Bureau on the Discharge Monitoring Reports (DMRs), but the data collected at each facility from these tests must be maintained for state inspectors to review during inspections. Compliance sampling and process control sampling are not

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Reflections in the Ripples - *continued from page 3*

conducted for the same purposes. Process control sampling is like checking the oil in your car motor or gas tank level to assure that the motor won't seize up and won't run out of fuel; compliance sampling might well be based on how fast and far the car can travel.

Montana has a variety of wastewater treatment plants. They include the following types: facultative (non-aerated) lagoons, aerated lagoons, lagoons that have mixers to boost performance, small mechanical package plants, oxidation ditches (extended aeration activated sludge), conventional activated sludge plants, advanced activated sludge nutrient removal plants, sequencing batch reactors, a trickling filter plant, rotating biological contactors, membrane bioreactors are proposed, a biowheel facility is under construction, and several versions of subsurface recirculating sand filters and other mechanical treatment plants. Some of these facilities discharge to surface water, some to ground water, some to land to grow crops beneficially, and some don't discharge at all by using the net evaporation loss of the water to the atmosphere.

As you can see, the sampling and testing regimens will vary according to the type of wastewater treatment plant. Simpler lagoon systems will need to be monitored for ice cover, rainfall, coloration of the ponds, odors, sludge levels in the ponds, water levels in the ponds, flow into and out of the plant, pollutant removal efficiency, and other criteria of performance. Advanced facilities will monitor nitrogen and phosphorus levels in basins, or dissolved oxygen levels or might even use oxidation reduction potential (ORP) meters to monitor nutrient uptake, removal or changes in the nitrogen and phosphorus compounds as the wastewater flows through the basins. These are not the same monitoring programs.

Plants must establish what process control tests best serve the staff as they work to achieve compliance with discharge permits. Non-discharging lagoons need to monitor levels in cells to assure that water levels are low in the evaporation cells before the onset of winter, when little evaporation will occur under the frozen surface of the ponds. This data must be recorded for future use by the plant staff and review by inspectors. Weed removal from lagoon dikes is important to reduce odors from scum mats and to allow full basin use of the water surface to maximize pollutant removal. These are just examples of things that operators must account for even in the simpler lagoon facilities.

The Water Pollution Control State Revolving Fund (WPCSRF) staff will be working with facilities to develop standard sampling and process control testing for all Montana wastewater treatment facilities. Most mechanical plants already monitor many standard conditions, such as dissolved oxygen levels in aeration basins and sludge levels in clarifiers, so proper O&M procedures may already be in place in facilities. As we conduct inspections and provide technical assistance to plants across Montana, we will be working with plant personnel to define what proper O&M means with regard to optimizing performance and meeting permit compliance standards.

I recently provided a training session at the Fall School for Operators in Bozeman concerning the 'other' sampling program: process control sampling versus compliance sampling. With the advent of advanced facilities needed to meet new stringent standards in water quality, proper O&M at plants will continue to grow in importance.

Fall School for Operators

The annual school in Bozeman hosted by the Montana State University Engineering department and the Montana Water Center, in conjunction with DEQ staff and the Montana Environmental Training Center (METC), had around 200 operators in attendance. The technical program included a variety of regulatory and technical assistance training sessions. Speakers came from as far away as Ohio and as near as the City of Bozeman. The city provides a great resource by allowing sessions to tour water, wastewater and collection and distribution facilities in Bozeman. I'd like to thank Tom Adams and John Alston for their great support of the school.

Annually for the past six years, the city water department gets together with Water School staff to review nominations for the Mike Certalic award. Mike was an outstanding operator and community leader who we want to remember by acknowledging the efforts of other outstanding operators who take pride in their work and in their communities. Kevin Neidhardt, water and wastewater operator at the Trapper Creek Job Corps program, was selected this year. Congratulations, Kevin. ■

Water System Security and Emergency Preparedness NEWS and UPDATES

By Dusti Lowndes, DEQ PWS Kalispell Regional Office

Social Engineering?

Is it cloning people or correcting bad behaviors? Neither, it is a way to break down security measures within your water systems. Hackers and other criminals use a technique known as social engineering to gather sensitive information from their targets. This technique usually involves a knowledgeable individual phoning the target organization and ingratiating themselves with an employee of the organization. During casual and seemingly innocent conversation, the caller will attempt to extract sensitive information from the employee. Many employees want to be helpful and will provide the requested information, unless it is clearly too sensitive to provide to an outsider. However, based on the caller's apparent knowledge of the organization and operations, an employee may be duped into divulging information that they might not otherwise give to a stranger. The caller will then use that information to aid in cyber or physical attacks against the organization. It is critical that employees understand what information is considered sensitive to operations and are aware of social engineering techniques. Such knowledge will better enable employees to protect the organization's sensitive information. (WaterISAC Weekly – 6 August 2007) ■

Winner of the Spring 2007 Security Contest

KEVIN DUROCHER of the Montana Rural Water Systems

What does "NIPP" stand for and what is a "CI/KR"?

"NIPP" stands for National Infrastructure Protection Plan and was developed by the U.S. Department of Homeland Security (DHS). The NIPP sets national priorities, goals, and requirements for effective distribution of funding and resources which will help ensure that our government, economy, and public services continue in the event of a terrorist attack or other disaster. "CI/KR" stands for Critical Infrastructure & Key Resources. Water is one of the sectors within the NIPP. CI/KR includes physical or virtual assets, systems, and networks so vital to the United States that the incapacity or destruction of such assets, systems, or networks would have a debilitating impact on security, national economic security, public health or safety, or any combination of those matters. (Information obtained from DHS website) ■

Congrats Kevin!

What does "NIPP" stand for and what is a "CI/KR"?

Fall 2007
Water Security Challenge

List at least five ways that this cylinder yard could be protected and properly secured. Keep in mind the concepts of physical security – **Deter, Detect, Delay, and Respond.** Send your answers to me via mail or email. On November 1, the participants' names will be placed in a hat and a prize will be sent to the winner. Thank you for staying vigilant in securing our water and wastewater systems and protecting public health.

