Minnesota Well Management News

A Minnesota Department of Health Publication

Volume 29, No. 1 **Spring/Summer 2009**

New Well and Boring Fee Legislation to Take Effect in 2009

The 2009 Legislature has passed Session Law Chapter 79, Article 10, which eliminates the exemption for federal, state, and local governmental entities from paying fees for wells and borings. Beginning on **July 1, 2009**, governmental agencies will now be required to pay all fees including notification, permit, variance, maintenance permit, and license fees. The only exceptions are for Native American reservations and Federal Military installations, where an exception is provided in federal law. The fee amount for well maintenance permits for government-owned monitoring wells has been set at $50 per well. The maintenance permit fee for all other, privately owned monitoring wells will remain at $175.

The 2009 Legislature also made adjustments to the fees for vertical heat exchanger (VHE) system permits. The permit fees will be:

- $215 for a VHE permit with less than 10 tons of heating/cooling capacity.
- $425 for a VHE permit with 10-50 tons of heating/cooling capacity.
- $650 for a VHE permit with greater than 50 tons of heating/cooling capacity.

These fee changes become effective on **July 1, 2009**, as well.

INSIDE:

2009 Legislation - State Surcharge on Licenses

The 2009 Legislature passed new legislation (see Minnesota Statutes, section 16E.22), imposing a temporary surcharge on each business, commercial, professional, or occupational license in order to fund the development of a statewide electronic licensing system through the Office of Enterprise Technology (OET). The surcharge applies to initial license applications and to license renewals. The surcharge will be in effect for up to six years between July 1, 2009 and June 30, 2015. The surcharge is 10 percent of the license fee.

The full well contractor license fee is $250 annually, and all other well and boring contractor license fees are $75 annually. The corresponding surcharges will be $25 and $7.50 respectively. This surcharge will apply to all new licenses issued after July 1, 2009, and will apply to license renewals beginning in 2010. The Minnesota Department of Health will collect this surcharge and send it to the OET.

New Rule Changes for Well Caps and Covers

The new rule revisions that became effective on August 4, 2008, have clarified the requirements for covering a well or boring that is under construction. Minnesota Rules, part 4725.3150 requires a well or boring to be covered with a weatherproof, insect proof cap or cover. During construction, the contractor must temporarily cover the borehole, casing, and annular space, when not actively working on the well or boring.

The cap or cover must consist of:

1. a threaded plug, cover, or plate;
2. a welded or solvent welded overlapping plate or cover;
3. a rubber expansion sealer;
4. a bolted flange with rubber gasket;
5. an overlapping cap or cover with compression gasket;
6. an extension of the casing at least 1 inch into the base of a power pump; or
7. a sanitary seal or plug with a one-piece top plate, compression gasket and noncorrodible draw bolt(s). If the well or boring is in a building that meets the requirements of the Minnesota Rules, part 4725.2175 (Utilities and Buildings), a two-piece top plate, compression gasket, and noncorrodible draw bolts may be used.

Well covered with unapproved cap consisting of part of a pressure tank.

The revised rules now specify that tape, pails, and loose plastic used for well caps or covers are ***not*** permissible. In the past, these and many other “creative” forms of well caps and covers have been used by well contractors, either during the actual well construction phase or between the well construction and pump installation period.

Before leaving the construction site, all bolts on well caps or covers should be drawn tight and all holes in temporary or permanent well caps and covers must be plugged.

Geothermal Heat Exchangers: A Renewable Resource

Geothermal heat exchangers use the thermal energy stored in the earth's crust as a source of heat for heating and as a heat sink for cooling residential, commercial, and other buildings. Also called geothermal heat pumps, vertical heat exchangers, earth-coupled heat exchangers, groundwater thermal heat exchangers, and heat pumps, by whatever name, the basic technology remains the same. While in the heating mode, geothermal heat exchangers remove heat stored in the earth and transfer it to a building, and while in the cooling mode, remove heat from the building and transfer it to the earth. Geothermal technology relies on the fact that the earth's temperature at depth remains relatively constant. In Minnesota this temperature ranges from about 40 to 50 degrees Fahrenheit at a depth of 50 feet throughout the year.

Once installed, geothermal heat exchangers are able to heat and cool buildings at very low operating costs, requiring only a relatively small amount of electricity to operate. In addition, some systems are designed to provide hot water for domestic use.

There are two main types of geothermal systems used in Minnesota – open loop and closed loop.

