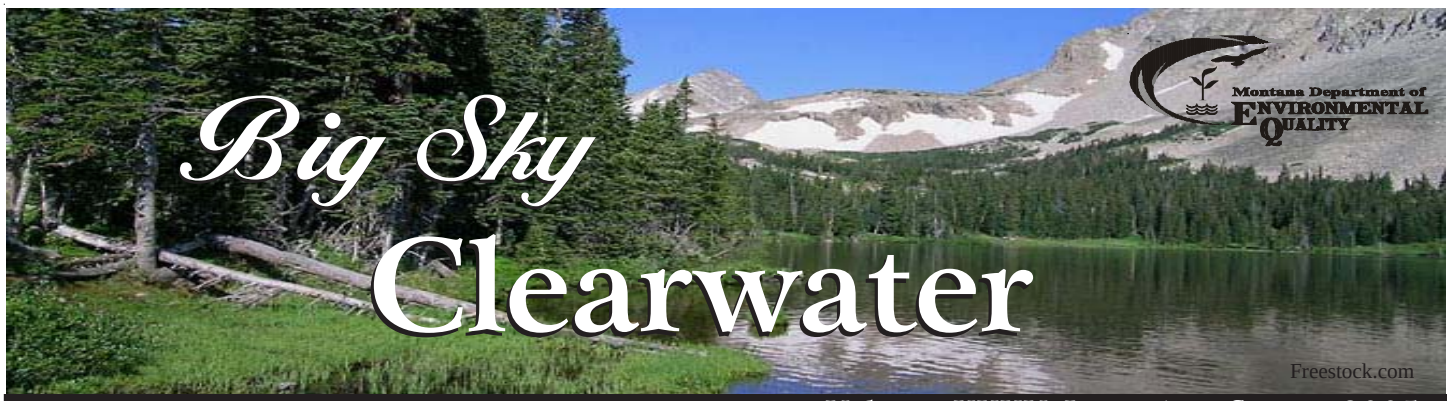

Volume XXXV, Issue 1 — Spring 2005

Chemical Monitoring Waiver Program

By Greg Butts, MT DEQ - Kalispell

There is a chemical monitoring waiver program for public water supply systems in Montana!

These waivers are available to all community and non-transient, non-community water systems that submit a written application and meet the waiver program requirements. There are four groups of contaminants that have monitoring waivers available.

The first is the contaminant asbestos. Asbestos is a mineral, inorganic contaminant that is normally sampled once for each nine-year compliance cycle. The sample is taken in the distribution system, from an area that has asbestos/cement (A/C) water main pipe. If your system does not have A/C pipe, you can fill out an asbestos monitoring waiver form, which will eliminate the requirement for sampling. In addition, there is a statewide waiver for asbestos monitoring of your source water. Statewide waivers apply to all public water supply systems.

The next group of contaminants is the inorganic chemicals. The inorganic chemicals are divided into two subgroups, the Phase II and Phase V inorganics (Phase II = barium, cadmium, chromium, fluoride, mercury and selenium; Phase V = antimony, beryllium, nickel and thallium). To receive a monitoring waiver for either subgroup or individual contaminants, the water system must have completed three rounds of sampling and analysis. The waiver

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Inside This Issue

Big Sky Clearwater

Volume XXXV, Issue 1

Spring 2005

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:

EDITOR: Big Sky Clearwater
Montana Department of Environmental Quality
1520 East Sixth Ave. • Metcalf Building
P. O. Box 200901
Helena, MT 59620-0901

Visit our website at:

http://www.deq.mt.gov
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The *Big Sky Clearwater* is published twice a year by the
Montana Department of Environmental Quality's
Planning, Prevention and Assistance and the Permitting and Compliance Division

Chemical Monitoring Waiver Program - *continued from page 1*

program manager will review the monitoring history, water quality data and any treatment in determining which chemicals qualify for reduced monitoring.

The organic chemicals have available waivers but the application process is substantially different from the others. This group includes the synthetic organic chemicals, which utilize three EPA Analytical Methods (515.1, 525.2 & 531.1), and the volatile organic chemicals (Method 524.2). There are two types of waivers available for organic chemicals, the use waiver and the susceptibility waiver. The application for an organic use waiver requires quite a bit of information from the water system including; aquifer characteristics, land use in the designated inventory area, inventory of contaminants for each land use and maps illustrating all of this. The susceptibility waiver requires this same information and a hydrogeologic analysis of the susceptibility of the source to contaminants. Some of this information is being collected by the Source Water Protection folks, in the preparation of a Source Water Delineation and Assessment Report. This report is being, or has been, prepared for each public water system and can be very useful when completing the application for either a use or susceptibility waiver.

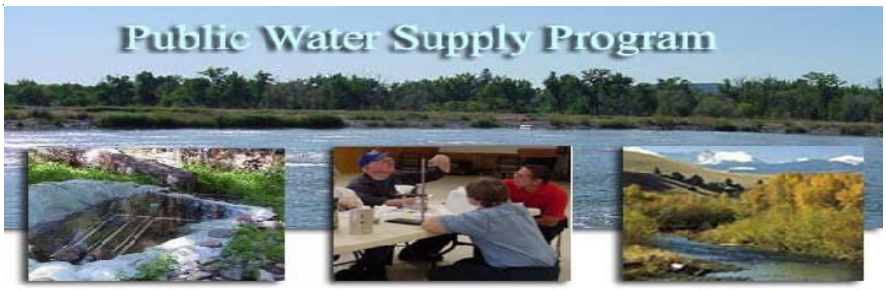
The final type of waiver is for lead and copper monitoring. Under the Minor revisions of the Lead and Copper Rule, small systems that meet the materials and monitoring requirements may apply to the state to reduce monitoring frequency to once every nine years. The requirements for this "no-risk waiver" are:

a. The system must certify that the distribution system contains insignificant amounts of copper and lead metal components.

b. Baseline monitoring must be completed and the most recent round of sampling must demonstrate 90th % concentrations of copper below 0.65 mg/L and lead 90th % concentrations below 0.005 mg/L.

In conclusion, the chemical monitoring program for the state of Montana is actively assisting public water systems in reducing monitoring costs by issuing waivers and helping systems understand the complex monitoring regulations. Some of the waivers do require periodic renewal, but all of them will save money for the water system. There is information about the available waiver on the internet at: **www.deq.mt.gov/wqinfo/pws/Waivers.asp**.

You can also call Greg Butts (755-8985) for information about inorganic, organic and asbestos waivers, or Sam Martinez (444-5313) for information about lead and copper waivers. ■



www.deq.mt.gov/wqinfo/pws/Waivers.asp.

New Opportunities for Solving Acid Mine Drainage Problems in Rural Montana

By Bill Botsford and Ted Duaime

The small town of Belt, Montana, 22 miles south east of Great Falls, was established in the 1880s, primarily because of the coal the area contained. The coal in central Montana fueled the growth of the state. From the 1880s through the 1940s coal was mined from the area and supplied fuel for railroads, smelting and other industrial use and home heating. The Central Montana coalfields, known as the "Great Falls – Lewistown" coalfields, stretch across Cascade, Judith Basin and Fergus counties. Past coal mining resulted in over 400 abandoned coal mines. The Montana Department of Environmental Quality (DEQ), Mine Waste Cleanup Bureau, Abandoned Mines Section (MWCB-AM) has mitigated many of these abandoned mine waste problems. However, Acid Mine Drainage (AMD) remains a problem at some of these sites. Dealing with AMD problems are always difficult and expensive because the water draining from these sites is very acidic (low pH), and high in iron, aluminum and sulfate. These pollutants can severely impact local streams and coulees. Figure 1 is a graph showing water quality from the Anaconda Mine discharge at Belt, Montana.

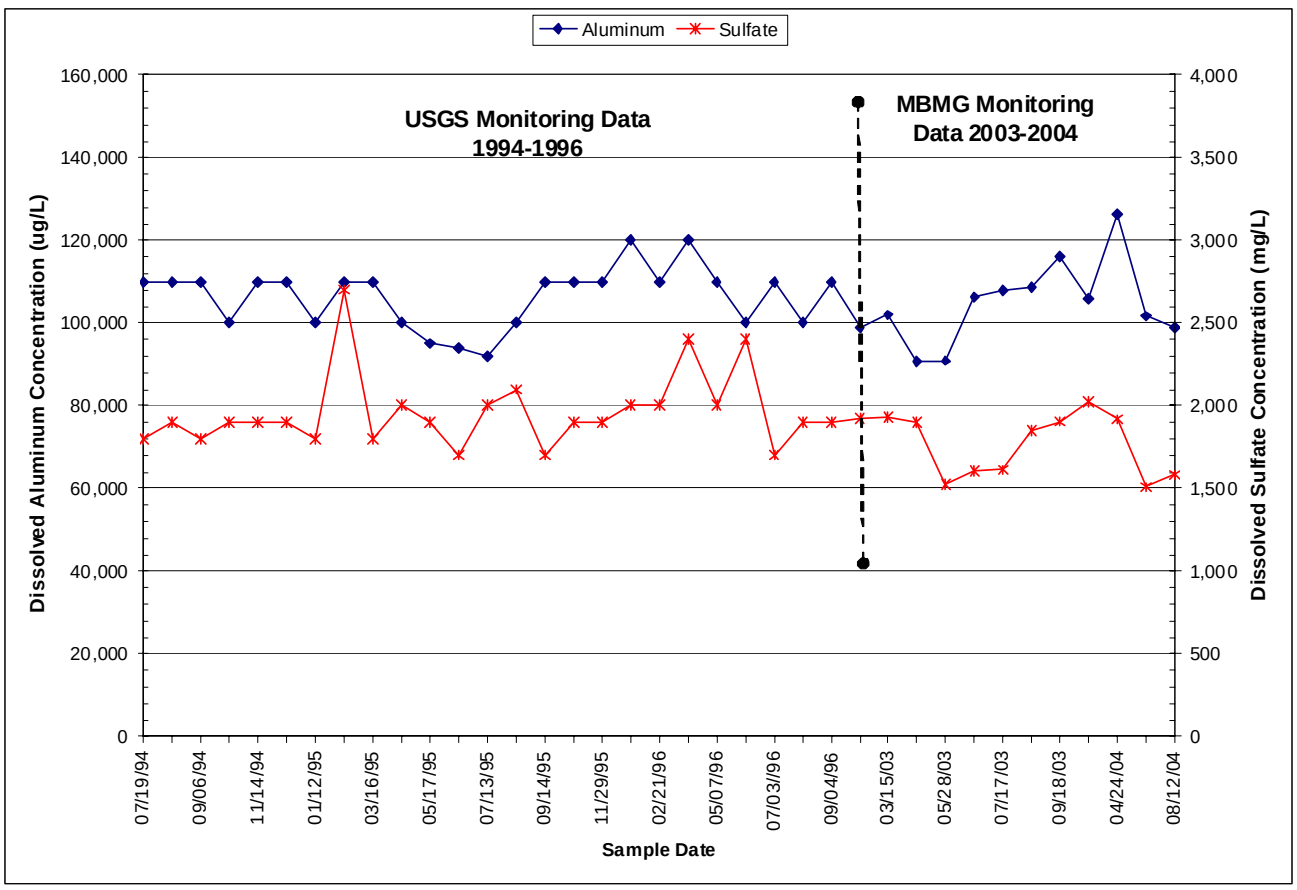


FIGURE 1. Aluminum and sulfate concentrations from discharge water from the Anaconda Mine, Belt, MT.

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New Opportunities for Solving Acid Mine Drainage Problems in Rural Montana - *continued from page 4*

One solution that was considered to address the AMD at Belt and the surrounding area, including Sand Coulee, Stockett and Centerville, was active treatment systems. Over the years DEQ has looked at this as a possible solution, but the funding required for this approach runs into the tens of millions of dollars. Small communities like Belt do not have the tax base to sustain the required capital for operation of an active treatment system.