Dusti Lowndes
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Public Water & Subdivision Bureau
Montana Department of Environmental Quality
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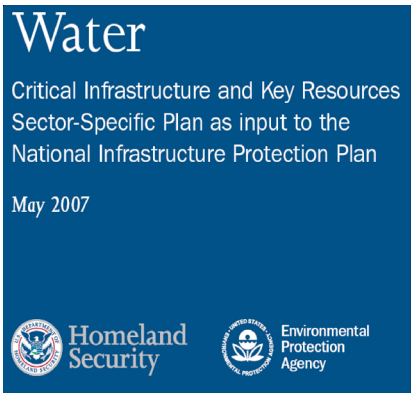
Water Sector Specific Plan



Water Sector Specific Plan was released in May of this year and it is a document that discusses critical infrastructure protection as it relates to water systems, which include wastewater. There are four main goals and objectives set out in this document that will be used as guidance in protecting our water systems:

1. Sustain protection of Public Health and the Environment;
2. Recognize and reduce risks;
3. Maintain a resilient infrastructure;
4. Increase communication, outreach, and public confidence. ■

Securing Chlorine Supply Urged

By Carol Eisenberg
carol.eisenberg@newsday.com
June 13, 2007

WASHINGTON - Homeland Security Secretary Michael Chertoff urged operators of water and waste treatment plants to secure chemicals such as chlorine from terrorists, although they're not required to do so. "For those of you who are not subject to the [new chemical security] regulations, I don't want you to breathe a sigh of relief that you're off the hook," Chertoff told industry leaders in a briefing about the nation's first-ever national chemical security rules.

Referring to water treatment plants' use of chlorine - an ingredient used in an increasing number of truck bombs in Iraq - Chertoff warned that the consequences of ignoring terror threats was "quite severe" in potential liability as well as lives.

"You're on the hook because you're going to have to do this yourselves because the consequences of ignoring risks ... will be quite severe," he said.

An estimated 3,000 drinking-water and wastewater treatment plants are listed in EPA documents as keeping more than 2,500 pounds of chlorine gas, according to Paul Orem, author of a report published by the Center for American Progress, a think tank.

Nonetheless, Congress exempted such plants from oversight under the nation's first-ever chemical security regulations, which took affect last week, because they are already regulated by the Environmental Protection

Agency. It could not be learned how many operate in New York.

Robert B. Stephan, assistant secretary of homeland security for infrastructure protection, said there was no indication of any terror plot to use chlorine in this country, "but our goal is to stay two or three steps ahead of these guys and so we have to anticipate that someday they may use that tactic here."

Stephan said the department has reached out to plant operators about recommended steps to secure chemicals, given out grants to expand buffer zones and improve surveillance, and distributed real-time intelligence. He discounted a terror tie-in to recent thefts and attempted thefts of chlorine tanks from water. ■

HELP! I Have a Lead or Copper Action Level Exceedence! What Do I Do?

By Autumn Coleman

I am DEQ's new lead and copper rule manager. Since I started in July, I have been lucky enough to talk with many of you regarding the lead and copper rule. I thought it would be good to introduce myself to you and share a summary of my most frequently asked questions about lead and copper action level exceedences. Please call me if you have any other questions about lead and copper in drinking water.

Autumn Coleman
406-444-5360 • acoleman@mt.gov

Question: What constitutes a lead or copper action level exceedence?

Answer: It is when the 90th percentile level of tap water samples exceeds 0.015 mg/L for lead and 1.3 mg/L for copper.

Question: If I have an exceedence, is that a violation?

Answer: No. An action level exceedence is not a violation, but it triggers other requirements.

Question: What requirements does a **COPPER** action level exceedence trigger?

Answer: Water Quality Parameter (WQP) monitoring, lead and copper source water monitoring, and Optimal Corrosion Control Treatment (OCCT).

Question: What is required for Water Quality Parameter Monitoring and when is it due?

Answer: Within the same monitoring period as the action level exceedence, systems are required to monitor for WQPs in the distribution system AND at each water source. WQPs are used to determine water corrosivity and are needed to help identify the OCCT to be installed.

Water Quality Parameters

1. pH (measured in the field)
2. temperature (measured in the field)
3. alkalinity
4. calcium
5. conductivity
6. orthophosphate (if used)
7. silica (if used)

Question: How do I measure temperature and pH in the field and how do I report that to the DEQ?

Answer: According to the Lead and Copper Monitoring and Reporting Guidance for Public Water Systems published by the EPA www.epa.gov/safewater/lcrmr/pdfs/guidance_lcrmr_monitoring_reporting.pdf temperature analyses must be conducted in the field to ensure accuracy. Measure temperature using either a hand-held thermometer or a combined temperature/pH electrode and meter. pH measurements must also be conducted in the field and must be made with a pH electrode and meter within 15 minutes of sample collection. The meter should be capable of measuring to 1/10 of a unit.

Talk to your laboratory, if they don't have a method of transmitting the pH and temperature electronically, you must submit your pH and temperature results to the DEQ at P.O. Box 200901, Helena, MT 59620-0901 Attn: Lead and Copper Rule Manager.

Question: How long do I have to monitor for WQP's in my system?

Answer: Every six months until OCCT is installed. At that time you may be required to continue monitoring depending on your method of OCCT.

Question: What are the requirements for monitoring for lead and copper in source water?

Answer: Systems that exceed the lead or copper action levels are required to collect a lead and copper sample from the source water at each entry point into the system. The one time monitoring is required to be completed within six months of the action level exceedence. It is used to determine whether a system has to complete source water treatment for lead and copper.

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HELP! I Have a Lead or Copper Action Level Exceedence! - *continued from page 8*

Question: When is my OCCT Study due?

Answer: Systems have six months from the date of the action level exceedence to recommend OCCT, in other words, six months to submit an OCCT Study. After the DEQ approves the OCCT Study, the system has 18 months to complete the OCCT Study.

Question: How long before the system has to install OCCT?

Answer: Once the DEQ determines the type of OCCT to be installed, the system has 24 months to install OCCT. If the OCCT involves modifications to the existing system, the submittals must meet the requirements for Engineering Review.

Question: What requirements does a **LEAD** action level exceedence trigger?

Answer: Water Quality Parameter (WQP) monitoring, lead and copper source water monitoring, Optimal Corrosion Control Treatment (OCCT), and **LEAD PUBLIC EDUCATION**.