In an open loop system, groundwater is pumped from a well to the heat exchanger and is then either pumped into an injection well, onto the ground surface, to the shallow subsurface, for use such as irrigation, or into surface water. Sometimes called "pump and dump," these systems are regulated under Minnesota Statutes, Chapters 103G and 103I. Minnesota Statutes, section 103G.271, restricts the amount of water used for these once-through systems to no more than 5 million gallons of water per year. This restriction limits the application of an open loop system to residential or smaller sized commercial buildings. There may be other regulations and restrictions, both state and local, on how the effluent is discharged. The construction of open loop systems (a.k.a. groundwater thermal exchange devices), with a supply well and reinjection well, is regulated by the Minnesota Department of Health (MDH) under Minnesota Statutes, section 103I.621. Chapter 103G only applies to systems pumping greater than 1,000,000 gallons per year, or greater than 10,000 gallons per day.

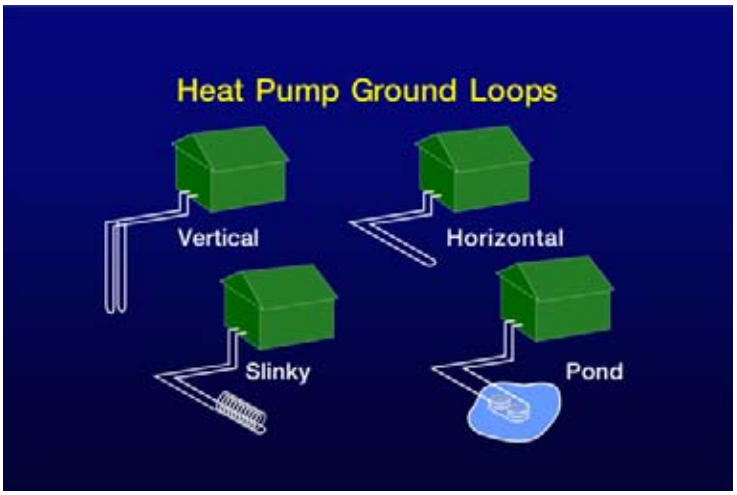


Figure 1 – Different Closed Loop Geothermal System Configurations.

In closed loop systems (refer to Figure 1), a heat transfer fluid is circulated through piping that has been placed beneath the earth's surface, either horizontally in an excavation, vertically in a bore hole, or even sometimes in a surface water body. The amount of piping and heat transfer fluid required in a closed loop system is dependant on the heating and cooling demands of the building, the temperature of the earth and the thermal conductivity of the formation it is placed in. Closed loop systems can be designed to meet the heating and cooling needs of houses to large commercial buildings. A typical private residence may require six vertical loops, while a large commercial building may require 400 vertical loops, with the loops being up to 200 feet deep.

In Minnesota, closed loop systems that are placed in vertical bore holes are regulated under Minnesota Statutes, section 103I.641 and Minnesota Rules, part 4725.7050. The regulations require that 160 pounds per square inch rated, SDR-11, high-density polyethylene (HDPE) piping, meeting ASTM Standard D3035-03a, be placed in the bore holes. The piping must be pressure tested and must be encased in the bore hole with an approved grout. The grout serves to protect groundwater if the closed loop leaks, seals the bore hole to prevent interconnection of aquifers, seals the bore hole to prevent surface run-off from moving down the bore hole, and also is needed to provide a thermal connection between the piping and the bore hole wall. The heat transfer fluid must only be food-grade or USP-grade propylene glycol and water. The propylene glycol is used as a safe, nontoxic anti-freeze, to prevent the heat transfer fluid from freezing during the winter heating period.

Closed loop heat exchanger systems with loops installed horizontally in the ground, or by laying coiled piping in the ground are not presently regulated by the MDH (except for the setback to water-supply wells). The piping is typically placed in trenches 6-10 feet deep. Coiled systems are sometimes referred to as “slinky” systems. The heat transfer fluid in these horizontal systems is usually a water and anti-freeze mix which commonly contain glycol, methanol, ethanol, or some other chemical.

Closed loop heat exchangers located on the bed of a public water body are regulated by the Minnesota Department of Natural Resources under Minnesota Rules, part 6115.0211. A permit is required. The rule requires that the heat transfer fluid used must not be detrimental to the environment should a release occur.

Another type of closed loop system uses copper tubing and circulates a refrigerant. These systems are sometimes referred to as “direct exchange” or “DX” because they circulate the refrigerant directly to the ground through the copper tubing, instead of using the heat transfer fluid for transfer to the refrigerant, as in the other systems. Presently, Minnesota Rules, Chapter 4725 does not permit the vertical construction of these systems in Minnesota; however, two experimental systems have been allowed by variance and are being monitored. DX systems are not allowed in North Dakota, Michigan, Iowa, and Wisconsin; but are being installed in some other states.