Another option that was evaluated is treatment through the use of passive wetland systems. In the 1990s the DEQ tried passive treatments. Passive treatment, at the time, was a popular technique and had been used with some success in other parts of the country. But DEQ's attempts at these technologies were not successful in this area because of the high metal and sulfate concentrations and Montana's long cold winters. Precipitate from the high concentration of metals clogged and fouled the treatment systems. Loading with metals and sulfate during the winter decimated wetland treatment efforts. During the limited time the passive treatment system operated, it was never more than 50% effective and water quality standards were never met.

Other early attempts to find a solution to the AMD problem in the Great Falls area included dewatering or preventing water from reaching the area above mine workings. Early work by Montana Bureau of Mines and Geology (MBMG) and DEQ was directed toward trying to eliminate or control the amount of mine recharge. Horizontal drilling into the area over the mine would dewater ground water above the mine workings and eliminate or reduce recharge. However, the horizontal drilling needed to do this proved too expensive. In the mid-1980s a plan to change the crops grown in the agricultural land over the mine site was tried. The majority of the agricultural land at that time was in small cereal grains (wheat and barley), with alternating crop-fallow plantings. Previous research on saline seep problems had demonstrated the increased recharge of local ground water systems from this farming practice. Research also demonstrated the usefulness of selective planting of alfalfa in identified recharge areas to use excess moisture, thus reducing the amount of water entering the local ground water system. The plan was to get the farmers to plant alfalfa in selected areas overlying the mine workings. This would mitigate (reduce) some of the recharge to the mine inherent with dryland farming practices. This program was implemented for three years during which time the rooting depth of the planted alfalfa was monitored, as were water levels and flow rates from selected mine discharges. Whether this plan had a positive affect on the recharge is still a question, as the funding needed to subsidize changes in farming practices to grow the alfalfa was cut and the project was abandoned.

Changes in socio-economic conditions and technical advancements now offer new opportunities to investigate possible solution to AMD. Conversations with MBMG, DEQ, and the Natural Resources and Conservation Service (NRCS) are bearing fruit on that topic. Some ideas being discussed include creating a special practice area in one of the NRCS conservation programs, to encourage landowners to change farming methods in areas recharging the mines. A plan to put diverted clean water to beneficial use has been discussed. Plans may provide some funding to support source control of AMD, such as pumping costs. Discussions have been held with the Department of Interior (DOI), U.S. Bureau of Reclamation to assist with additional drilling costs.

The renewed optimism for solving the AMD problem is the result of current work, which began by in 2001 when DEQ and MBMG looked at source control. To understand what was needed to achieve a source control solution, MBMG and DEQ needed to understand how the mine was being recharged, not only vertically from overlying formations, but laterally as well. DEQ tasked MBMG to begin the development of a three-dimensional model of the mine workings and the surrounding geologic structure and stratigraphy. The goal is to develop a 3-D model that could be used to understand what was occurring within the mine works and how the recharge of surface and ground water was occurring. The model, originally formed with horizontal planar features such as the geologic stratigraphy, now is being transformed to reflect the geologic structure. The stratigraphy and structure of the area in and around the mine has been the focus of the last two years of work. Monitoring wells and boreholes have been strategically placed. The lithology of the drill holes has been logged and downhole videos made. The drilling program aimed at intersecting the mine workings, was highly successful and encountered the mine workings at four locations. Figure 2 shows the major mine haulage routes and locations of recently installed monitoring wells and soil borings.

continued on page 6

New Opportunities for Solving Acid Mine Drainage Problems in Rural Montana - *continued from page 5*

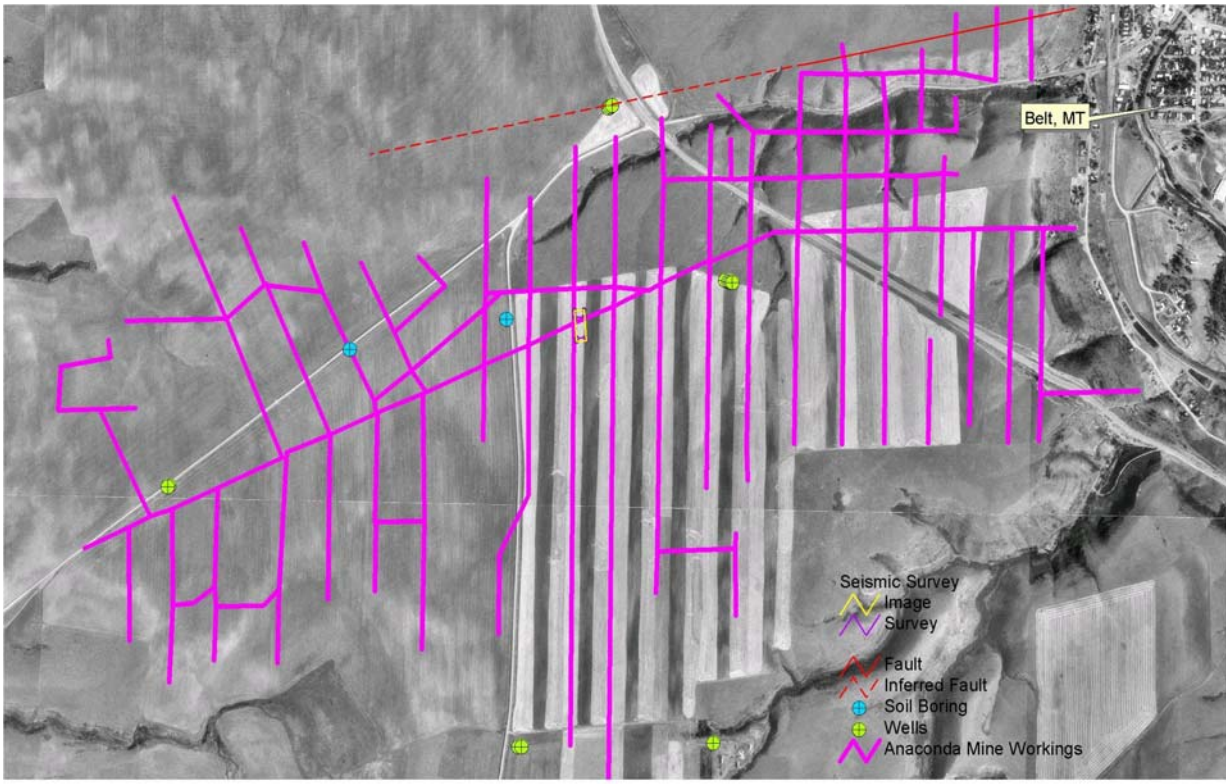


FIGURE 2. Major haulage ways for the Anaconda Coal Mine, Belt, MT, with location of recently installed monitoring wells.

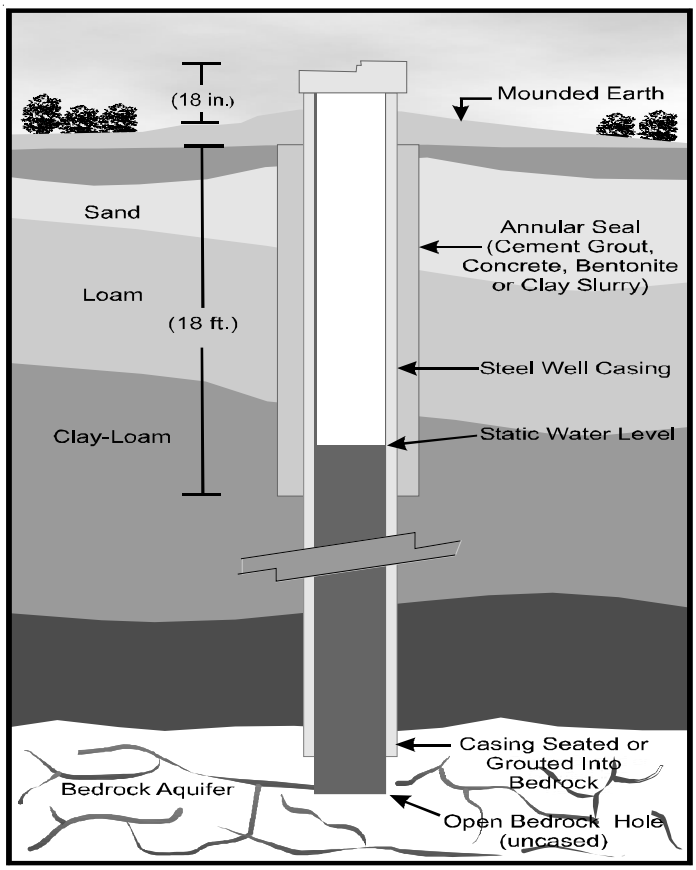
The result of this work is a model which more realistically reflects the true structure of the problem. Geologic mapping over the last two field seasons has pointed to previously unknown faults and geosyncline/anticline pairs. The current work includes adding these folding beds and structure to the model. This will yield a model that can be used to test scenarios for dewatering the mine workings and intercepting and diverting recharge away from them. An additional option to reduce AML is drilling horizontal wells in the formations above the mine. While this was not plausible twenty years ago, new techniques have been developed that make this one of several tools that may help to end the AMD in the area. If successful other sites in the area can be mitigated using a combination of these same methods.

Bill Botsford is the Montana Department of Environmental Quality Project Officer for the Belt Acid Mine Drainage Project and can be contacted by phone at (406) 841-5027 or Email **wbotsford@mt.gov**

Ted Duaime is the Montana Bureau of Mines and Geology Project Hydrogeologist for the Belt Acid Mine Drainage Project and can be contacted by phone at (406) 496-4157 or Email **TDuaime@mtech.edu** for the Belt Acid Mine Drainage Project. ■

Developing A Public Water Supply Well

Development of a new well for a public water supply (PWS) requires the review and written approval of the Department of Environmental Quality (DEQ) prior to beginning construction (Public Water Supply Law, 75-6-112(3)). Test wells that might later be converted to PWS wells also require prior DEQ approval. The purpose of the review is to ensure that public drinking water sources will be sited and constructed in a manner likely to produce an adequate quantity of water meeting drinking water standards. Following is a general outline of the plan submittal and review process. Most new sources should follow this procedure; however, there are always exceptions. If you have any questions about well development requirements, please contact the DEQ Public Water and Subdivisions Bureau at (406) 444-4400. Below are some basic steps to follow:



Water Supply Well Construction

1. **Submit a design report, plans and specifications to DEQ for review of the proposed source location and well construction methods:**

   - For a community PWS*, Circular DEQ 1 applies and a registered professional engineer (PE) is required.
   - For a non-community PWS**, Circular DEQ 3 applies and a PE may be required for more complex systems.
   - Information required with either submittal includes:
     - PWS-6 Source Water Assessment to show that the well will be located to avoid contaminant sources or has barriers to reduce susceptibility.
     - Easement or ownership documentation for a 100-foot continued protection zone around the well.
     - PWS-5 Assessment of Groundwater Sources Under the Direct Influence of Surface Water to see if the proposed well would likely be susceptible to surface water contaminants.

NOTE: *For wells intended to produce greater than 35 gpm, evidence of application for a Beneficial Water Use Permit to the Department of Natural Resources and Conservation (DNRC) is required PRIOR to well construction.*

2. **Well construction may begin after written approval from DEQ.**

   - Plans and specifications must be resubmitted for review and re-approval if construction is not completed within three years of the approval date.

3. **The following must be submitted to DEQ for review and approval of the complete public water system:**

   - Yield and drawdown test data and pump curve;
   - Driller's well log;
   - Design report, specifications and plans for transmission piping, treatment, pumphouse plumbing, pumps, hydropneumatic tanks, etc.

continued on page 8

Developing A Public Water Supply Well - *continued from page 7*

4. **The well may not serve water to the public until certified as-built drawings and specifications have been received by DEQ or the project engineer certifies by letter to DEQ that the well was inspected and found to be constructed in accordance with approved plans and specifications. Certification must include:**

   - Satisfactory bacteriological and nitrate/nitrite test results.
   - Evidence that DNRC water rights requirements are being met.