Question: What is lead public education?

Answer: Lead public education informs customers about health effects, sources and what can be done to reduce exposure. Lead public education can include billing inserts sent directly to customers, pamphlets or brochures distributed to hospitals and other locations that provide services to pregnant women and children, newspaper notices and public service announcements submitted to TV or radio. See the following website for downloadable brochures and posters **www.epa.gov/safewater/lcrmr/compliancehelp.html.**

Question: When is lead public education due?

Answer: Lead public education is due within 60 days of the lead action level exceedance and continues annually as long as the action level is exceeded.

Question: Does my system have to continue to monitor for lead and copper after an action level exceedence while the system is completing OCCT?

Answer: No. System's lead and copper monitoring schedules will continue on a 6 month monitoring period after an action level exceedence unless a system requests, in writing, to waive the lead and copper monitoring while conducting OCCT. System's monitoring schedules are available online at www.deq.mt.gov/wqinfo/pws/reports.asp.

Question: I have a lead or copper exceedence, should I be afraid to contact the DEQ?

Answer: No. The Public Water Supply Program is responsible for assuring that the public health is maintained through a safe and adequate supply of drinking water. This function is partially achieved by compliance monitoring, training, and technical assistance.

Compliance with the Lead and Copper rule is required by the Public Water Supply Rules and the Administrative Rules of Montana (ARM 17.38.216, 234, & 239). ■

OPERATOR EXAMS PASSED JANUARY 2007 - JUNE 2007

CLASS I

CABBAGE, RICHARD	HELENA	1A	CO
KIENLEN, PAUL	HELENA	1A	CO
LAIB, MARTY	BILLINGS	1A	CO
BASZLER, MARK	BUTTE	1B	OT
DAVIS, CHRISTOPHER	LOMA	1B	OT
DELL, WILL	BILLINGS	1B	OT
FERGUSON, DAREN	HELENA	1B	OT
HANSON, LONI	RED LODGE	1B	CO
JONAS, DEANNE	FORSYTH	1B	CO
KIRSCHENMANN, ROBERT	HARDIN	1B	CO
LANTZ, STEVE	HELENA	1B	CO
LEWIS, TAMMY P.	SEELEY LAKE	1B	OT
PICKENS, JOSH	BILLINGS	1B	OT
HUSCHLE, MICHAEL	BOZEMAN	1C	CO
POTTS, JEFFREY	BILLINGS	1C	CO
SIEK, CLAYTON	HAMILTON	1C	CO
THOMAS, WILLIAM "DAVE"	HAVRE	1C	CO

CLASS II

ACKERMAN, DALE	MALMSTROM AFB	2A	CO
FLETCHER, KELLY	MALMSTROM AFB	2A	CO
BROOKS, ANGELA S.	KALISPELL	2A3B	CO
WRIGHT, JOEL	MISSOULA	2A3B	CO
NUTTALL, WILLIAM	PINESDALE	2B	CO
CANEN, RAYMOND	HINSDALE	2C	CO
MARSH, ELAINE M.	GLACIER	2C	CO
WEAVER, CHAD	BOISE, ID	2C	CO

CLASS III

COPE, BENJAMIN	BOZEMAN	3A	CO
FISCHER, WILLIAM (BILL)	FORSYTH	3A	OT
HARRINGTON, SCOTT	FORSYTH	3A	OT
ATHMAN, BROCK	BOZEMAN	3A4B	OT
BEILER, LEONARD	DARBY	3A4B	CO
BROWN, DEVIN	MISSOULA	3A4B	CO
BURKLAND, BARBARA	HELENA	3A4B	OT
FIELZER, KURT	MISSOULA	3A4B	CO
HALLENIUS, ALEXANDER	BOZEMAN	3A4B	OT
JOSLYN, CHARLES	CHOTEAU	3A4B	CO
KOPLAND, ROBERT	GARDINER	3A4B	CO
LINDBERG, FRED A.	HUNGRY HORSE	3A4B	CO
NOLAND, GERALD	PABLO	3A4B	CO
WAGNER, KEVIN	ROUNDUP	3A4B	OT
WALLACE, MICHELLE	FAIRFIELD	3A4B	CO
FRANZEN, ROBIN	BELT	3C	CO
GARRISON, JACKSON	ROUNDUP	3C	OT
NOLAND, GERALD	PABLO	3C	CO
WAGNER, KEVIN	ROUNDUP	3C	OT

CLASS IV

DAVIS, CHRISTOPHER	LOMA	4A	OT
EAKINS, CHRISTOPHER	MALMSTROM AFB	4A	CO
HOPPER, MICHELLE	MALMSTROM AFB	4A	CO
KLINGENBERG, TIMOTHY	MALMSTROM AFB	4A	CO
SHERETON, LLOYD	MALMSTROM AFB	4A	CO
WHITMAN, THOMAS LEE	NORTH VALLEY	4A	CO
BOURK, TIM	BOZEMAN	4AB	CO
DEMARCO, ANTHONY	MARION	4AB	CO
ESCHENBACHER, WAYNE	SAVAGE	4AB	CO
EVANS, DAVID	CROW AGENCY	4AB	CO
GALLAGHER, BILL	HELENA	4AB	CO
GILHAM, JOHN	GLACIER	4AB	CO
GOFF, B. RANDALL	EUREKA	4AB	OT
JOHNSON, GABRIEL "GABE"	DECKER	4AB	CO
LAFEVER, CARA	BIGFORK	4AB	CO
MARI, MAHONA L.	SILVER BOW	4AB	CO
MARSH, WILLIAM	BAAB	4AB	OT
NERISON, DON	FT. SHAW	4AB	CO
SMITH, ROBERT	COOKE CITY	4AB	CO
WARDELL, ROQUE	FT. HARRISON	4AB	OT
WELCH, MICHAEL	BIG SKY	4AB	CO
WHITE, DUSTIN	BILLINGS	4AB	CO
WILKINS, BRIAN	HELENA	4AB	CO
BULIK, BRUCE	FAIRFIELD	4C	CO
DURFEY, GARY	HOBSON	4C	OT
GUSTAFSON, KEITH	FAIRVIEW	4C	CO
KAISER, GARY	CHESTER	4C	CO
KLEINSASSER, JOHN	CHESTER	4C	CO
MCNAC, LENEY	ASHLAND	4C	CO
NELSON, FREDRICK	LINCOLN	4C	CO
TALKINGTON, LINDSAY	CHOTEAU	4C	CO
WALDNER, JOHN	HAVRE	4C	CO