Under Minnesota Rules, Chapter 4725, a permit is required to install a vertical heat exchanger. The vertical heat exchanger must be installed by a licensed well contractor or vertical heat exchanger contractor. The first permits were issued in 1984. Since 1984, over 2,000 permits have been issued for systems designed to meet the needs of houses, schools, churches, and other large government or commercial buildings. In 2005, approximately 130 vertical heat exchanger permits were issued in Minnesota. In 2006, that number doubled to 260. In 2007, 230 permits were issued and in 2008, 525 permits were issued.

In an age of rising fuel costs and dependence on fossil fuels, geothermal heat exchangers can provide a clean, renewable energy alternative. They appear to be here for the long run.

For more information on vertical heat exchangers, you may contact Mark Hoffman, with the MDH Well Management Section at 651/201-4589.

Approved Geothermal Heat Transfer Fluids

Geothermal heating and cooling systems continue to grow in popularity in Minnesota. The high cost of energy, the "green" movement, and economic incentives available for installation of these energy-saving systems have all contributed to this growth. Most systems are some variation of a ground source closed loop heat exchanger that circulates a heat transfer fluid through buried high density polyethylene (HDPE) pipe. Some of the systems are installed in drilled vertical bore holes and are regulated by the Minnesota Department of Health (MDH). Many, however, are installed in horizontal trenches, coiled in shallow excavations, or placed underwater in a pond or lake, and are not directly regulated by the MDH.

The heat transfer fluid circulating in ***unregulated*** closed loop systems may include materials that are harmful to human health or groundwater. Therefore, the MDH requires that the piping for these unregulated horizontal ground source closed loop heat exchangers containing a heat exchange fluid other than food-grade propylene glycol, must be at least 50 feet from a water-supply well. The minimum setback may be reduced to 10 feet if the pipe materials and heat transfer fluid meet the requirements of Minnesota Rules, part 4725.7050 for vertical heat exchangers. (For ***regulated*** vertical heat exchanger systems, the minimum setback distance required between a well and the vertical piping is 35-feet; and between a well and the horizontal piping is 10 feet.)

So, how do you identify an MDH-approved heat transfer fluid? Minnesota Rules, part 4725.7050, subpart 1, item E specifies that only food-grade or United States Pharmacopeia (USP)-grade propylene glycol and potable water may be used as a heat transfer fluid. As long as the product being used is propylene glycol without additives, and is labeled "Food Grade," "USP Grade," or "FCC Grade" (see below for FCC description), it is acceptable for use. If it only has the words "food grade," it must be made in the United States (because food grade may mean different things in different countries).

There are two propylene glycol products with additives that have been approved: **Dowfrost**, made by Dow; and **EnviroGard** (previously called RhoGard Ultra DP), made by Rhomar Water Management. The MDH Well Management Section has established a policy for review and approval of food-grade and USP-grade propylene glycols with additives. The manufacturer must submit a complete list of additives to the MDH, documentation must be submitted verifying that each of the additives is food grade or USP grade, and the product must be listed by NSF International as a nonfood compound suitable for use where there is a possibility of food contact. We are not actively soliciting additional products, but will review at the request of the manufacturer.

One other note: "food grade" does not mean safe to eat. It means that the product is considered safe when used in or around food preparation in accordance with the requirements in the relevant parts of Title 21 of the Code of Federal Regulations.

If there is no package, label, or other documentation of what type of fluid is circulating in an existing, unregulated closed loop system, then a 50-foot isolation distance must be maintained between the geothermal system and a water-supply well.

* FCC – Food Chemical Codex. Provides standards for identity, purity, and testing of food ingredients. FDA (the Food and Drug Administration) uses FCC as the standard for defining food grade. So, if it's labeled FCC grade, it is food grade.

Vertical Heat Exchanger Setbacks and Contamination Sources

During the spring district continuing education meetings, Minnesota Department of Health (MDH) staff discussed the sharp increase in the number of permits issued for Vertical Heat Exchangers (geothermal heat loops). Contractors have been asking MDH staff many questions about setback requirements from utilities, buildings, and water-supply wells.

Setback Requirements for Vertical Heat Exchangers

Minnesota Rules, part 4725.7050, subpart 1, requires that a vertical heat exchanger must be constructed according to the general construction standards in Minnesota Rules, parts 4725.2010 to 4725.3875 and the requirements of Minnesota Rules, part 4725.7050. Therefore, vertical heat loop installations must follow the same construction standards that are required for wells and borings. This includes meeting the separation distance requirements from electric lines, gas pipes, and propane tanks.

Setback Distances from Utilities – Minnesota Rules, part 4725.2150, requires a minimum isolation distance of 10 feet between a vertical heat exchanger boring/loop and a pipe with flammable or volatile gas, an electric line, or a liquid propane tank. The isolation distance may be reduced to 5 feet if the person constructing the boring has electric wires de-energized and visibly grounded or has insulating barriers placed on the wires at a distance of 10 feet either side of the rig mast during construction; any propane tank is empty; and if that person posts a permanent sign on the system warning of the location of the electric wire, gas pipe, or liquid propane tank. An exception to these requirements is provided for low voltage electric lines with a voltage less than 50 volts (i.e., television or fiber optic wires) where no minimum separation is required.