5. **Within 90 days after well construction, the following must be submitted to DEQ:**

   - Complete set of certified as-built drawings.
   - Final operation and maintenance manual.

6. **Before the end of the first calendar quarter in which the PWS well is connected, the following water quality samples must be submitted to DEQ:**

   - Community or non-transient non-community PWS*:

     Nitrate, nitrite, specific conductance, coliform bacteria (2 tests minimum), pH, temperature, alkalinity, conductivity, turbidity, calcium, iron, manganese, hardness, sodium, sulfate, chloride, inorganic chemicals, volatile organic chemicals, synthetic organic chemicals, radionuclides (community PWSs only), unregulated chemicals.

   - Transient non-community PWS**:

     Nitrate, nitrite, specific conductance, coliform bacteria (two tests minimum).

* Community PWS – Serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

** Transient non-community PWS – Serves at least 25 persons daily (not the same people) for at least 60 days in a year (e.g. cafes, motels, campgrounds).

* Non-transient non-community PWS – Regularly serves at least 25 of the same persons over six months per year. (e.g. schools, daycares).

All necessary approvals must be obtained from the PWS Section at DEQ (444-4400). Source Water Protection staff (444-6697) can provide technical assistance with PWS-6 Source Water Assessment.

Other Information Sources

All DEQ Drinking Water Circulars can be viewed on the Internet at **http://deq.mt.gov/wqinfo/Circulars.asp**

Instructions and templates for completing a PWS-6 report can be viewed on the Internet at **http://www.deq.mt.gov/ppa/p2/swp/Circulars.asp**

Information about potential contaminant sources can be found and mapped at **http://nris.state.mt.us/mapper/** ■

Water and Wastewater Operators' Advisory Council

By Carol Reifschneider

I would like to offer very special greetings on behalf of the Water and Wastewater Operators' Advisory Council and extend the best wishes for a healthful and happy 2005.

The Advisory Council serves the Montana Department of Environmental Quality (DEQ) and its Water and Wastewater Operator Certification Program to develop and maintain highly qualified, professional operators of water and wastewater systems for the citizens of Montana. The Advisory Council is made up of water and wastewater operators, managers, and educators. These individuals include: Joni Emrick, Kalispell wastewater treatment facility Superintendent; Steve Ruhd, City of Conrad Public Works Director; Roger Thomas, City of Billings Public Utilities Division Wastewater Supervisor; Jon Dilliard, MDEQ Public Water and Subdivision Bureau Chief; and myself, Carol Reifschneider, Associate Professor in Water Quality at MSU-Northern. In addition, this past year two individuals were asked to serve on the Advisory Council to replace two retiring members, Bob Cottom and Lee Leivo, who both served the Advisory Council with the highest degree of professionalism and insight. The two new additions to the Advisory Council are: Tony Porrazzo, City of Polson Water Operator, and Roger Skogen, City of Valier Wastewater Operator.

The Advisory Council meets twice a year, in May and during Water School in September. We review and discuss any rule changes that the DEQ needs to put forth, the water schools and the certification exams, and the compliance and enforcement activities undertaken by the Department. The Advisory Council also reviews the status of the operator reimbursement program, the renewal of operator certification, the continuing education for operators and, of course, the fees associated with the licensing of water and wastewater operators.

Please realize that the members of the Advisory Council serve as your source for input to DEQ and the Certification Program on all of these issues. Please feel free to contact any member of the Advisory Council, including the Certification Program Officer, Jenny Chambers, to make your comments on any of the issues identified and especially those concerns that you feel are not being adequately addressed. ■

The Advisory Council contact information is as follows:

Name	Email Address	Work Phone
Carol Reifschneider	reifschneider@msun.edu	265-4126
Joni Emrick	jemrick@kalispell.com	758-7817
Steve Ruhd	pwd@3rivers.net	271-5821
Roger Thomas	thomasr@ci.billings.mt.us	657-8357
Tony Porrazzo	polsonwatersewer@centurytel.net	883-8215
Roger Skogen		279-3361
Jon Dilliard	jdilliard@mt.gov	444-2409
Jenny Chambers	jchambers@mt.gov	444-2691

Water and Wastewater Operator Certification News

Security Questions

The Operator Certification Program has agreed to participate in the Association of Boards of Certification (ABC) pre-testing of security questions. ABC has completed grant work from the Environmental Protection Agency to develop and validate security questions. As a final step in the grant, ABC is conducting a voluntary pre-testing of the questions. These security questions will be given from February through April 2005. ABC will assess how well each question is answered and resolve unforeseen problems before using security questions on a scored version of an exam. The security questions will be handed out as the applicants hand in their examinations. This is strictly voluntary and we hope that people taking examinations will take a few minutes extra to participate!

Grant Reimbursement Program

All certified operators that work in a Community or Non-Transient Non-Community Public Water Supply System serving less than 3,300 people are eligible to receive reimbursement for the following: renewal fees; operator training to fulfill your CEC requirement; application and exam fees for new operators or a back-up operator; pre-exam training for new applicants; and mileage. Unpaid operators are also eligible for the above mentioned reimbursement in addition to pre-diem expenses.

Currently, there are 506 Community or Non-Transient Non-Community Public Water Supply System with only one water operator linked per system. ARM 17.40.208 (1) requires that "Every water…system must have an individual in responsible charge at the system site or on call at all times who can respond in a timely manner to threats to public or environmental health." If an emergency occurs or the certified operator is on vacation and the certified operator is unable to serve as the operator in responsible charge, then the system must provide a fully certified back-up operator to respond to any threats. The back-up operator must be designated to the Department. With the reimbursement funds available, now is the time to be thinking of having another individual certified to serve as a back-up operator! For more assistance or questions, please contact Jenny Chambers at 444-2691, **jchambers@mt.gov,** or visit our website at **http://www.deq.mt.gov/wqinfo/opcert/index.asp.**

Water Exam and Study Material Information

During 2004, the Operator Certification program worked with engineering consultants, DEQ staff, and water operators throughout the state to develop criteria to convert our current water treatment and distribution examinations. Montana has developed specific Needs-to-Know lists in an effort to design and implement Montana prescriptive exams utilizing the Association of Boards of Certification (ABC) services and item bank of questions. The Operator Certification Program began administering the 11 new prescriptive exams on October 1, 2004. Along with the development and administration of the new exams, the program also reviewed and modified all of the water treatment and water distribution supplemental study guides.

Everyone has been waiting to see how the first round of ABC based water exams went and we are happy to announce that the results are in. The exams went as planned and we received better results than anticipated on the small groundwater system exams. The overall pass rate for the Fall Water School exam site (October 1, 2004) was 65% (*both water and wastewater*). The pass rate was slightly lower for the surface water exams (*higher classifications*), but as anticipated these folks are going to have to prepare more for the exam.

Be prepared by:

- Getting applications and appropriate fees in as soon as possible.
- Once our office receives applications and fees, supplemental study materials will be sent to the applicant.

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Water and Wastewater Operator Certification News - *continued from page 10*

- Order the additional referenced study materials.
- Study in groups, if possible.
- If attending exam prep session, be prepared – study before you get there, know what questions you want to ask and what areas you need help with.
- Take your study materials with you to the exam prep sessions.
- Give yourself plenty of study time – the new ABC exams require more study and cover more information – especially for the higher classifications.

Too often our office receives applications from people signing up for an examination that is coming up in a month or two. This is not enough time for the applicant to fill out the application and mail it back to our office; have our office mail out the supplemental study materials; allow the applicant time to order additional study materials from the referenced California State University manuals (Ken Kerri); and properly study in order to take the examination.

During 2005, the Operator Certification program will continue to administer the exams, and will track progress and evaluate statically data. These examinations will be modified as necessary until the Department has valid, comprehensive, and fair examinations. We are excited about this transition and feel that the conversion will be a success!

If you have questions or concerns, please do not hesitate to contact our office:

Jenny Chambers, Program Manager
All program questions
406-444-2691 • jchambers@mt.gov

Reta Therriault, License Permit Tech
Applications, exams, certifications, compliance
406-444-3434 • rtherriault@mt.gov

Ashley Eichhorn, License Permit Tech
Renewals, CEC's, training providers
406-444-4584 • aeichhorn@mt.gov ■

Protecting Public Health in Small Water Systems An International Colloquium

Last summer MSU-Bozeman convened fifty-five drinking-water experts from 16 countries to deliberate the challenges of providing safe drinking water through the small public water systems of the developed world. These microbiologists, regulatory authorities and operations experts agreed on a number of findings and recommendations that should apply in most affluent nations. Participants in the meeting endorsed a regulatory emphasis on public health protection, as opposed to demonstrating compliance after the fact, although both quality assurance and quality control - and strong governmental involvement - were judged essential. The group recommended application of a risk-assessment method such as the Hazard Analysis and Critical Control Point approach to understanding health risks in individual systems. There was strong support for administrative consolidation of small systems, even though this can be very difficult to bring about. Sanitary surveys were endorsed for training and self-audits, as well as regulatory assessments. The group failed to reach consensus on the appropriate balance between public subsidy and customer fees to fund system expenses, although everyone agreed that both are necessary, and that systems function more smoothly and water quality is better when consumers are well-informed about their water sources and risks, and pay a substantial portion of the system costs. During the deliberations the need for high-quality training of operators, regulators and system managers consistently rose to the highest priority.

The Montana Water Center has made the full report of the colloquium available for download: see <**http://water.montana.edu/colloquium/products**/> ■

EXAMS PASSED JULY 2004 - DECEMBER 31, 2004

CLASS 1's

SHANE, ERIN	BOZEMAN	1A	OT
SIMON, PATRICK	BOZEMAN	1A	OT
DEAN, ZACHARY	SEELEY LAKE	1B	OT
GRIGGS, THORNTON	CONRAD	1B	OT
THIESSEN, PETER	SIDNEY	1B	CO
CUMMINS, JAMES	BOZEMAN	1C	OT
CURRY, PATRICK	HELENA	1C	CO
EREAUX, KENNETH	MALTA	1C	CO
FINCH, JOSEPH	HELENA	1C	CO
GUMENBERG, JUSTIN	GREAT FALLS	1C	CO
MANSANTIK LOREN	BUTTE	1C	OT
MURPHY, CARL	MISSOULA	1C	OT
MUSCUTT, JULIE	EAST HELENA	1C	OT
ROMANCHUK, KEVIN	GREAT FALLS	1C	CO
SORENSEN, CHRISTIAN	GREAT FALLS	1C	OT
WEBB, JAMES	MALTA	1C	CO
WEIKEL, JOHN	BILLINGS	1C	OT
WOLFE, DWANE	MILES CITY	1C	OT

CLASS 2's

GRIGGS, THORNTON	CONRAD	2A	OT
GUITH, BERT	CUT BANK	2A	CO
BECHEL, GERALD	BROWNING	2A3B	CO
ISRAEL, ROD	FLORENCE	2A3B	OT
SWEENEY, ANTHONY	LEWISTOWN	2A3B	CO
COSGRIFF, DAVID	LIBBY	2C	CO

CLASS 3's

CUMMINS, JAMES	BOZEMAN	3A4B	OT
ELI, RON	VAUGHN	3A4B	OT
FORWARD, CHARLES	W YELLOWSTONE	3A4B	CO
HYLAND, NATHAN	WHITEFISH	3A4B	CO
NEESE, JASEN	LOLO	3A4B	CO
CLOW, ROBERT	BILLINGS	3B	OT
ALLEN, GOERGE	LAKESIDE	3C	CO
DARNE, WARREN	ALBERTON	3C	CO
ELI, RON	VAUGHN	3C	OT
FORWARD, CHARLES	W YELLOWSTONE	3C	CO
GRIGGS, THORNTON	CONRAD	3C	OT
HOSKINS, DANIEL	W YELLOWSTONE	3C	CO
ISRAEL, ROD	FLORENCE	3C	OT
LOVATO, JOE	LODGE GRASS	3C	CO
NEESE, JASEN	LOLO	3C	CO
PURTLE, JOEL	BELT	3C	CO
SORRELL, PATRICK	POLSON	3C	OT