CLASS V

ANDERSON, RONALD	LEWISTOWN	5AB	CO
BURT, GARY	BUTTE	5AB	CO
CAMPBELL, JASON	GREAT FALLS	5AB	CO
CATES, DONALD	LEWISTOWN	5AB	CO
CLARK, RICHARD	MISSOULA	5AB	CO
ESTABROOK, ROGER	BUTTE	5AB	CO
GLASGOW, GREGG	BILLINGS	5AB	CO
HOFER, JASON	TURNER	5AB	CO
HOON, MICK	KALISPELL	5AB	CO
MALSAM, JAY	GREAT FALLS	5AB	CO
MCCAUGHEY, SHARI	BUTTE	5AB	CO
OLSON, MICHAEL P.	BILLINGS	5AB	CO
OLSON, ROBERT	LEWISTOWN	5AB	CO
ROBINETTE, BRADLEY	COLUMBUS	5AB	CO
ROHNER, TERRANCE	SIDNEY	5AB	CO
THOMPSON, TYLER	LAKESIDE	5AB	CO

FC = Fully Certified
OT = Operator-in-Training
A = Water distrubution Operator
B = Water Treatment Operator
C = Wastewater System Operator
D = Industrial Wastewater Operator
AB = Well Water Supply Operator

Congratulations Operators!!

The examinations for certification require considerable time in study and preparation. It represents a lot of hard work and initiative on your part. In behalf of the Department and your employers, we recognize this achievement and show appreciation for working hard to ensure that you are properly trained to protect the public health and safety of Montana

Liz Geary, Operator Certification Technician

Chemical & Radiological Rule Update

By Andrea Vickory
Chemical & Radiological Rule Manager, PWS

Just as a reminder, for the Community and Non-transient non-community public water supplies, the 3-year compliance period (2005-2007) is coming to an end in December 2007. For the systems that monitor every three years their sample reports are due. Many times systems wait until November or December to sample which does not necessarily guarantee the reports will make it DEQ PWS by the January 10th reporting deadline. You may want to sample earlier just for this reason.

Non-transient non-community public water supplies were required to sample for arsenic as part of the 2006 rule revision. This became a new sampling requirement for this class of systems, with many of them required to sample every three years. An arsenic informational page has been set-up on the DEQ website to assist systems through the arsenic MCL exemption process and to provide additional information for the systems to use to educate the public if desired.

December 2007 also marks the end of the radiological initial monitoring period for community systems. This required four consecutive quarters of samples. In some instances the state has been able to waive the last two quarters sampling. If the system is waiting to sample the last quarter radiologicals with other chemical samples, they may want to separate them out since the radiologicals have a longer holding time at the lab which may conflict with ability to meet the January 10 reporting timeline.

Also, note worthy are the slight changes to the DEQ PWS website report. Now you can easily view lead and copper summaries and identify the disinfection/disinfection by product sample results.

Monitoring schedule reports and postcard reminders are being sent out more frequently to assist the systems in their monitoring requirements. ■

Did You Ever Wonder……..

How many new public drinking water sources are approved each year in Montana?

The numbers vary from year to year, but from June 2006 to July 2007 the number of new drinking water sources approved by DEQ was around 75. In 2006, the number was about the same. In 2003, approximately 44 new PWS sources were approved.

The Montana Bureau of Mines and Geology records well logs and tracks the number of new wells completed each year. Since January 2003, approximately 36,000 new wells in Montana have been recorded. That averages out to more than 650 new wells per month. Most of these are probably for domestic water supplies. ■

Ground Water Rule Update

The United States Environmental Protection Agency (EPA) recently finalized the Ground Water Rule (GWR). In December 2009, all public water systems that utilize groundwater (both community and non-community) will have to comply with the GWR. So what exactly does this entail?

The GWR includes two main components, triggered monitoring, and sanitary surveys.

Triggered Monitoring

Beginning in December 2009, if a groundwater system has a positive Total Coliform Rule (TCR) monitoring result, it will be required to test each groundwater source for a fecal indicator. If this triggered source water monitoring is confirmed positive, the system will be required to perform corrective actions.

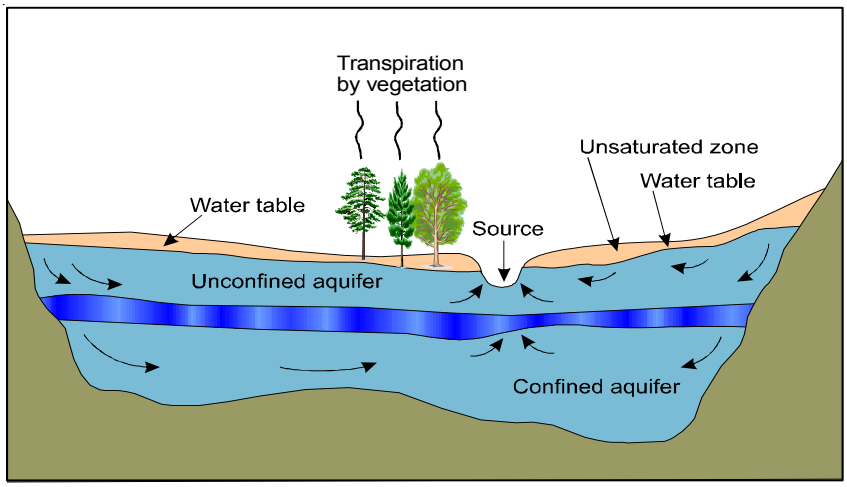
Sanitary Surveys

As a component of the GWR, the Montana Department of Environmental Quality must incorporate a list of 'significant deficiencies' into regulation. These deficiencies are those that are causing, or have the potential to cause, contamination of the water supplied to customers. DEQ is required to establish at least one significant deficiency in regulation for each of the eight required elements of a sanitary survey. Any significant deficiency identified during a survey will require the water system to perform corrective action. The corrective actions for the two components above are also outlined in the GWR. They are:

- correct all significant deficiencies;
- eliminate the source of contamination;
- provide an alternate source of water, or provide treatment which reliably achieves 99.99 percent (4-log) inactivation or removal of viruses.