These requirements are minimum standards, and do not exempt persons from more restrictive requirements of the Occupational Safety and Health Administration (OSHA). The OSHA requirements are contained in the Code of Federal Regulations part 29 (29 CFR) under the construction portion of the code (part 1926).

Distance from a Building – How close can a vertical heat loop be to a building? A minimum horizontal distance of 3 feet must be maintained between a vertical heat loop boring and the farthest exterior projection of a building, including the walls, roofs, decks, overhangs, and other permanent structures. The borings cannot be located within or under a building and must be accessible for repair or sealing.

Vertical Heat Exchangers and Water-Supply Wells – The rule revisions that took effect on August 4, 2008, require that a minimum isolation distance of 35 feet be maintained between a water-supply well and a vertical heat exchanger boring. A water-supply well includes: a potable water well; irrigation well; a well for agricultural, commercial, or industrial water supply; a well used for heating or cooling; and a remedial well or test well. The horizontal piping for a vertical heat exchanger system must be located no less than **10 feet** from a water-supply well.

A 50 foot isolation distance must be maintained between a water-supply well and any portion of an unregulated, nonvertical, heat exchanger system that does not have pipe materials and heat transfer fluid meeting the requirements of Minnesota Rules, part 4725.7050 for vertical heat exchangers.

Vertical Heat Exchanger Piping and a Water Service Line – The Minnesota Department of Labor and Industry (DLI) administers the Minnesota Plumbing Code. The Minnesota Plumbing Code, Minnesota Rules, Chapter 4715, regulates the location of a water service line. Minnesota Rules, part 4715.1710, subpart 3, states that a potable water service line must not be located near a source of pollution. A horizontal separation of 10 feet must be maintained between a water service line and the horizontal piping of a vertical heat exchanger or a horizontal ground source closed loop heat exchanger.

DLI enforces the plumbing code for public installations. Many local units of government have adopted the plumbing code and enforce it. Many cities also administer the state mechanical code, and therefore, contractors may be working with city staff during the installation process. Because drilling contractors and mechanical contractors are often working on these projects together, several cities have additional requirements that the contractors have to follow in order to obtain a mechanical permit and ultimately a permit of occupancy. For example, the city of Edina requires that every vertical heat loop must be "tied in" or surveyed so the loops can be located in the future. The city then knows where the loops are and can verify they will not be under future building additions, are not in city or utility easements, and are on the correct property. The city also requires a Well and Boring Record be part of the mechanical application permit so they can verify the heating/cooling calculations, and the actual number of loops installed.

If you have additional questions or concerns about the setback distances addressed in this article you can contact a well specialist at your local MDH district office and they will be able to answer your questions about the well code, and refer you to the appropriate agency for any other plumbing or safety questions.

Vertical Heat Exchangers and Sources of Contamination – Even though Minnesota Rules, Chapter 4725, does not require that vertical heat exchanger borings meet the contamination source setback distance requirements contained in Minnesota Rules, part 4725.4450 at this time, the MDH recommends that the setback distances be followed whenever possible.

Continuing Education Meetings

With the new rule requirement (see Minnesota Rules, part 4725.1650) for all certified representatives to obtain two hours of Minnesota Department of Health (MDH)-provided or MDH-sponsored continuing education, Well Management Section staff held evening programs in Bemidji, Duluth, Fergus Falls, Mankato, Marshall, Rochester, St. Cloud, and St. Paul during March-April 2009. The distribution of attendees was:

Profession	**Number of Attendees**
Well Contractor	105
Limited Well/Boring Contractor	37
Monitoring Well Contractor	19
Explorer	10
Delegated Well Program	11
Other Government Agency	6
Elevator Contractor	1

Well Management Section staff also made two-hour presentations at pump and supply-house programs offered by First Supply, Brainerd; First Supply, Rochester; Goodin, Minneapolis; Pipeline Supply; Preferred Pump, St. Cloud; and St. Hilaire Supply, St. Hilaire during March-April 2009. In addition,

Well Management Section staff provided the program update and staffed a booth at the Minnesota Water Well Association Convention and Trade Show in Duluth in January 2009. Finally, staff met with a group of well contractors in Alexandria, Minnesota in January 2009 to discuss a variety of issues specific to irrigation wells.

These efforts were designed to improve communication between the MDH and well and boring contractors and limited well/boring contractors; to highlight some of the significant changes in the recent rule revision; and to discuss some of the more common well construction issues. Topics covered at these meetings included industry statistics, a final update on the 2008 rulemaking, 2009 legislation, an overview of geothermal systems, issues with pump and pitless installations, grouting and grout settlement problems, review of public water-supply well requirements, and local issues.