CLASS 4's

THIESSEN, PETER	SIDNEY	4A	CO
AMUNDSON, LEIF	DARBY	4AB	CO
AUCK, SHAWN	HOBSON	4AB	CO
BILLMAYER, FRANK	KALISPELL	4AB	CO
BLICKER, BRIAN	BELGRADE	4AB	CO
BROWN, JEROME	RICHEY	4AB	OT
DARNE, WARREN	ALBERTON	4AB	CO
FISCHER, DARREN	MOORE	4AB	CO
GEERY, TODD	MILLTOWN	4AB	CO
HOUGHTON, DONNA	COLUMBUS	4AB	CO
JILES, ANNAMARIA	ROBERTS	4AB	CO
KAHL, JIM	DARBY	4AB	CO
KARTEVOLD, FORREST	HELENA	4AB	CO
KLUESNER, CARL	LIMA	4AB	CO
KNODLE, GLENN	TROY	4AB	CO
LUCKE, NATHAN	MISSOULA	4AB	CO
MONACO, KEITH	MISSOULA	4AB	CO
PARKS, BRUCE	MISSOULA	4AB	OT
PEKOVICH, MICHAEL	BILLINGS	4AB	CO
PLENKE, JOHN	BELGRADE	4AB	CO
RICE, JASON	MISSOULA	4AB	CO
SIDLE, JOHN	VIRGINIA CITY	4AB	CO
SIMPSON, AUDIE	SACO	4AB	OT
STOSICH, MARK	LIMA	4AB	OT
STREETER, LARRY	COLUMBIA FALLS	4AB	CO
VANDERPAS, CHARLES	BOZEMAN	4AB	CO
WAGNER, TIMOTHY	BILLINGS	4AB	CO
AXTMAN, JASON	FAIRVIEW	4C	CO
OBERFELL, PAUL	SIDNEY	4C	CO
SIDLE, JOHN	VIRGINIA CITY	4C	CO
WOOD, GLENN	BIG SKY	4C	CO

CLASS 5's

CERASANI, MIKE	SUPERIOR	5AB	CO
GRAY, JERRY	GREAT FALLS	5AB	OT
GRIFFIN, JOHN	MILLTOWN	5AB	CO
GUINN, CHARLIE	LEWISTOWN	5AB	CO
LAPP, CHARLES	COLUMBIA FALLS	5AB	CO
MacRAE, DOUGLAS	LIVINGSTON	5AB	CO
MEHARRY, BECKY	BOZEMAN	5AB	CO
PASSWATER, BRENT	BIGFORK	5AB	CO
PRATTON, KENNETH	REED POINT	5AB	CO
QUINLAN, THOMAS	GLASGOW	5AB	CO
REES, RONNIE	MANHATTAN	5AB	CO
WILLIAMS, DONALD	EUREKA	5AB	CO

A = Water Distribution
B = Water Treatment
C = Wastewater
D = Industrial Wastewater
CO = Fully Certified Operator
OT = Operator-in-Training

Congratulations!!

The exams for certification require considerable time in study and preparation. Passing represents a lot of hard work and initiative on the part of the individual. Be sure to show appreciation to your water and wastewater operator for working hard to ensure that they are properly trained to care for your system.

Alternative Continuing Education Credit Opportunities for Operators

By Jenny Chambers
Water and Wastewater Operator Certification Program Manager

In addition to traditional correspondence courses and other training courses, there are new types of training made available with the onset of new technologies. These training courses are approved for Continuing Education Credits (CECs). These training opportunities include, but are not limited to, the following:

a. On-line Internet Training;
b. Compact Disk – Read Only Memory (CD-ROM);
c. Video Based Training;
d. On-site Facility Based Training; and
e. Satellite Teleconferences.

Please contact:

Jenny Chambers at 444-2691 (jchambers@mt.gov) or
Ashley Eichhorn at 444-4584 (aeichhorn@mt.gov) for more information.

Featured Alternative Training Courses Selected For Review

CEU Plan
Affordable alternative training, starting at only $9.95 for one-hour courses (0.1 CEC's).
Over 50 approved online training courses.
Visit **ceuplan.com** for more information.

Exam Prep Sessions for Water and Wastewater

March 2–3, 2005 • Helena, Montana

Operator Exam Prep Sessions provide additional study opportunities for those taking any of the water or wastewater certification exams. The Exam Prep Sessions will focus on basic review of water and wastewater terminology, mathematical principals, problem solving, and general maintenance, treatment, general troubleshooting and more!

For more information or to register contact the Montana Environmental Training Center at 771-4432 or visit their website at **www.msun.edu/grants/metc** ■

Operator Examination Notification

The following dates are tentative at this time

DEPARTMENT OF ENVIRONMENTAL QUALITY
1520 EAST SIXTH AVE
PERMITTING & COMPLIANCE DIVISION
WATER & WASTEWATER OPERATOR CERTIFICATION

METCALF BUILDING,
PO BOX 200901, HELENA MT
59620-0901
406/444-3434 – FAX: 406/444-1374

OPERATOR NAME: _____ **OPERATOR #:** _____
(Please print)
NAME OF SYSTEM OPERATED: _____ **PWS#:** _____

MAILING ADDRESS: _____

CITY: _____ **ZIP CODE:** _____ **DAYTIME PHONE #:** _____

CLASSIFICATION OF EXAM REGISTERING FOR: Class _____ **Type** _____

To register for one of the examinations on this form, you must send the following to the above address 15 days before the exam date:

1. A completed application for certification as a water or wastewater operator;
2. Application fees: $70 for water and/or $70 for wastewater
3. Examination fees: $70 for water treatment, $70 for water distribution (2A3B, 3A4B, 4AB, 5AB are combination exams and count as one exam) and/or $70 for wastewater and;
4. A completed copy of this form and the fees for each examination.

OPERATOR CERTIFICATION EXAM PREP TRAINING, CEC's & DEQ EXAMINATIONS

NOTE: You must also contact the training provider to register for the training (additional fees may be charged)

Training Provider	Location	Training Date	Exam Date	Registration Deadline	(✓)
Montana Colony & Rural Water Systems (MRWS)*	Great Falls	01/26 – 01/27/05	01/28/05	01/14/05	
MRWS Conference *	Great Falls	02/16 – 18/05	02/18/05 afternoon	02/03/05	
Kalispell Spring School (METC / DEQ) MRWS Annual Operator Certification & Math Review	Kalispell	03/16 – 18/05	03/18/2005 afternoon	03/04/05	
Billings Spring School (METC / DEQ)	Billings	04/6 – 08/05	04/09/05	03/25/05	
Summer School (METC / DEQ)	Missoula	06/15 – 16/05	06/17/05	06/02/05	
72nd Annual Fall Water School (METC/DEQ/MSU)	Bozeman	10/03 – 10/06/05	10/07/05	09/22/05	

***Only Class 4 and 5 water or Class 3 and 4 wastewater exams will be given**

Please bring a photo ID with you to the exam – you will be asked for one.

DEQ Spring Examinations

Training offered at Billings and Kalispell

Examination Location	Exam Date	Exam Registration Deadline	(✓)
Billings	04/09/05	03/25/05	
Great Falls	04/09/05	03/25/05	
Havre	04/09/05	03/25/05	
Helena	04/09/05	03/25/05	
Kalispell	03/18/05	03/04/05	
Miles City	04/09/05	03/25/05	
Missoula	04/09/05	03/25/05	

The deadline to sign up for all examinations is 15 days before the examination date. To sign up for an examination, contact Reta Therriault at 406/444-3434 or **rtherriault@mt.gov** for application information. An application is also available on the DEQ web site at **http://www.deq.mt.gov/wqinfo/opcert/index.asp.**

Class 4 and 5 water exams and Class 3 and 4 wastewater exams can be taken in a DEQ office in Helena, Kalispell or Billings by appointment. Contact Reta Therriault at 406/444-3434 or **rtherriault@mt.gov** for application information.

Links to trainers telephone numbers and web sites:

1. Montana Environmental Training Center
   406/771-4433
   http://www.msun.edu/grants/metc/

2. Montana Rural Water Systems, Inc.
   406/454-1151
   www.mrws.org

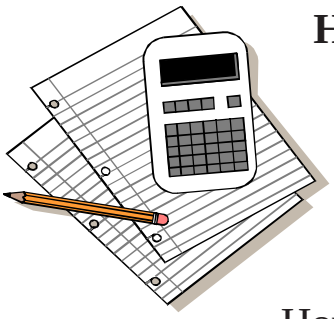
3. Midwest Assistance Program
   406/273-0410
   www.map-inc.org

4. Montana Association of Water and Sewer Systems
   406/273-3336
   http://www.nmclites.edu/grants/metc/!mawss.html

Please bring a photo ID with you to the exam – you will be asked for one.

CEC NAGGINGS

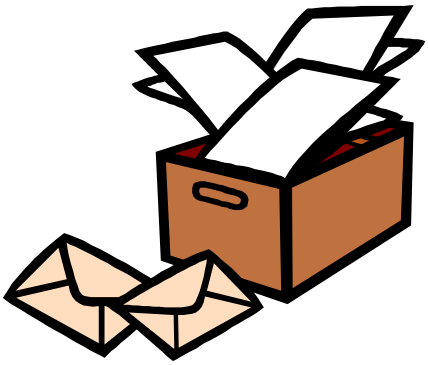
(THAT YOU MAYBE SHOULDN'T IGNORE)



HAPPY NEW YEAR!!! By now each of you should have received the CEC (continuing education credits) status reports, which were sent out in December. Remember these credits are due by May 31, 2006.

However, let's not wait until next year to get your credits! Why not earn your credits early so you don't have the stress of having to rush at the end? There are lots of fun and exciting ways to get your credits; including attending any of the many already approved courses. The Montana Environmental Training Center (METC) 2005 calendar lists courses by training providers. You can also complete any of the approved correspondence courses (these are also listed in the front of the METC calendar), or find your own class and apply to have it approved for credit. There are also some new ways to earn credits: On-line Internet and CD-Rom courses. Remember that operators-in-training are not required to earn CEC's.

If there are any problems or questions on your CEC status or to request information on any of the training options, simply contact Ashley Eichhorn, Water/Wastewater Operator Certification Technician at (406) 444-4584. Hope to see your credit forms cross my desk soon!



71st Annual Fall Water School

The 71st Annual Fall Water School was held in Bozeman, September 27-30, 2004. The Montana Department of Environmental Quality, Montana Environmental Training Center, Montana State University (MSU) College of Engineering, and the MSU Montana Water Center conduct the Fall Water School. This school is designed for entry level and experienced operators and managers. There were an approximate total of 180 participants and 15 vendors at the school. An examination was held on October 1, 2004 and 83 exams were administered. It was a great turnout and good comments were received from those that attended. Thanks to all of you that continue to make Fall Water Schools a success!

Joe Meek

Joe received the Montana Environmental Training Award. Joe is the Source Water Protection Program Manager at the Department of Environmental Quality.

Mike Certalic Award

The Mike Certalic Award is presented at the Fall Water School to a water or wastewater operator in the state. The 2004 Mike Certalic Award recipient was Mr. Andy Jensen.
Andy is the water operator in Absorkee.

Congratulations Andy!

Concentrated Animal Feeding Operation Rules Revision

The Department of Environmental Quality is seeking comments on proposed amendments to the Administrative Rules of Montana pertaining to concentrated animal feeding operations (CAFO). These proposed amendments adopt the revised federal CAFO regulations, establish state technical standards for nutrient management, and establish design criteria for animal waste management systems.