The GWR is very detailed – you should start to familiarize yourself with it now. A great resource for more information is EPA's website (www.epa.gov/ogwdw/disinfection/gwr/index.html). The site includes the full text of the GWR, as well as helpful guidance for public water systems.

If you have questions on the GWR, please contact Kate Miller at (406) 444-4400. ■



Arsenic and Your Distribution System

This fact sheet helps water system owners and operators understand and respond to issues that may arise with arsenic in the distribution system, or with distribution system concerns resulting from the installation of arsenic treatment. Although arsenic is measured at the entry point to the distribution system for compliance determinations, you should be aware that arsenic levels could increase in the distribution system at any time due to a number of factors. It is important to remember that any process changes, including chlorination, can impact your distribution system and the water quality at customers' taps.

Arsenic Can Build Up on and Release in Pipes and Storage Tanks

Public water systems with arsenic in their raw water may find that scales on pipes and other components in their distribution systems contain relatively high arsenic concentrations. These arsenic-rich scales can become dislodged and suspended in the water, and may be ultimately delivered to consumers.

Arsenic has been shown to attach to iron in distribution system pipes. Because iron is so effective at binding with arsenic, corrosion deposits can have high concentrations of arsenic solids. In a recent study, arsenic levels found in solids that were collected after pipe sections and hydrants were flushed were as high as 13.65 milligrams of arsenic per gram of solid. Most of the remaining solid was composed of iron.

It is known that even if your water has detectable levels of arsenic that are below the 0.010 mg/L MCL, and you have iron pipes or components in your distribution system, your system's pipes may have arsenic-rich scales attached to them. As long as the scales are not disturbed, they will remain attached to the pipes or other distribution system components. Certain conditions, such as flushing of mains or fire flow conditions, may result in those scales being sloughed off and suspended in the water, releasing the arsenic. Other conditions, such as changes in water chemistry, may result in some of the arsenic dissolving back into the water. Both of these situations could cause high arsenic levels at consumers' taps.

Arsenic Control Measures Can Affect Finished Water Quality

Public water systems installing arsenic treatment should be informed about possible changes to their finished water that may result from the arsenic treatment they install. For example, systems may need to adjust their finished water quality to address new concerns about corrosion. Changes in water chemistry due to using new sources, blending different source waters, or installing arsenic treatment are some of the factors that can affect distribution system water quality. In some cases, this may cause an increase in arsenic levels in the distribution system or create simultaneous compliance issues with other drinking water regulations.

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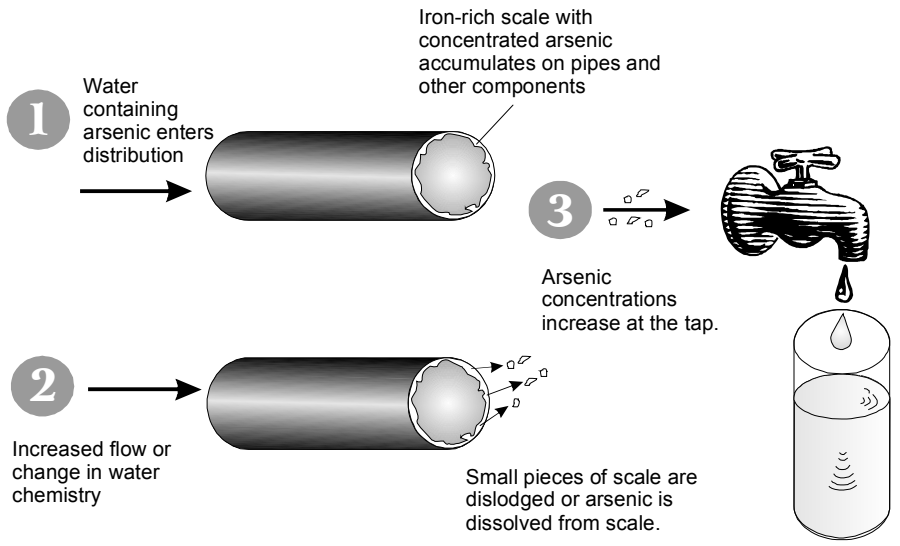
How Arsenic Can Increase in Your Distribution System



Research is still needed to understand what water quality conditions cause arsenic in pipe scales to be re-suspended or dissolved back into the water. In the meantime, if you now have, or have had, arsenic in your raw water and your distribution system contains iron pipes or other iron components, realize that you may have arsenic buildup in scales.

Arsenic and Your Distribution System - *continued from page 13*

▶ Switching to a New Source or Blending Sources

If you plan on switching wells or blending sources to meet the arsenic MCL, remember that the new well's water may react differently in your distribution system than the water you were using before. Be sure you understand the new well's water quality characteristics like pH, alkalinity, and iron and manganese concentrations. Changes in these water quality parameters could impact lead and copper as well as arsenic levels, disinfection by-products, and aesthetic characteristics like taste, odor, and color.

▶ Reducing pH During Treatment

Some arsenic treatment technologies require the pH to be reduced as a treatment step. If your system has adopted one of these techniques, be sure your pH is raised to a level that will not cause corrosion problems in your pipes. If you already have a corrosion control program in place, review whether you will need to adjust your corrosion chemical dose in response to any change in your water quality resulting from the installation of arsenic treatment. Keep in mind that adjusting the pH upward for lead and copper control may also cause arsenic to be released from scale on pipes and components.

▶ Installing a Treatment Technology that Uses Iron

If you have installed an arsenic removal treatment technology that uses iron, you should not see elevated levels of iron in the water entering the distribution system if the treatment technology is being operated properly. However, if the treatment technology has been recently installed and operational adjustments are still being made, you may see elevated iron levels after treatment. You may also see elevated iron levels if you are blending with iron-rich water. In these cases, keep in mind that arsenic adsorbs on to iron, and the iron may deposit in your pipes and storage tanks. This arsenic-rich iron could dislodge and be re-suspended in the water when flows increase. If this happens, consumers may receive pulses of water containing high levels of arsenic and iron, and should be warned not to consume the water if it appears rusty in color.