The Well Management Section is planning to hold a continuing education program during fall 2009 for those who did not attend the spring meetings. Several different options are being explored including in-person training, web training, and video conferences. The MDH will notify certified representatives by mail, when the additional meeting is scheduled.

Management of Drilling Wastewater: An Update from the Minnesota Pollution Control Agency

(By Chelsea Domeier, Minnesota Pollution Control Agency)

Most drilling methods generate drill cuttings, drilling mud, water, or some combination thereof. These drilling byproducts may contain sediment, silt, bentonite clay, and small rock pieces. Discharging these wastes containing suspended solids into lakes, rivers, and wetlands can increase water turbidity, temperature, and nutrient levels; and it can also decrease the presence of dissolved oxygen. These impacts can negatively affect aquatic life, and the use and enjoyment of Minnesota's water bodies. To protect the health and ecosystems of water resources, the Minnesota Pollution Control Agency (MPCA) does not authorize the discharge of untreated drilling wastewater into surface waters. Minnesota Rules, part 7050.0210, subparts 2 and 13 prohibit discharges into water bodies which may cause nuisance conditions and pollution. Due to high levels of total suspended solids in drilling wastewater, discharging it untreated into surface waters will cause both nuisance conditions and pollution.

The MPCA recommends that drilling contractors adhere to the following steps to manage drilling wastes:

1. To protect water bodies in rural locations, drillers should install temporary Best Management Practices (BMPs) at drill sites to collect and slow down the wastewater's flow. This allows the sediments laden in the wastewater to settle out prior to entering waterways. BMPs can include earthen berms, hay bales, sandbags, sediment filter bags (as described in the February 2003 issue of the Water Well Journal), earthen depressions, storage tanks, or lined dumpsters. BMP selection will depend upon the drilling site's proximity to a water body and available space. Wastewater retention time will vary based upon the total suspended solids concentration; retention time can be increased by installing walls or barriers which create a maze-like path for the water to flow through the BMP. Once sediments have settled out, wastewater can be discharged to the ground; solids must be stabilized on site or removed and properly disposed of in accordance with Minnesota rules.

2. At drilling locations in urban settings parking lots, roads, and sidewalks will prevent the flow of wastewater from slowing down and sediments from settling out. Therefore, wastewater from drilling activities should always be contained onsite. Water contaminated with sediment and drill cuttings should be pumped into a storage tank immediately as it surfaces. The fluid should be contained and kept in drums, tanks, or lined dumpsters to prevent it from running offsite into roadways and storm sewers. Storm sewers need to be protected because they discharge into surfaces waters without treatment. To prevent discharging untreated wastewater into storm sewers, sandbags or berms should barricade the storm sewer catch basins directly down hill from, and in close proximity to, the drilling site. Catch basin filter baskets should be installed to capture sediment. As an added preventative measure, sandbags or berms should also be placed around the drill site, as they can help contain and direct a spill if the need arises. When drilling wastewater is adequately treated and solids are removed and contained on the drill site, the clean water can be disposed of through the storm sewer after city officials have been notified. If liquids are to be managed by a Wastewater Treatment Facility, it is the responsibility of the party which generated the wastewater to contact the authorized operator and obtain permission for disposal through the sanitary sewer. Captured solids should be properly disposed of in accordance with Minnesota rules.

3. The MPCA recommends that drillers prepare spill kits, and create a "Waste Disposal Plan" (WDP) and a "Spill Prevention and Response Plan" (SPRP) for both urban and rural drill site locations. These plans will help drillers prepare in advance, and, in turn, can prevent untreated discharges to surface waters from occurring. However, should a spill or untreated discharge to a surface water occur, the MPCA must be immediately notified in accordance with Minnesota Statutes, section 115.061. The statute requires the responsible party to recover the discharge or spill immediately and take action to minimize or abate pollution as soon as possible. Failure to comply with the Minnesota Statutes, section 115.061 and Minnesota Rules, part 7050.0210 can result in an enforcement action from the MPCA that may include a monetary penalty and corrective actions. **Spills and discharges to surface waters should be immediately reported to the Minnesota Duty Officer by calling 651/649-5451 or 800/422-0798.** The duty officer will record all pertinent information and then will notify the appropriate state agencies with jurisdiction.

Untreated well drilling wastewater discharge caused nuisance conditions and pollution in a creek in southeastern Minnesota.