Under the Montana Water Quality Act, CAFOs are considered point sources subject to the Montana Pollutant Discharge Elimination System (MPDES) permit program. Under this permit program, CAFOs are required to contain all process-generated wastewaters, including storm water runoff, and properly dispose of generated wastes. To qualify as a CAFO, a facility must first meet the definition of an animal feeding operation. Animal feeding operations, however, are not in themselves considered point sources subject to the MPDES permitting program. Animal feeding operations are defined as a lot or facility where animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. An animal feeding operation is considered a CAFO when it confines the following number of animals (*please note footnotes*):

Animal Sector	Size Thresholds (number of animals)		
	Large CAFOs	**Medium CAFOs[1]**	**Small CAFOs[2]**
Cattle or cow/calf pairs	1,000 or more	300 - 999	less than 300
Mature dairy cattle	700 or more	200 - 699	less than 200
Veal calves	1,000 or more	300 - 999	less than 300
Swine (weighing 55 pounds or more)	2,500 or more	750 - 2,499	less than 750
Swine (weighing less than 55 pounds)	10,000 or more	3,000 - 9,999	less than 3,000
Horses	500 or more	150 - 499	less than 150
Sheep or lambs	10,000 or more	3,000 - 9,999	less than 3,000
Turkeys	55,000 or more	16,500 - 54,999	less than 16,500
Laying hens or broilers (liquid manure handling systems)	30,000 or more	9,000 - 29,999	less than 9,000
Chickens other than laying hens (other than a liquid manure handling systems)	125,000 or more	37,500 - 124,999	less than 37,500
Laying hens (other than a liquid manure handling systems)	82,000 or more	25,000 - 81,999	less than 25,000
Ducks (other than a liquid manure handling systems)	30,000 or more	10,000 - 29,999	less than 10,000
Ducks (liquid manure handling systems)	5,000 or more	1,500 - 4,999	less than 1,500

(Footnotes)

[1] A Medium CAFO falls within the size range listed in the Table and either: has a manmade ditch or pipe that carries manure or wastewater to state waters; or the animals come into contact with state water that passes through the area where they're confined.

[2] Never a CAFO by regulatory definition, but may be designated as a CAFO on a case-by-case basis if operation is determined to be a significant contributor of pollutants to state waters.

continued on page 19

Concentrated Animal Feeding Operation Rules Revision - *continued from page 18*

On February 12, 2003, the United States Environmental Protection Agency (EPA) published revisions to the federal Clean Water Act regulations for CAFOs. These rules updated EPA's 1976 CAFO regulations and became effective on April 14, 2003. Under EPA's revised rules, states with delegated permitting programs are required to revise their rules to reflect the federal regulations.

These revised regulations require all CAFOs to apply for a permit, develop and implement a nutrient management plan, and submit annual reports to the regulatory agency. Additionally, new source performance standards for large swine, poultry, and veal calf operations have been established that do not allow production area discharges to occur. Existing swine, poultry, and veal calf CAFOs, as well as other animal sectors, are allowed to discharge if precipitation events cause an overflow from a waste control facility that is properly designed, constructed, operated, and maintained. The regulation specifies that the waste control facility must be designed to contain all process-generated wastewater plus the runoff and direct precipitation from a 25-year, 24-hour rainfall event. Additionally, the revised federal regulations specify that large dairy cow, cattle, swine, poultry, and veal calf CAFOs must develop nutrient management plans that are in accordance with state technical standards for nutrient management; maintain setback distances between land application sites and state waters; keep records of routine visual inspections of water lines, containment structure(s), and diversion devices; and install a depth marker in all liquid impoundments.

Copies of the proposed rules can be found at the Department's website: **http://www.deq.mt.gov/wqinfo/mpdes/cafo.asp**, or by contacting Moriah Peck at (406) 444-0917. ■

Source Water Protection Notes

EPA recently released a publication entitled "*Taking Stock of Your Water System – A Simple Asset Inventory for Very Small Drinking Water Systems.*" The publication starts off by describing why a homeowners association, mobile home park, or any other small PWS would want to do an inventory and then jumps right into a worksheet format to allow the user to actually complete their own inventory and assessment. The worksheet is very user-friendly and even includes a completed example page by page that a water system operator would fill out. At the end, you should have a better idea of what PWS components you may need to replace sooner than later. This will help you complete the final worksheet called "Prioritizing Your Assets." The intent of this simple table is for you to list the various major parts of your water system, estimate condition and remaining useful life, and set priorities for replacement planning.

The publication can be viewed, downloaded, or printed from DEQ's Source Water Protection webpage at **http://deq.mt.gov/wqinfo/swp/Links.asp**. Look under the second section called Public Water System Information for the link to the Small Water System Asset Inventory Worksheets.

If you need assistance accessing or working through the publication, contact Joe Meek at the Source Water Protection Section at DEQ (406) 444-4806 or Steve Kilbreath at the PWS Section at DEQ at (406) 444-4630. ■

New DEQ Director – Richard Opper

Richard Opper - DEQ Director

RICHARD OPPER was appointed as Director of the Montana Department of Environmental Quality in 2005 by Governor Brian Schweitzer.

He served the past 14 years as the Executive Director of the Missouri River Basin Association, a commission made up of governor-appointed representatives of eight states and the Indian tribes in the Missouri River Basin. The commission was based in Lewistown, Montana during his tenure. Prior to that he worked as the Executive Director for the Missoula-based Northern Lights Institute.

Richard received his bachelor's degree in agricultural sciences from Oklahoma State University and his master's degree in soil science in 1979 from Montana State University. His research emphasis was in mine reclamation. He is married to Sally Mueller; they have one son, Isaac. ■

Considering An Irrigation Project?

National Center for Appropriate Technology (NCAT) works with irrigators to select management techniques tailored to their needs. NCAT performs energy audits, installs weather stations, or monitors evapotranspiration rates for local situations. Irrigators participating in NCAT's Montana Rivers Project funded by the Department of Environmental Quality Nonpoint Source Program tested the AM400 soil moisture monitors in their irrigated fields. The AM400 soil moisture monitor:

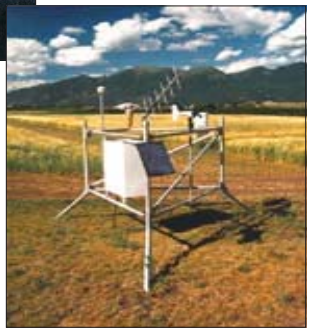
- allows irrigators to check soil moisture whenever they like at up to six locations in their fields;
- automatically measures soil moisture every eight hours and displays the previous 35 days of measurements in simple-to-read bar graph;
- records over ten months of soil moisture information, which can be downloaded at the end of season.

Soil moisture monitor.

Call (800) 346-9140 to learn more about NCAT and the AM400 soil moisture monitor, or to arrange for a free consultation. Get more information from the website: **http://www.ncat.org/mtrivers/.**

Do it yourself installation.

Reduce losses to evaporation.



Agrimet Weather Station

Top 10 Things

Small Groundwater Suppliers Can Do

"TOP 10" THINGS that small groundwater suppliers can do to protect their systems from contamination and other harm:

10. Prepare (or update every 6 months) an emergency response plan. Make sure all employees help to create it and receive training on the plan.

9. Post updated emergency 24-hour numbers at your facilities in highly visible areas (pumphouse door, vehicles, office) and give them to key personnel and local response officials.

8. Develop response procedures with local police, emergency response, and public health officials.

7. Fence and lock your drinking water facilities and vulnerable areas (e.g. wellhead, hydrants, manholes, pumphouse and storage tanks).

6. Lock all entry gates and doors and set alarms to indicate illegal entry. Do not leave keys in equipment or vehicles at any time.

5. Install good lighting around your pumphouse, treatment facility and parking lot.

4. Identify existing and alternate water supplies and maximize use of backflow prevention devices and interconnections.

3. Use your Source Water Assessment information to work with any businesses and homeowners that are listed as potential sources of contamination and lessen their threat to your source.

2. Lock monitoring wells to prevent vandals or terrorists from pouring contaminants directly into groundwater near your source. Prevent pouring or siphoning contaminants through vent pipes by moving them inside the pumphouse or treatment plant. If that isn't possible, fence or screen them.

1. In case of an emergency, first call "911" then follow your emergency response plan.

— Based on New England EPA "Top 10"

Waste Not Conference Gearing Up for Spring

In an effort to bring new ideas on recycling to Montana, Headwaters Cooperative Recycling Project, Montana Department of Environmental Quality and Yellowstone National Park has been busy planning the "Waste Not Montana Conference 2005." The two-day conference is slated for April 11–12, 2005 at the historic Chico Hot Springs, in the Montana's spectacular Paradise Valley. Famous for its' outdoor mineral hot spring pools and four-star restaurant, Chico Hot Springs is located near the north entrance of Yellowstone National Park.

Headwaters Cooperative Recycling Project's goal is to assist all Montana communities in achieving their waste reduction and recycling goals by providing education, information and assistance to those communities striving to reach their recycling goals, while developing a sustainable system that everyone can replicate. Currently, there are 16 counties, cities and national parks represented in the organizations.

In addition to vendor, show highlights will include the unveiling of the mobile glass pulverizer and bus tour of Yellowstone. The glass pulverizer is an exciting project and DEQ's Brian Spangler will be on hand to share the evolution of this project and where it's headed. This will include a barbeque lunch.

On the second day of the conference, Yellowstone National Park will sponsor a guided bus tour with lunch. The tour will visit Old Faithful, the world's most famous geyser. Park personnel will point out highlights, answer questions and share their knowledge of Yellowstone's rich past as well as current events affecting the park.

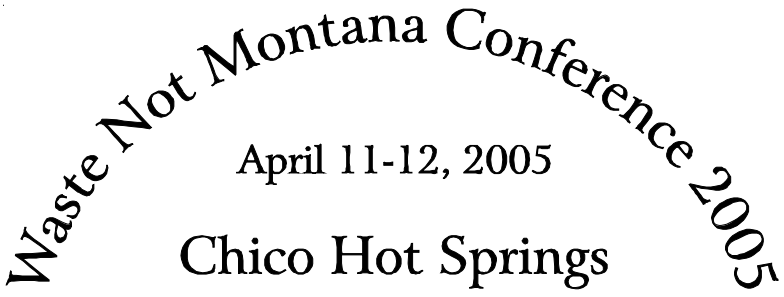
Keynote speaker will be Dayna Baumeister, Ph.D. She will speak on Biomimicry. Biomimicry is a new science that studies nature's models and then imitates or takes inspiration from these designs and processes to solve human problems. Biomimicry is a new way of viewing and valuing nature. It introduces an era based not what we can extract from the natural world, but what we can learn from it.

Other conference topics will include Tire Recycling, Plastics Recycling, Challenges in Urban Recycling, Regional Update on Alternative Fuels, Electronics Recycling and Sustainability on a Local and Global Scale.

This year's conference promises to be enlightening and a great opportunity to learn what's going on in the world of recycling in our state.

For more information about attending the conference contact:

Headwaters Cooperative Recycling
Phone: 406-225-3194 ■



DEQ and Recycling Glass

By Brian Spangler

The DEQ Business and Community Assistance Program has been working to provide a recycling option for glass for the past couple of years. We have turned the corner and 2005 will be a good year for recycling in Montana! After working on the mobile glass pulverizer for over two years, the project will be rolled out in the next couple of months.

At a meeting held December 10th with the Montana Department of Transportation (MDT), the Montana City interchange pilot project, glass cullet for road base, was discussed in detail. MDT Environmental Services, MDT Materials Bureau, DEQ Business and Community Assistance Program, Headwaters Cooperative Recycling board members and the MDT consulting engineers attended the meeting. The project is scheduled for this summer.