▶ Using Activated Alumina or Enhanced Coagulation with Alum

If you plan on using activated alumina or enhanced coagulation with alum to treat your water, consider testing the water periodically for aluminum in the distribution system. While not a concern in terms of health effects, aluminum concentrations as low as 0.05 mg/L can result in customer complaints about particles or color in their water.

Is Arsenic in your Storage Tank?

Water systems may also find deposits of arsenic-rich particles in their storage tanks or at locations in their distribution system with low flows. If the flow is increased or a storage tank is drawn down to a low level, these arsenic-rich particles can get stirred up and transported to consumers' taps. This situation occurs primarily when iron media used in treatment are released into the distribution system, or when iron particles are not properly filtered out during iron removal treatment. If these treatment technologies are operated correctly, this should not be a problem for most water systems.

How Can I know if Arsenic is a Problem in My Distribution System?

Drinking water regulations require public water systems to monitor for arsenic at the **entry point** to the distribution system. There is no federal requirement for systems to monitor for arsenic **within** the distribution system. You may, however, want to test your distribution system water for arsenic to be sure that the water being delivered has arsenic levels below the MCL. If you decide to monitor your distribution system, consider testing for arsenic at locations where the settling and accumulation of iron solids or pipe scales are likely (i.e., areas with cast iron pipe, ductile iron pipe, or galvanized iron pipe).

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Arsenic and Your Distribution System - *continued from page 14*

If your water system has installed some form of arsenic treatment, keep in mind that the treatment you installed may change the water quality in other ways. It might cause the water to react differently in the distribution system. Depending on the kind of treatment you've installed, consider what distribution system problems might result.

A change in the taste, odor or appearance of the water at customers' taps may be the first indication of a problem. Some water quality parameters to consider monitoring, depending on your arsenic treatment technology, include iron, pH, manganese, alkalinity, and aluminum.

Is Your Ground Water System Installing Disinfection for Pathogen Control

Water systems that disinfect their water should be aware of the possibility of an increase in arsenic concentrations in their distribution system, particularly if the water contains high concentrations of dissolved iron. When chlorinated, the dissolved iron forms particles on which arsenic can accumulate. As a result, high arsenic concentrations may occur in distribution system water even if arsenic concentrations in the raw water are below the MCL.

This happened to a small community water system in the Midwest that began chlorinating water from a series of wells that had raw water arsenic levels between 0.003 and 0.008 mg/L and iron concentrations up to 0.4 mg/L. At the same time, the system installed a polyphosphate feed system for corrosion control. Soon after chlorination began, the system received intermittent colored-water complaints from its customers with increasing frequency across the distribution system. Samples collected from several representative locations throughout the service area had a reddish-brown color and contained particles. A metals analysis showed high levels of copper and iron oxides in the finished water, along with arsenic concentrations approaching 5 mg/L. Because of the water's colored appearance, it was considered unlikely that customers would consume the water. Doctors and health care professionals were notified of the situation and instructed to watch for signs of arsenic poisoning.

Researchers found that chlorinating the water caused the formation of ferri-hydroxide solids. The minimal arsenic present in the groundwater was being concentrated as it absorbed onto the solids. Copper oxide particulates also formed and were released. To some extent, the polyphosphates served a useful role by keeping iron in solution and counteracting the tendency for the iron oxides to form, but additional steps were needed. For six months the system alternated their chlorination schedule: on for one day then off two days. The system then returned to full-time chlorination, starting with a low distribution system residual of 0.2 mg/L and gradually increasing it to 0.5 mg/L. The system continued to flush water mains on a semi-annual schedule using an unidirectional approach. In the last year, the system received only one colored water complaint.

For more details on this case, see "Well Water Disinfection Sparks Surprises" by Steve Reiber and Glenn Dostal, Opflow Vol. 26 No. 3, March 2000.

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Arsenic and Your Distribution System - *continued from page 15*

How Can I Prevent Arsenic Accumulation in My Distribution System?

There are a number of management techniques that can be used to help keep arsenic levels low in the distribution system. They include:

- Optimize treatment operations for turbidity removal.
- Check finished water pH and alkalinity after arsenic treatment is installed. If they have changed, consider whether corrosion control practices need to be modified.
- Adopt a unidirectional flushing program for water mains.
- Clean and maintain your storage tank(s).
- Optimize distribution system operations to minimize water age. This practice will prevent sediment accumulation and water quality deterioration.
- Operate valves and hydrants to avoid sudden changes in flow direction or velocity. This practice will prevent the resuspension of sediments into the water column.
- Monitor arsenic levels at drinking water taps, hydrants, and low flow dead-end areas.

What Should I Do if Distribution System Arsenic Levels are High?

▶ Consider Notifying the Public

Even if your water system has not violated the arsenic standard, you may want to notify consumers that you have detected arsenic levels in the distribution system exceeding the MCL. If you make such notice, consider using the following standard public health effects language for arsenic:

> *Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.*

You may also want to explain how you plan to fix the problem. For example, if you plan on cleaning or flushing the distribution system to remove scale from the pipes, explain briefly what you will be doing, when you'll be doing it, and when you expect the problem to be addressed.

▶ Consider Distributing EPA's Consumer Fact Sheet on Arsenic

EPA has developed the fact sheet Arsenic in Your Drinking Water—Just the Facts for Consumers that explains the health risks associated with having elevated levels of arsenic in your drinking water. This fact sheet is available on the web at www.epa.gov/safewater/arsenic/basicinformation.html**.** Color copies are also available by calling the Safe Drinking Water Hotline at 1-800-426-4791. Consider distributing the fact sheet as part of your public education effort if you think you have arsenic problems in your distribution system.

For More Information on Managing Your Distribution System:

Distribution Systems: A Best Practices Guide (EPA# 816-F-06-038)

AWWA. 2004. AWWA Standard G200-04: Distribution Systems Operation and Management. Denver, CO.

Lytle, D. A.; Sorg, T. J.; Frietch, C. 2004. Accumulation of Arsenic in Drinking Water Distribution Systems. *Environ. Sci. Technol*. 38(20); 5365-5372.