License Requirements for Well and Pump Work on Community Public Water-Supply Wells

Occasionally, the Minnesota Department of Health (MDH) receives questions regarding whether a city/municipal employee must have a well contracting license to perform well or pump work on community public water-supply wells (city/municipal wells). The MDH regulates the construction, repair, and sealing of wells and borings in Minnesota through Minnesota Statutes, Chapter 103I and Minnesota Rules Chapter 4725 (Minnesota Well Code). Minnesota Statutes, Chapter 103I requires that a person who drills, constructs, repairs, or seals a well or boring, or installs a well pump or pumping equipment must have a well contractor's license.

Some activities that city/municipal employees may perform on community public water-supply wells without a well contractor's license include: measurement of water levels, disinfection, and repair of a pump after it has been removed from the well by a licensed well contractor.

Activities that city/municipal employees, or any other person, may not perform on community public water-supply wells without an appropriate well contractor's license include: well construction, repair, and permanent sealing; removal or installation of well pumps; well treatment with any material other than chlorine; and modification of the well casing.

Licensed well contractors are bonded and have extensive experience related to well construction, well sealing, pump installation, maintenance, and repair. Licensed well contractors must also comply with annual continuing education requirements that provide well contractors with current regulatory and industry information including emerging construction and repair techniques, products, and materials.

In addition to the full well contractor license, the MDH offers other "limited" well contracting licenses for several limited categories of well work including, pumps and pumping equipment, pitless and screen, and well sealing. If you have any questions regarding who can perform work on public water-supply wells and if a license is needed, please contact Michael Convery, with the MDH Well Management Section, at 651/201-4586.

Employees from Bergerson-Caswell, Inc., a Minnesota Licensed Well Contractor, installing a line-shaft turbine pump in a new, community public, (municipal) water-supply well in Woodbury, Minnesota.

South-Central Groundwater Monitoring and County Geological Atlases

(By Jim Berg, Minnesota Department of Natural Resources)

The 2008 Legislature allocated funding from the Environment and Natural Resources Trust Fund for an aquifer investigation, mapping, and monitoring project in south-central Minnesota. The allocation provides $1.6 million for a 3-year project in Sibley, Blue Earth, Nicollet, Brown, Watonwan, and Martin counties. The allocation is being shared by the Minnesota Department of Natural Resources (DNR) ($894,000) and the Minnesota Geological Survey (MGS) ($706,000) to evaluate the Mt. Simon aquifer and begin Part A geologic atlases for Sibley, Blue Earth, and Nicollet counties. Some of the funding for well installation work is from a separate bonding allocation. The Mt. Simon aquifer is an attractive resource for high-capacity use in a region that would otherwise have limited aquifer choices. This project will give DNR Waters and other water agencies the opportunity to learn more about the physical and recharge characteristics of this poorly understood, but important aquifer.

The DNR Division of Waters is currently coordinating installation of monitoring wells (observation wells) at 13 locations by drilling companies. The wells will be completed in the Mt. Simon aquifer and some shallower aquifers on public property in the project area to depths of approximately 300 feet to 600 feet. The wells will be sampled for chemical constituents that will help determine the residence time or age of the groundwater in this aquifer. Instrumentation will be installed in the wells to continuously record groundwater levels. These data will help determine aquifer recharge characteristics and potential limitations for future use. The DNR Division of Waters also will develop a guidance document to define the purposes and procedures for maintaining and developing statewide monitoring of groundwater levels.

The MGS has initiated Part A geologic atlases for the three-county area. These atlases will describe the location, size, and boundaries of aquifers. This effort will also establish digital locations and geologic interpretations for wells and enter the information in the County Well Index for Nicollet, Blue Earth, and Sibley counties. Part A atlases create the basic geologic and database framework for subsequent DNR Part B hydrogeolgic evaluations.

This project will create both short and long-term benefits for the people and natural resources of the region. The information generated by this project will be immediately useful to water management scientists, planners, drillers, consultants, industrial users, and municipal officials for understanding and assessing local groundwater conditions for protection and wise use. The 2009 Legislative Citizen's Commission for Minnesota Resources (LCCMR) also has recommended a similar proposal for starting additional geologic atlases and extending the Mt. Simon aquifer investigations to Sibley, McLeod, Wright, and Sherburne counties. If approved, this project would begin in July 2009.

OSHA Rules Regarding Isolation Distances Between Wells and Borings and Electric Wires

The Occupational Safety and Health Administration (OSHA) has requirements for the separation distance that must be maintained between electric wires and a crane or mast, (such as a mast or derrick found on a drilling machine or pump hoist). The OSHA rule is paraphrased below. The full rule is available on the federal OSHA Web site at: www.osha.gov/pls/oshaweb.