Headwaters Cooperative Recycling made a decision in September to modify the trailer that will allow a skid steer to be loaded. The skid steer will allow the glass to be loaded into the hopper of the pulverizer as it is rotated throughout communities; therefore, communities will not have to have glass loading capabilities. The modification to the trailer caused a delay with the expected delivery date of October 2004. The new delivery date is now at the end of February. Upon delivery, Andela, the manufacturer, will provide an operational video that will provide detailed instructions and information on the operation of the system. This will allow communities to understand the operation of the system.

There has been concern about silicosis from the pulverized glass; therefore, my office will schedule an industrial hygienist to be at the Andela operational training of the pulverizer. The industrial hygienist observations and results will be passed along to all involved.

The official rollout of the pulverizer will take place at the Waste Not Conference, April 12-13, 2005. Details of the conference can be viewed at: **http://www.deq.mt.gov/Recycle/WNPC05.pdf.** Additionally, we are planning an Earth Day event for the DEQ which will involve the pulverizer and will provide further details upon confirmation.

If you should have any further questions, please contact Brian Spangler with the Department of Environmental Quality, Program Manager, Air, Energy and Pollution Prevention Bureau, Business and Community Assistance Program, 1100 North Last Chance Gulch, P.O. Box 200901, Helena, MT 59620-0901, Phone (406) 841-5250, Fax (406) 841-5091. Again, it is exciting as we move recycling forward in the state. ■

Mobile Glass Pulverizer

Enforcement Corner

During calendar year 2004, there were a total of 31 public water supply systems that were sent to DEQ Enforcement Division for violations of the statues or rules. The assessed penalties for violations totaled $44,702.25. Below is a summary of a few system's violations and penalties assessed. The goal of the DEQ public water supply system is to ensure public health is protected and to strive to keep all public water supply systems in compliance.

Description of Violation	Penalty Assessed
Failed to obtain department approval before construction, alteration, extension, or operation of a system of water supply or water distribution designed to be a public water or public sewage or industrial discharge system.	$3,500.00
System failed to pay service connection fees.	$ 100.00
System failed to retain a certified operator.	$1,481.00
System failed to collect nitrate/nitrite samples for 2001 and 2002; failed to collect IOCs, VOCs, and SOCs samples for period 1999-2001; failed to pay annual service connection fees 1999, 2000, 2001, and 2002; failed to provide public notification of its monitoring and reporting violations.	$2,155.00
System failed to collect monthly bacteriological samples for 12/02, 03/03, and 08/03; failed to complete annual nitrate/nitrite samples for 2000, 2001, 2002; failed to retain a certified operator; failed to provide public notification for its monitoring and reporting violations.	$1,980.00
System failed to collect annual nitrate/nitrite samples during 1999, 2000, 2002; failed to collect IOC arsenic, IOCs, VOCs, SOCs during period 1999-2001, failed to collect annual lead and copper monitoring samples; failed to retain a certified operator; failed to provide public notification for its monitoring and reporting violations	$4,774.00
System failed to collect routine nitrate samples during period 2000, 3rd quarter of 2002, and 2nd, 3rd, and 4th quarters of 2003; violated nitrate MCL on 2/20/02; failed to take confirmation sample after MCL results received; failed to provide public notice of its MCL, monitoring, and reporting violations.	$2,082.00
System failed to fully comply with the requirements of the lead and copper rule; failed to pay the full annual service connection fees for state fiscal years 2002 and 2003.	$2,992.75
Failure to meet obligations of compliance agreement with Public Water and Subdivisions Bureau (DEQ), specifically installing treatment and conducting monitoring to address ongoing nitrate exceedances; failed to collect two quarters of bacteriological samples and failed to post public notice.	$1,751.25

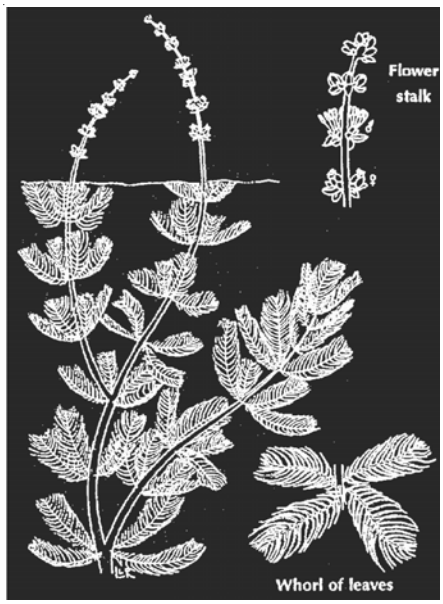
For questions on maintaining compliance with some of the requirements above, please contact the following individuals:

Nitrate/Nitrate, IOC, VOC and SOC sampling	Andrea Vickory	444-3358
Lead and Copper monitoring	Sam Martinez	444-5313
Bacteriological monitoring	Sandi Ewing	444-5314
Engineering Review	Rachel Clark	444-6722
Operator Certification	Jenny Chambers	444-2691

Invaders From Below The Water

Eurasian Watermilfoil

Myriophyllum spicatum L.



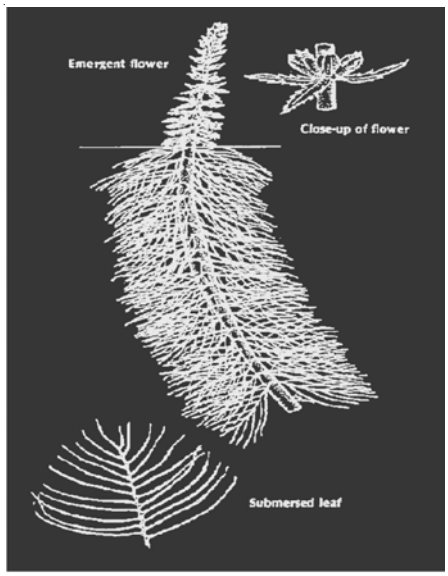
Aquatic plant line drawing is the copyright property of the University of Florida Center for Aquatic Plants (Gainsville)

Description: Eurasian watermilfoil grows in the water and its feather-like leaves circle the stem. Leaves and stems tend to remain below the surface. It forms extremely large mats of vegetation. This plant has a reddish flower that sticks out above the water's surface.

General Information: Eurasian watermilfoil is at home in Europe and Asia. In Montana, it is an exotic plant that can clog lakes and ponds because no natural predators keep it in check. Once introduced into a lake, it is virtually **impossible** to get rid of Eurasian watermilfoil. It grows fast, reproducing by simply breaking off pieces of the original plant. One single fragment brought in on a fisherman's boat or waders can infest an entire lake. Dense mats of Eurasian watermilfoil mean boating, fishing, and swimming will be difficult and perhaps impossible. Water quality may be affected along with shorefront property values.

Variable Watermilfoil

Myriophyllum heterophyllum



Aquatic plants of New England Series. *G.E. Crow and C.B. Hellquist 1983. Illustration by Pam Bruns.*

Description: Variable watermilfoil has densely packed leaves that encircle the stem. It is usually found below water along the shorelines of lakes and ponds. Watermilfoil forms dense mats near the surface of the water. The plant has a spike-like flower that grows above the water's surface from mid to late summer.

General Information: Variable watermilfoil grows very rapidly. It breaks off from the wave action of boats, swimmers or other animals. The one single fragment can infest an entire lake. Once introduced into a lake, it is nearly impossible to get rid of variable watermilfoil. Dense mats of variable watermilfoil hinder boating, fishing and swimming. Water quality and shorefront property values may also be affected. It has not been recorded in Montana. Let's keep it that way.

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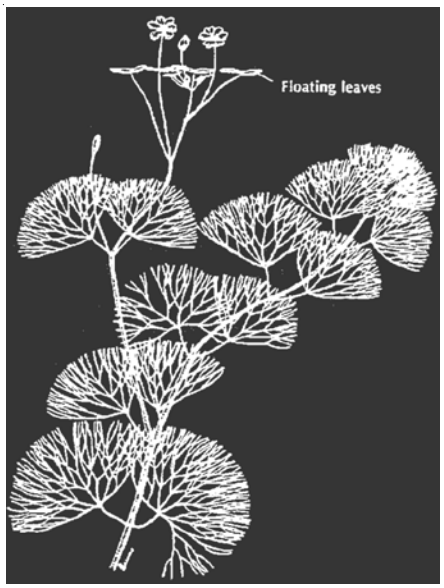
Invaders From Below The Water - *continued from page 25*

Fanwort

Cabomba caroliniana



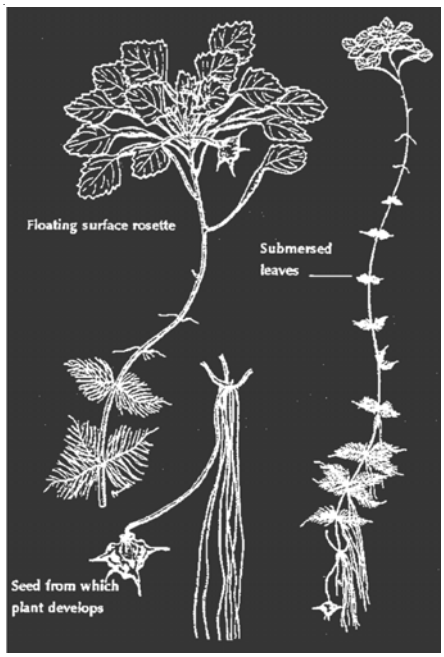
Aquatic Plants of New England Series. *G.E. Crow and C.B. Hellquist 1983. Illustration by Pam Bruns.*

Description: Fanwort grows below water and has narrow leaves that look like a fan arranged on a narrow stem. Small white flowers stick above the surface. Some fanwort leaves float on the surface below the flowers; these are small and lily-like.

General Information: This plant was commonly used in aquariums as an ornamental plant. Lakes and ponds got their fanwort when people dumped the contents of aquariums or brought it from one lake to another on a boat or trailer. Fanwort can spread quickly around shorelines of lakes and ponds and interfere with recreational activities. Fanwort is known to be in Washington State but has not been sighted here.

Water Chestnut

Trapa natans L.



Aquatic Plants of New England Series. G.E. *Crow and C.B. Hellquist 1983. Illustration by Pam Bruns.*

Description: Water Chestnut has feather-like, submerged leaves that are paired along the stem. It also has floating leaves that are triangular in shape. The cord-like plant stems can be as long as 16 feet. It flowers in mid to late July and produces a horned fruit, the "chestnut."

General Information: This invasive aquatic plant came from Europe into New York in the late 1800's as an ornamental. It has spread to Arizona; but has not been recorded in Montana. Ducks and geese spread this plant. However, people also transport the plants from lake to lake.

Reflections in the Ripples

By Bill Bahr, SRF Program

In keeping with previous columns about the state of water and wastewater treatment plant operations in the state of Montana, I am excited to reminisce about things that happened last year and to speculate about things that may be coming in our future.

EPA Clean Water Act Awards. In 2002 and 2003, Montana had two facilities, Hamilton and Kalispell, respectively, that won first place nationally in the EPA Clean Water Act awards for doing a great job at treating wastewater using some innovative operations. Last year we didn't nominate any facilities, so this year, I am looking forward to forwarding nominations on to the regional competition, with high hopes that our excellent facilities in Montana get a crack at the national awards. Contact me at 444-5337 for information about the EPA Clean Water Act award program.

Advanced Wastewater Operations Training. Last year, the Montana Environmental Training Center (METC) sponsored two excellent training opportunities for operators and managers of activated sludge and advanced wastewater treatment plants. **Dr. Michael Richard** presented a two-day seminar on 'Optimizing Activated Sludge Operation' in Red Lodge in May. The class included in-depth analysis of microbiological problems and control strategies. Specific topics included steps for improving floc formation, preventing bulking conditions, filament identification and control, and industrial, toxic and environmental impacts on microbial populations. Dr. Richard provided many examples of successful plant operational and process changes dealing with short- and long-term solutions. The second seminar was in August at the University of Montana Biostation facility at Yellow Bay on Flathead Lake conducted by **Paul Klopping**. Paul has widespread national and international expertise in plant operations and in microbiology. The seminar included microscopic examination of plant samples brought by those in attendance. Following discussion of typical activated sludge plant conditions, Paul led the class through evaluations of the various plant samples and we attempted to arrive at reasonable process control strategies. Paul made micrographs (digital slides of the microscopic views) of the various plant samples with appropriate comments and loaded them onto CDs for the class. Thanks Mike and Paul!