Distribution System Research – http://www.epa.gov/nrmrl/wswrd/dw/dsr.html ■

Statistics From Summer Water School Exams
Helena, Montana – June 22, 2007

Water Distribution		Pass	#70-70	#80-89	#90-99	#100	FAIL	#60-69	#50-59	#40-49	#<40
1A		0%					0%				
2A		0%					0%				
3A		0%					0%				
4A		0%					0%				
WD TOTAL	**0**	**0%**	**0**	**0**	**0**	**0**	**0%**	**0**	**0**	**0**	**0**

Water Treatment		Pass	#70-79	#80-89	#90-99	#100	FAIL	#60-69	#50-59	#40-49	#<40
1B	1	0%					100%	1			
2B		0%					0%				
3B		0%					0%				
WT TOTAL	**1**	**0%**	**0**	**0**	**0**	**0**	**100%**	**1**	**0**	**0**	**0**

Combination WD/WT		Pass	#70-79	#80-89	#90-99	#100	FAIL	#60-69	#50-59	#40-49	#<40
2A3B	1	100%	1				0%				
3A4B		0%					0%				
4AB	7	71%	1	4			29%	2			
5AB	2	100%	1	1			0%				
COMB TOTAL	**10**	**80%**	**3**	**5**	**0**	**0**	**20%**	**2**	**0**	**0**	**0**

Wastewater Plant		Pass	#70-79	#80-89	#90-99	#100	FAIL	#60-69	#50-59	#40-49	#<40
1C	3	67%	2				33%	1			
2C	1	100%	1				0%				
3C	3	67%		2			33%	1			
4C	1	100%	1				0%				
WW TOTAL	**8**	**75%**	**4**	**2**	**0**	**0**	**25%**	**2**	**0**	**0**	**0**

TOTAL EXAMS	19	Pass 74%	#70-79 7	#80-89 7	#90-99 0	#100 0	FAIL 26%	#60-69 5	#50-59 0	#40-49 0	#<40 0

Failed	**5**
Passed	**14**
7	**CO**
8	**OT**

* Numbers of CO & OT reflect combined exams where an operator could be CO in one and OT in the other one.

Financing for Environmental Compliance

In the next twenty years cities, counties, and tribes will need to spend billions of dollars to improve capital assets and remain in compliance with federal environmental laws. Financing environmental capital assets can be daunting. How can a government raise millions of dollars of revenue necessary to purchase capital equipment? What is the best financing method to pay for environmental capital assets? Do current management methods optimize capital costs? The EPA recently launched a new web page to assist cities, counties, and tribes with the financial planning process for environmental compliance.

The following steps can help guide city representatives through the process of developing a financial plan to maintain compliance with current and future EPA regulatory requirements. At a minimum, EPA recommends that steps 1–3 be completed first as they create the foundation for the subsequent steps.

Step 1: Assemble a Team

Determine which municipal employees should be involved in the capital asset financing process. To be effective the team should include technical, financial political representatives, and a community liaison.

Step 2: Conduct a Need Analysis

Develop an inventory of current system costs and forecast future capital asset needs and associated costs. This step will create a financial needs baseline.

Step 3: Define Project Goals

Set clear goals and objectives for the project.

Step 4: Devise Technical Solution

Analyze various technical options and construct the best solution

Step 5: Conduct Rate Analysis

Conduct a rate analysis to learn whether current rates cover current costs. Determine whether the current rate structure will cover future costs.

Step 6: Complete a Community-wide Financial Analysis

See how the financial resources necessary to improve environmental capital assets can mesh with community-wide projects and financial commitments. Assess existing (internal and external) financial resources available for environmental capital asset acquisition.

Step 7: Select Financial Options

There are four main financing options. They are:

1. Municipal revenue-generating authority
2. Grants
3. Loans
4. Bonds

System privatization is another option available to communities.

Step 8: Create and Communicate the Project Financial Plan

Once the above steps have been completed, the information can be summarized and used to communicate the goals, costs, and deadlines of the project.

A detailed description of the process and financing options can be located at the EPA's new web site which is www.epa.gov/compliance/assistance/financing/index.html ■

Protect Your Source by Working With Local Government

Communication between public water system (PWS) owners, operators, and city or county government staff is very important when working to protect drinking water sources. DEQ's Source Water Protection Program (SWAP) completed Source Water Assessment reports for Montana's public water systems. Public water system operators should be familiar with the assessment reports for their PWS. The assessment reports discuss the susceptibility of drinking water sources to contaminants and demonstrate the importance of land use in the source areas so operators can maintain potability and adequacy of supply. Typically, the more densely developed an area, the less protection sources have. This could adversely impact drinking water quality. It is also important to be sure that local government staff involved in land use decisions are aware of these drinking water sources. Operators should work with PWS owners to control as much of the source area as possible, be aware of the existing land uses surrounding the sources, and communicate with local government officials that make land use decisions.

Here are some tips on protecting your drinking water sources:

- Get the SWAP reports for your systems, available on the DWS webpage at: http://nris.state.mt.us/wis/swap/swapquery.asp
- Check with the city and county government to see who makes the land use decisions that may affect your sources. It may be a city or county planner, planning and zoning, a land use official or a commission.
- Talk to the city or county planner who reviews current and future drinking water sources so your system sources will be taken into consideration if nearby development is proposed.
- Talk to your local health department about your source and any concerns you may have. They often are involved with project approvals such as subdivisions and work to advise local officials on these issues.
- Work with all the involved parties now to prevent any future source issues. Take a proactive approach before an adjacent parcel gets developed.

For more information, contact the Source Water Protection Section at DEQ at 406-444-6697. ■

Understanding Water Test Reports*

Understanding your water test reports is the first step in understanding the quality of the drinking water you get from your sources. Unfortunately, there is no consistent format across the United States for these reports and for the non-chemist the information is frequently difficult to understand. There are some items that are likely to appear on most test results reports. In many cases, this information is set up in a table format. Listed below are brief explanations:

Analyte or Parameter
What compound, substance or organism was tested for.

Test Method
Usually an EPA or state approved method for the specific analyte identified with an alphanumeric designation (eg. EPA 200.8 for metals)

Result
The measured value from the test. This is reported as a concentration (weight per unit volume) for many chemicals and metals. Typically, the label for the value is listed as milligrams per liter (mg/L) or micrograms per liter (ug/L). These are also referred to as parts per million (ppm) or parts per billion (ppb), respectively. For bacteriological monitoring, the results are handled differently than for compounds and metals. The results are reported as "Total Coliform" absent or positive, and "E. coli coliform" absent or positive.