Code of Federal Regulations (CFR), part 1926.550(a) (15), administered by OSHA, requires that unless electrical distribution and transmission lines have been de-energized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following:

1. For electric lines rated 50kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet;
2. For electric lines rated over 50kV, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1kV over 50kV or twice the length of the line insulator, but never less than 10 feet;

Using the OSHA equation for an overhead electric line rated for 169kV, the minimum required setback distance can be calculated by the following steps:

Step 1 – Calculate voltage above 50kV: 169kV – 50kV = 119kV

Step 2 – Calculate additional separation distance: 119kv x 0.4 inch/kV = 47.6 inches (approximately 4 feet)

Step 3 – Calculate minimum separation distance: 10 feet + 4 feet = 14 feet

The OSHA requirement is a radial distance between the mast and the wire, it does not directly apply to the well. For instance, in the preceding example, if the electric wire was 45 feet above the ground, and the drilling machine mast or derrick is 29 feet tall, OSHA rules would permit the rig to operate directly under the wires. However, in Minnesota, Minnesota Rules, part 4725.2150 requires a horizontal setback of at least 10 feet between an electric wire and the vertical projection of a well or boring. Therefore, a well contractor would still have to maintain the 10 foot horizontal setback distance.

In the preceding example, if the overhead electric wire was 29 feet above the ground and the mast or derrick is 29 feet tall, OSHA rules would require a setback of 14 feet between the electric wire and the drilling machine mast. Minnesota rules would require a horizontal setback of at least 10 feet between the electric wire and the vertical projection of the well or boring.

Cost Share and Loan Availability for Well Construction, Repair, and Sealing

A list of cost-share grant or loan programs for well sealing, organized by county, is available from the Minnesota Department of Health, Well Management Section's Web site at: www.health.state.mn.us/divs/eh/wells/sealing/costshare.html. Preapproval is required to qualify for these programs so the arrangements for cost-share grants or loans must be made before a well is sealed. Please contact the program directly for application information. State law requires that a licensed well contractor do well sealing work.

Several federal and state loan and grant programs for well construction, repair, and sealing are listed on the Well Management Section Web site at: www.health.state.mn.us/divs/eh/wells/sealing/loans.html.

The information on cost share and loan availability for well construction, repair, and sealing is also available on a fact sheet. To request a printed copy, please contact the Well Management Section at 651/201-4600 or 800/383-9808.

The Importance of Sealing Wells

In the Fall 2007/Winter2008 issue of *Minnesota Well Management News*, we published an article about a donkey that fell into a well pit containing an abandoned, unsealed well near the town of Underwood, Minnesota. About a month after the donkey fell in the well pit, the following article appeared in the Weston Forum, a Connecticut newspaper:

Dog Falls Down Well
The Weston Forum
October 10, 2007

A Labrador dog is running today as if nothing happened, thanks to the efforts of firefighters who rescued it from the bottom of an abandoned well.

Animal Control Officer Mark Harper received a call on Friday, October 5th, that a dog had fallen down a well in the back yard of a residence on Smith Farm Road. When Mr. Harper arrived, he heard the dog barking from the bottom of the well, which measured three feet by three feet in diameter and was 22 feet deep.

The sides of the well were made of poured concrete and it was topped with a wooden cover. The cover had rotted through, and Mr. Harper believes it broke when the dog walked across it, landing the dog in about a foot and a half of water at the bottom of the well. Mr. Harper lowered a catch pole to try to reach the dog, but it was too short, so he called the Weston Volunteer Fire Department for assistance.

Fire Chief John Pokorny and about 12 other fire fighters arrived on the scene along with Rescue Truck 5. Sensing that the dog was OK from the sound of his barks, the first thing they did was test the air in the well. "We found the oxygen level was lower than normal, so we utilized a special fan that blew air in,'' Mr. Pokorny said.

They lowered a ladder into the well and a firefighter climbed down and scooped up the dog, which weighed about 65 pounds. He slowly brought the dog back to the top. "The dog actually helped climb up the ladder with its paws,'' Mr. Pokorny said.

Back on terra firma, the dog was dirty, but, except for a small cut on the face, was uninjured and was soon running around the yard again.

Mr. Pokorny hopes this incident will serve as a warning to others who have old and abandoned wells on their property. "This was a dog rescue, but it just as well could have been a child or adult who fell through the wooden cover. There are a lot of old abandoned wells in town, and they are dangerous. . .

Even though these two stories have happy endings, they outline the importance of sealing all abandoned wells. Thanks to the efforts of those who had the foresight to enact well sealing legislation, Licensed Well Contractors and Well Sealing Contractors, the Minnesota Department of Health, local cost-share programs, and property owners; over 233,000 wells have been sealed in Minnesota. Many accidents have surely been prevented as a result. Continued diligence on the part of all parties involved, to assure that abandoned wells are properly sealed in a timely fashion, will undoubtedly help prevent accidents like these in the future.