Lagoons. Before we forget that there are over 300 lagoon systems compared to only about 30 mechanical WWTPs in Montana, the following items of interest have arisen over the past year. **New technologies** are being promoted that include: algae control using ultrasonic waves, solar-powered lagoon circulation, lagoon covers, and wind-powered lagoon circulation. At METC operator schools in the spring, summer and fall, water circulation in lagoons received a good deal of attention. Proponents of wind- and solar-powered equipment showed how the various layers in lagoons interact to provide treatment of wastes and reduction of the solids that result from that treatment. Lagoon covers can help prevent odors, help with ammonia reduction and improve overall treatment according to sessions at the annual conference of MWEA and MSAWWA and the Fall School in Bozeman. Review of the ultrasonic algae control literature shows that algae growth is retarded in the presence of specific wavelengths of ultrasonic sounds. Like the rest of you, I am interested to see if these new tools will help us do a better job of treating wastewater and improving the effluents from our facilities.

Lagoon problems range from discharge permit violations for TSS and BOD when algae blooms occur, to weed control on dikes, to foaming on the surface of aerated systems. **Foaming,** a different problem in mechanical plants, is usually a result of detergent surfactants in lagoons and will be better or worse depending on whether it's 'wash day' in the community. Foams have appeared on both aerated lagoons with blower and diffuser aeration as well as with aspirating surface aerators. If foams become excessive and impact treatment or blow off site, foam suppressants can be used, but the operator must use chemicals with caution when spraying lagoons. The microbiological life forms must be protected. Frozen foam during the winter can have serious consequences for floating aerators and, as of yet, I know of no single solution that works best. Be careful when working on the surface of frozen lagoons; ice thickness may vary considerably, especially near aeration sources. **Weeds** continue to plague operators of lagoons that have natural soils on the dikes. Weed control and removal down to the water surface on the inside of lagoon dikes is a difficult operator responsibility It is important to lagoon operations to have lagoon water surface open and not blocked by

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excess plant growth. Physical removal by cutting and pulling is an effective strategy, but is labor-intensive and presents some safety concerns. Please use safe practices when working on slopes and, especially, when near the wastewater in the ponds. Burning may be an option, but many modern lagoons have PVC liners buried under a soil layer. Heat might damage the liner, so alternate removal methods should be employed. Chemical removal can be used, but the chemicals must be safe for discharge to state waters, since they may end up there. Please contact the Montana Department of Agriculture, 444-7819, for a list of Ditchbank and Aquatic Herbicides approved for use in Montana. A license for application may be needed in some cases.

Lagoon influent sampling. Many lagoon operators will see the requirement for sampling the influent (raw wastewater) in their recently issued MPDES discharge permit. Please read the Statement of Basis for the permits to gain insight into the need to show reduction of organic pollutants, measured as the Biochemical Oxygen Demand (BOD), in the wastewater as it is treated passing through the lagoons. This is a change from previous requirements that allowed for an assumed standard reduction in pollutants across the lagoons based on historical averages for systems operated in cold climates.

New Electronic Lagoon Operator Training. The Montana Water Center at MSU in Bozeman has developed water training programs using computer CD technology that have met the needs of many operators over the years. Look for a new CD-ROM from the Water Center for Wastewater Lagoon Systems within the next year. Operators will be able to work on typical lagoon math problems while solving operational problems and learning about how lagoons treat wastewater in this new training tool. Kevin Kundert has been instrumental in getting this product ready for all of us to use.

Spray Irrigation Systems. Spray irrigation, the land application of treated wastewater by applying the WWTP effluents at agronomic rates to crops, is a long-practiced beneficial use of wastewater. Irrigation requires storage, if there is not winter period discharge option, and relies on applying water during the growing months, generally from April to October. The rate of application varies during the summer, with greatest plant growth and application rates in the middle summer months. Plants that have discharge permits, either surface water MPDES permits or ground water MGWPCS permits, must have the irrigation discharge included in the current discharge permit. Please review your permit and contact the Water Protection Bureau at 444-3080 to see if your permit will need to be amended to include the spray irrigation at your facility. All other systems utilizing spray irrigation (or any irrigation method), should, at a minimum, monitor the amount of water applied weekly, record storage cell levels monthly, and check nitrogen and fecal coliform levels monthly through out the application season to assure that the environment and public health are protected. System O&M manuals will provide application strategies and land, crop, and soil analyses of the site made during approval will document crucial conditions that the system must maintain.

New Treatment Technologies … Applied and On the Horizon. In the near future, we will be seeing more and more about **Membrane Biological Reactor** (MBR) technology to address the need for cleaner and cleaner effluents from WWTPs. The name derives from the coupling of conventional suspended growth processes and microfiltration or ultrafiltration processes. Although the technology of microfiltration is commonly used in drinking water systems, wastewater treatment faces different challenges due to the stuff that ends up in wastewater, primarily greases and fats. These foul the membranes and don't clean easily. I have often said that in my training classes that if you wanted to make bunches of money, invent an economical way to filter wastes from wastewater, avoiding the need for biological treatment. Operators know well the many ways that the 'bugs' in an activated sludge plant can become upset, not do what they are supposed to do, and, as a result, not treat wastes efficiently or well. MBR technology is on the way and may well be one of the ways we improve plant performance beyond that which our secondary clarifiers can provide. **Sequencing Batch Reactor** (SBR) technology is now being used in the RAE system near Bozeman. By the time you read this, new SBR plants will probably be in operation at Big Sky and at the Glacier National Park Headquarters, too. The RAE system is also using a reed-bed technology for biosolids treatment. SBRs are being used to reduce nutrients (nitrogen and phosphorous compounds) in their effluents. These technologies rely on activated sludge, but include anaerobic

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and anoxic zones to allow for biological conversion of ammonia and nitrate to nitrogen gas and phosphorus uptake by microorganisms to reduce N&P levels in the plant discharges.

Wastewater Problems … A myriad of other problems with collecting and treating wastewater remain to be fixed. **Sewer leaks** are still a risk to the health of people across the United States and Montana. A recent report from the Environmental Protection Agency (EPA) claimed that sewer systems (pipes and plants) are 'spilling enough raw sewage and waste into oceans and streams to fill more than one million Olympic-sized swimming pools every year'. DEQ receives many calls throughout the year complaining about sewage that has overflowed lift stations, backed-up out of manholes, and entered residences through backed up sewer pipes. All spills must be documented and the operator must record all steps taken to correct and prevent future releases of sewage. While federal regulations are being worked out, wastewater that enters state waters is a violation of the Montana Water Quality Act, and Sanitary Sewer Overflows (SSOs) are a violation of the federal Clean Water Act. Report all spills of wastewater to DEQ 444-0379 and contact the WPB of DEQ at 444-3080 if you have a Montana discharge permit.

Have you noticed any unusual smells, colors or other things in the raw wastewater at your plant? Operators at a facility in Washington started having problems in the plant and checked the influent. They found excess paper towels in the trash basket at first, but later linked problems with toxic material and the plant microbes to the recurring deposits in the trash basket. Working with law enforcement officials, they found an illegal methamphetamine lab was operating upstream in the community collection system. Occasionally, we will get **odor complaints** about wastewater plants or sewage overflows. People are, rightfully, genuinely concerned about catching diseases from exposure to wastewater and the odors associated with wastewater. Pathogens (disease-causing organisms) in wastewater are water-borne and don't survive in the air, but may persist in low concentrations in moisture in the air for short periods. All the research that I have found to date shows little correlation between illness and breathing air that smells bad from wastewater systems. Unpleasant odors can make people feel as though they are sick, nauseous or have headaches to name a few conditions. We encourage all plants to operate in a manner, or provide odor scrubbing, such that odors are not offensive to the people in the area. However, there is little chance that human pathogens in wastewater will be transmitted to people through odors.

The **Missoula WWTP** will be participating in a nationwide study to determine the fate of disinfectants and personal care products in the environment. The staff will collect samples from the plant effluent, the plant solids processes and the Clark Fork River. These samples will be included in a study by Johns Hopkins University in Baltimore to help find out what happens to stuff we send down the pipe.

In the News … The Kalispell Advanced WWTP was featured in the Water Environment & Technology August 2004 issue. Joanne Emrick was a speaker at the WEFTEC conference in New Orleans in October. There were several Montanans in attendance and the technical sessions were varied and exceptional. EKO Compost, the biosolids composting facility handling Missoula's biosolids, was featured in Biocycle in August 2004, and included information about Idaho and Hawaii facilities, too.

That's it for this Reflections. Keep your feedback, good advice and comments coming in. I appreciate working with the dedicated operators, mangers and engineers around the state and look forward to seeing you at your plants, at training sessions and the joint conference of MWEA and MSAWWA in Billings in April. Or, stop in for a cup of coffee. ■

Security Grant Upgrades

By Amy MacKenzie, DEQ

Montana DES is awarding grants totaling over $335,000 to public water supply systems for specific security upgrades. Most of the money was awarded for fencing, gates and locks and keys or key cards.

Butte will receive the largest award for several types of security upgrades at the main treatment facility. Butte/Silver Bow will receive funding for fencing and gates, remote cameras operating with motion detectors, key cards for access and controlled access to SCADA control room.

Billings, Billings Heights, Bozeman/Gallatin County, City of Deer Lodge, Glendive, Havre, and Helena split the remaining $200,000.

These grants are available from the War Supplemental Critical Infrastructure Grant from the Department of Homeland Security. I am hopeful that, during the next round of funding, the Montana DES and the Local Emergency Planning Councils will consider the needs of the public water supply systems for security upgrades. ■

Clean Water SRF News

The Clean Water State Revolving Fund program began to replace the Construction Grants program for constructing Wastewater Treatment Plants (WWTPs) in 1988. Initially, the federal government provided financial assistance to states to start a revolving loan fund that would help communities build treatment facilities and collection systems with low or no interest loans. Through 2003, the cumulative assistance total between the states and the federal programs was $43.5 billion. The annual number of loans averages about 1500, while the total now exceeds 14,000 loans. That's a lot of WWTPs built and a lot of wastewater treated, protecting our nation's waters and the health of the public. The CWSRF loans are also helping close landfills and are being used for nonpoint source projects.

The collaboration between federal programs and state SRF programs allows states to leverage the federal monies. The 2004 summary shows that state CWSRF programs yield a return in construction dollars equivalent to 1.97 times the original investment. Additionally, state programs are closer to the communities that need help and the report shows that the funds don't sit around in an unused account; an astounding 97% of the allotted funds are committed to projects. An attractive feature of the SRF program is the ability to offer very low rates on the loans.

The 2004 annual report shows that over the length of the program, communities save an average of 21% over the GO Bond market rates. WWTP construction projects can be very expensive and savings on this order are substantial in terms of residential wastewater rates.

The facilities slated for SRF funding in 2005 in Montana include projects for primary and advanced treatment, I/I correction, sewer replacement and rehabilitation, new sewers and new interceptor sewers. The projects span the state from Absarokee to Culbertson, from Chinook to Sheridan, from Wibaux to Libby. Some are as small as $83,000 (Rudyard) and some as large as $13 million (Great Falls).

For information about the DEQ WPCSRF program, contact:

Paul Lavigne	444-5321, or
Todd Teegarden	444-5324

■

2005 MWEA Awards Program

MWEA is soliciting nominations for the awards program at the 2005 Annual Conference

The Montana Water Environment Association (MWEA) honored Michael W. Jacobson with the Arthur Sidney Bedell award at the 2004 conference in Bozeman. Along with this prestigious honor, MWEA also selected Reed Point as the Best Small Wastewater System for 2004. MWEA also acknowledged Robert Todd Teegarden for his service as President of MWEA for 2004.