Water Testing Lab - photo by Montana Water Center

Method Detection Limit (MDL)
This limit is the smallest concentration that the test method can "see" or find in the sample. If the analyte is present at a concentration above the MDL, a value will be listed in the "Result" column. If the analyte is not detected it may be noted in the "Result" column in a number of ways including notations such as BDL (below detection limit), ND (non detect) or with a less than symbol (<) next to the Method Detection Limit value.

Maximum Contaminant Level (MCL)
The EPA has established maximum contamination levels for a number of compounds and metals at a level that will protect human health. MCLs are legally enforceable limits for public water supplies (often used as health benchmarks by private well owners). Secondary MCLs exist for compounds that do not pose health risks and are set up to control the aesthetic quality of the water. The MCL for total coliforms is a bit different.

- MCL for systems analyzing at least 40 samples/month: *no more than 5.0 percent of the samples collected during a month may be total coliform-positive.*

- MCL for systems analyzing less than 40 samples/month: *no more than 1 sample/month may be total coliform-positive.*

*Adapted from *The American Well Owner*. A Quarterly Publication of the American Ground Water Trust. 2006 Volume 4. ■

DEQ To Revise Wastewater Design Standards

By Moriah Peck, DEQ

Work to revise the Department of Environmental Quality's Circular DEQ 2: Design Standards for Wastewater Facilities began earlier this year. This circular, last updated in 1999, will include standards for newer technologies and revisions to existing standards that are too vague and/or outdated. This updated circular will include new standards and guidelines for technologies such as: biological nutrient removal, sequencing batch reactors, membrane bioreactors, and wetlands. Substantial revisions are also being made to sections dealing with ultraviolet disinfection, land application of effluent, and infiltration basins.

The circular is currently being updated by a committee of DEQ staff members. These staff members include engineers and technical assistance providers from DEQ's State Revolving Fund Section, as well as engineers from the Public Water and Subdivision Bureau and Water Protection Bureau. The Department is considering combining DEQ 2 standards with Circular DEQ 4: Montana Standards for Subsurface Wastewater Treatment Systems so that all wastewater treatment design standards can be found in one document.

The process for revising these standards will include a mailing of the proposed changes to engineers and interested parties throughout the state soliciting comments and concerns over the proposed changes. Once the Department has made changes in response to the comments received, a rule package will be submitted to the Board of Environmental Review for consideration. It is not expected that this rule package will be submitted until late next year.

For questions concerning the proposed changes, please contact Paul LaVigne, Environmental Engineering Manager for the Water Pollution Control State Revolving Fund Section of DEQ at (406) 444-5321. ■

Wetlands in Montana

by Lynda Saul

In 1988, the United States established a national wetlands protection policy intended to achieve no overall net loss of the nation's remaining wetland base in both amount and health as defined by acres and function. In 2004, President Bush expanded that policy to include a goal of national net gain. Despite laws and policies enacted to protect them, wetlands across the nation continue to be drained, filled, and degraded. Yet these areas protect and improve drinking water quality; restore the water quality of lakes, rivers, and streams; filter out polluted runoff from our water supply; absorb floodwaters; recharge groundwater; provide fish and wildlife habitat; and offer natural areas for recreation.

Montana has lost about one third of its original wetland base as a result of draining and filling since white settlement. In addition, countless acres have been lost due to diminished quality, a result of inappropriate adjacent land use and other impacts. Wetlands now comprise less than one percent of Montana's land mass and less than four percent of Montana are riparian areas. Recognizing the value of these ecosystems and the essential connections between clean water and our wetlands, riparian areas, and floodplains, the Montana Wetland Council believes that wetlands must be conserved.

The Montana Wetland Council (MWC) was formed in 1994 following a "Wetland Summit" that brought together a broad cross-section of Montanans to discuss issues and concerns related to wetlands. Since then the MWC has grown into a networking forum that promotes cooperative wetland conservation and restoration in Montana. Over 400 public, private, and nonprofit representatives of diverse wetland interests are involved and informed about the Council's activities. The MWC priorities are implemented by participants through their agencies and organizations, by specific projects supported mainly by the U.S. Environmental Protection Agency, and by other grants.

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Wetlands in Montana - *continued from page 21*

The Montana Department of Environmental Quality (DEQ) has led the MWC since its inception. The Montana Wetland Council is an important component of DEQ's mission to protect, sustain, and improve a clean and healthful environment to benefit present and future generations. The DEQ Wetland Program Manager provides consistent leadership and staff support to the MWC, and acts as a point person for wetland issues across the state. The MWC meets three times a year in Helena and has an active e-mail listserve to alert participants of important policy, management, and protection opportunities for Montana's wetlands. DEQ administers EPA Wetland Program Development Grants that implement the Montana Wetland Council's Conservation Strategies.

In 1997, MWC participants developed the "Draft Conservation Strategy for Montana's Wetlands." The purpose was "to establish a framework to guide and facilitate the protection, conservation, and management of Montana's wetlands for present and future generation in partnership with private landowners; federal, tribal, state, and local governments; economic interests; and conservation organizations."

Over the past decade, the MWC has used the 1997 "Draft Conservation Strategy" to prioritize wetland protection, conservation, and management work. In the interim, wetland issues have become more complex, the ongoing drought in Montana has exacerbated chronic water shortages, and residential growth and land development has accelerated. The MWC leadership agreed that it was time to evaluate progress and challenges over the last ten years and move the Council from an informational forum to an action-oriented network. To do that, MWC needed to embark on strategic planning and develop a new document to guide future efforts. The result is "Priceless Wetlands: A Strategic Framework for Wetland Conservation and Restoration in Montana 2008–2013." This strategic plan relies heavily upon member participation to move conservation forward, using coordinated conservation activities that the Montana Wetland Council has collectively agreed will make a difference.

If you would like more information on wetlands in Montana or would like to be added to the wetland council, please contact Lynda Saul at MT DEQ at 406 444-6652 or by email at lsaul@mt.gov. ■

Photo by Montana Water Center

photo by bigskyfishing.com