In 2005, MWEA will select a WWTP as the **WEF Burke Award** for 2004, for acknowledgement of an outstanding Safety program at a WWT facility. MWEA requests nominations from large and small facilities. This is a WEF award after George W. Burke. Mr. Burke served in several professional capacities in his long career and was instrumental in developing the WEF Annual Safety Survey. MWEA places great value in this award, in that it not only honors outstanding safety efforts at facilities, but the award provides enticement for other plants to work toward protecting workers and the public through an active and effective safety program.

At the 2005 conference in Billings, MWEA will honor an individual with the **Operator Award** for 2005. This award was created by MWEA in 1984 to recognize treatment plant operators and managers who may not be members of WEF, yet provide outstanding service to their community by innovations at the WWTP to optimize treatment and work within the community to educate citizens about community wastewater treatment.

Annually, at the joint conference, MWEA selects a smaller community to honor with the MWEA **Small Systems Award**. Through this award, started in 1992, MWEA has an opportunity to recognize those small community systems that continue to provide excellent wastewater treatment facilities, operate and maintain those facilities in exemplary manner, and involve the community in providing adequate financial support to protect the condition of the treatment facilities in order to protect public health and the environment. The truly special aspect of this award is that these proactive, outstanding community treatment systems accomplish these goals with limited resources relative to larger cities.

Please request criteria for the awards or send in nominations for these awards. Contact MWEA Awards committee chair, Bill Bahr by Monday, March 1, 2005, by calling 444-5337. ■

Tsunami and Hurricane Devastations Leave Millions Without Drinking Water

By Dusti Lowndes, Public Water Supply Specialist, DEQ-Kalispell

Water everywhere but not a drop to drink has been part of a tragedy for many people the last few months and will be for many months to come. We often take for granted the availability and quality of our water but the southeast United States and the countries surrounding the Indian Ocean know too well the health risks and difficulties that shirttail natural disasters such as tsunamis and hurricanes.

On December 26, 2004, a 9.0 magnitude earthquake, 10 km below the surface, shook the Indian Ocean. The earthquake created tidal waves 20 feet high that traveled up to 2000 miles and destroyed villages, towns, cities, homes, businesses, and entire residential islands in thirteen countries. Caught completely off guard, the citizens and tourists were swept into a living hell of debris and chaos. Images of heroic efforts by strangers, small children alone for days, desperate cries for 225,000 lost love ones, thousands of children left orphaned, and raging waves carrying the remains of peoples' lives are etched into our minds and swell our hearts with sadness. How do these millions of people pick up the pieces and start again? It's

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Tsunami and Hurricane Devastations Leave Millions without Drinking Water *- continued from page 29*

not enough that they suffer emotionally and financially, but the basic element for survival is gone – safe and sustainable water supplies.

The drinking water that was available is now contaminated by flooding and/or spoiled by salinity from the seawater. As the water rushed in from the ocean, water and sewage systems were inundated by enormous surges of water. The pathogenic organisms (bacteria, viruses, and parasites) present in contaminated floodwaters can cause water borne disease epidemics at a very large scale after a natural disaster. The biggest fear for the survivors, especially susceptible children and the injured, of the tsunami are communicable and diarrheal diseases caused by pathogenic organisms in the water.

Basic hygiene is difficult without clean water and sanitary disposal of body waste. The absence of clean water and toilets can lead to explosive outbreaks of life-threatening diarrheal diseases such as cholera, typhoid, dysentery, and some forms of hepatitis. It is estimated that 35% of the survivors in the relief camps have access to safe sanitation. At one point it was said that there were about 3 toilets per 2,500 people, which basically forces people to defecate in the open. Pathogenic organisms can be orally ingested, not only from not washing your hands in clean water before you eat or prepare food, but also if plates and utensils are washed in sewage – contaminated water. Another issue in possibly consuming contaminated water is that the water may not smell or look dirty and, therefore, it is easily consumed or used without its potential health risks known. It is tropical heat, you are thirsty and tired and there is no place to go to the bathroom for days on end - a recipe for mass illness when 1,237,068 million people are co-existing in temporary relief camps with extremely limited water and toilet facilities.

Relief organizations are working very hard to supply the essentials to the tsunami victims and survivors. Monetary donations are requested because logistically transporting items is expensive and ineffective. Unicef has been a leader in efforts to prevent the spread of water-borne diseases in the tsunami-ravaged areas.

Unicef has provided:

- 8 water bowsers with 2000-3400 gallons each, this should provide 250,000 people with fresh water;
- 100,000 bottles of drinking water;
- 471,000 water purification tablets and another 1.5 million packets towards the end of January;
- 75 water tanks, each a capacity of 425 gallons;
- 227 tons of water disinfecting chemicals (sodium and calcium hypochlorite);
- 30 centrifugal diesel pumps for use in the water disinfection;
- 50,000 water jerry cans (2.642 gallons);
- 1,500 temporary latrines (8,000 more on the way);
- 25,000+ family water-purifying kits;
- 30,000+ family hygiene kits;
- 6,000+ water storage and receptacles of various sizes;
- 3 million chlorine tablets for safe drinking water;
- Mobile water treatment units at 6 locations;
- Water quality testing kits;
- Rehabilitation and chlorination of water supply systems including 1500 wells;
- Drilling of emergency boreholes;
- Temporary power supplies for pumping.

AND MUCH MORE…

As the tsunami disaster hit, the southeastern parts of the United States were still trying to get its feet back under itself from three massive hurricanes that hammered the country, last fall, and cost 4.27 billion dollars in damage. Water companies were shut down for days and up to a week in some areas. The inland flooding and tidal waves caused thousands to be without shelter, power, and water. The Federal Emergency Management Agency (FEMA) states that 10.8 million gallons of water and 163 million pounds of ice were distributed to 1.6 million people in 13 states that were affected. In trying to make temporary repairs 151,000 rolls of plastic roofing material were also distributed. Residents with private wells that had been covered by standing water were advised to boil their water until the flooded wells were tested and disinfected, after

Tsunami and Hurricane Devastations Leave Millions without Drinking Water - *continued from page 30*

the storm and the floodwaters receded. Again, floodwaters can carry all types of contamination either from lakes, rivers, streams, industrial, agricultural, and/or sewage runoff. The residents were warned that water in a hurricane-affected area couldn't be assumed to be safe to drink. Many water company employees, even though they were experiencing their own personally grief and devastation of lost property, returned to work the next day to help out in the aftermath of the hurricanes and to get the water systems back on-line. Water systems not only put their emergency plans and contact lists into use during the storms but also improvised like moving all important files to higher floors, gathering equipment that was outside that might be needed for repairs and put them inside, and piling things into the center of the rooms as to gain easier access in case the windows or walls were damaged. In the months to come, true accounts of the aftermath, in relation to water systems, will start to manifest themselves. I hope we will all take time to learn from and admire the heroic efforts of others.

Although short-term relief is essential in both the tsunami and hurricane disaster areas, long-term rehabilitation will take great effort as well. To rebuild and maintain safe and sustainable water supplies, for all those who were devastated, will require a lot of donations and volunteers but, in the end, those affected will be given their lives back with some sort of hope.

Web Site References:

- ABC News at **http://abcnews.go.com**
- Anchorage Daily News at **www.adn.com**
- AWWA – Advocate at **www.awwa.org**
- FEMA at **www.fema.gov**
- Florida Dept. of Health at **www.dep.state.fl.us**
- Relief Web at **www.reliefweb.int**
- Unicef at **www.unicef.org**
- USAid at **www.usaid.gov**
- Watertech Online at **www.watertechonline.com**

You Can Make A Difference Every Day!

How much of a difference is up to you!

1. Repair leaky faucets and toilets right away.

Leaky sinks and toilets can waste 50 gallons of water in one day, depleting our rivers. For a leaky faucet, look for a faulty o-ring or valve seat. Toilet leaks aren't always so obvious. Try pouring colored liquid into the tank. If after 15 minutes you see dye in the bowl, you may need to replace the flapper.

Repairing a **leaky faucet saves 180 gallons/week**

Repairing a **leaky toilet saves: 1750 gallons/ week**

2. Turn off the tap while brushing your teeth or washing the dishes.

Try using a cup of water to rinse the brush. And fill up the sink first when washing vegetables or doing a load of dishes. It's a small change that will make a big difference.

Turning off the tap while **brushing teeth saves 25 gallons/week**

Turning off the tap while **washing the dishes saves 20 gallons/week**

3. Run the washing machine and dishwasher only when fully loaded.

This saves between 300-800 gallons of water each month.

Running a **washing machine** only when fully loaded **saves 160 gallons/week**

Running a **dishwasher** only when fully loaded **saves 45 gallons/week**

4. Safely dispose of household cleaners, paint and other chemicals.

Many cleaning products found in our homes and garages are too dangerous to be disposed of in the trash or down the drain. **Read the label**: take anything marked "Poison" or "Danger" to your local hazardous waste center. Use water-based paints and wipe your brush with a paper towel before rinsing it off.

Safely disposing of **household cleaners, paint and other chemicals** allows sewage treatment plants to work effectively and protects our rivers.

5. Sweep the driveway, patio or sidewalk rather than hosing it down.

Hosing for 15 minutes wastes 150 gallons of water. Water runoff from driveways or sidewalks carries contaminants into our rivers such as dirt, motor oil, fertilizers and animal waste.

Sweeping a **driveway** instead of hosing s**aves 75 gallons/week.**

6. Install water-saving showerheads and high-performance, low-flush toilets.

An outdated showerhead wastes 20 extra gallons a day or 7,200 gallons a year for every person in the house. An average family of four can save 14,000-17,000 gallons of water a year by replacing pre-1993 toilets with new high-efficiency ones. High-efficiency toilets, washing machines and dishwashers not only save money but also protect rivers.

Installing **water-saving showerheads** that use 2.5 gallons per minute s**aves 140 gallons/week**

Installing **high-performance toilets** that use 1.6 gallons per flush **saves 70 gallons/week**

You Can Make A Difference Every Day! *- continued from page 32*

7. Fix car leaks right away.

Leaky cars leave drips or puddles of motor oil and other fluids on streets and driveways. When it rains, these contaminants reach the river via the storm drains. Fix the leaks as soon as they are discovered.

Fixing **car leaks** keeps oil sheens and contaminants from spoiling our rivers.

8. Take care when changing motor oil and dispose of the oil safely.

One quart of motor oil can pollute 250,000 gallons of river water so use a large pan if you are changing motor oil yourself. **Never** pour leftover oil down a storm drain or into the trash - instead, drop it off at your local hazardous waste center.

Safely disposing of used motor oil keeps oil sheens and contaminants from spoiling our rivers.

9. Water lawns and gardens only in the morning or evening.

Water evaporates quickly during the middle of the day. A lawn only needs 1 to 1.5 inches of water per week. Set out a can to measure what is applied. Watering less creates deeper, stronger roots and a healthier lawn. Or let the lawn go brown, as nature intended during summer months. Plant native plants or try xeriscaping; both need less water.

Watering lawns and gardens in the morning or evening saves water and produces healthier plants.

10. Buy and use environmentally friendly products.

Choose safer, multi-purpose cleaners marked with only a “Caution” warning, rather than products labeled “Poison” and “Danger.” Avoid products with chlorine, phosphate and organic solvents like paint thinner.

Buying and using **environmentally friendly products** keeps contaminants that are toxic to people and wildlife out of the rivers.

Adopted from: River Network, 520 SW 6th Ave., Portland, OR 97204 * 503/241/3506
River Network, a national nonprofit organization, offers consulting, publications, acquisition of riverlands & small grants to help people raise money, build organizations, and monitor & protect rivers & watersheds. ■