Red River Valley Flooding, Spring 2009

In late March 2009, a deep snow pack, significant rain and snow events, and sudden warm weather resulted in rapid snow melt over already saturated and frozen ground in parts of the upper Midwest. The snowmelt and rainfall caused significant overland flooding throughout the Red River Basin in eastern North Dakota and western Minnesota. More localized flooding occurred along portions of the Minnesota River, Mississippi River, and many rivers and lakes throughout central and northern Minnesota.

On March 27, 2009, the Red River reached its previously recorded flood record and continued to rise, ultimately cresting at 40.82 feet at Fargo on March 28, 2009. (The flood stage at Fargo is 18 feet.) A slow-moving winter storm that produced blizzard conditions migrated through the region during March 30-April 1, 2009, dropping over 1-2 feet of snow throughout much of the region and severely complicating sandbagging and other flood control and emergency response efforts. The colder weather slowed snowmelt and prevented further rise in the river crest; however, water levels generally remained high because of continued snowmelt and ice jams on the river. The Red River crested a second time in mid-April, but remained below previous levels.

State Response:

Governor Tim Pawlenty signed an Executive Order, declaring a State of Emergency, on March 20, 2009, in anticipation of significant regional flooding. Clay, Kittson, Marshall, Norman, Polk, Roseau, Traverse, and Wilkin Counties were covered by the declaration. The Federal Emergency declaration followed with a Federal Disaster Declaration on March 27, 2009. The State Emergency Operations Center (SEOC) was activated on March 25, 2009. The SEOC coordinates the response of various state and federal agencies and other organizations in addressing problems and needs in any major emergency. A number of state agencies responded and remained involved for well over a month, including the Minnesota National Guard, Minnesota State Patrol, and the Minnesota Departments of Health, Natural Resources, Public Safety, and Transportation. Volunteer organizations, including the American Red Cross and the Salvation Army, provided mobile feeding sites, shelters, and supplies for cleanup. Local governments from throughout Minnesota provided equipment, materials, and staff to assist with administrative services, emergency services, and public works.

Minnesota Department of Health Response:

The Minnesota Department of Health (MDH) activated the department's Operation Center on March 25, 2009, to coordinate the MDH response with local public health agencies and health-provider organizations and facilities. Some of the major activities included:

- Working with food, beverage, and lodging facilities licensed by the MDH to prepare for flood impacts and then, working through flood recovery to reopen their businesses.
- Working with churches and shelters, which were providing food for public workers and volunteers to make sure food was prepared, maintained, and delivered according to sanitary standards.
- Activating the MDH Hospital Response Team and assisting in the evacuation of 134 residents/patients from Eventide Nursing Home and Merit Care Hospital in Fargo overnight on March 26-27, 2009, identifying available beds in Minnesota hospitals and nursing homes, tracking the distribution and care of evacuees in the Minnesota facilities, and coordinating the return of evacuees. A total of approximately 300 people were evacuated from North Dakota facilities to Minnesota, with many being transported as far as Brainerd and the Twin Cities.

- Activating the Minnesota Medical Reserve Corps to support care of the evacuated residents from North Dakota facilities. Approximately 100 health professionals volunteered to assist. On a parallel note, the Veterinary Volunteer Corps was activated and deployed to Fargo area to assist with the care of up to 600 animals.
- Deploying the MDH Mobile Medical Unit (see photograph) to Moorhead on March 29, 2009, due to the threat that access to emergency medical services could be disrupted by bridge closures since the area hospitals are located on the North Dakota side of the Red River in Fargo. The unit also served responders working on flood-related activities.
- Training volunteer organizations on proper indoor cleanup procedures.
- Publishing a number of fact sheets on personal protection, home clean-up (asbestos, carbon monoxide, fuel oil, mold, septic systems, wells, and water systems), and precautions for responders.
- Issuing 160 well water sample testing kits to seven local public health agencies which, in turn, provided the kits to owners of flooded wells.
- Staffing Disaster Recovery Centers.
- Coordinating behavioral health teams that circulated throughout the region and staffed Disaster Recovery Centers to assist individuals dealing with the devastation.

MDH Mobile Medical Unit deployed to Moorhead, Minnesota during the 2009 flood.

Private Wells:

MDH offices in Bemidji and Fergus Falls were heavily involved in the flood response. MDH staff in these offices contacted Public Health Nurse Directors in Clay, Kittson, Marshall, Norman, Polk, Roseau, Traverse, and Wilkin Counties to offer well testing services. The MDH set up local laboratories in the Bemidji and Fergus Falls district offices during this flood event to analyze water samples from flooded wells because it can be difficult to meet bacteria holding time deadlines when mailing/shipping water samples to the MDH Public Health Laboratory in St. Paul during an emergency. Clay County chose to provide well testing through their own county laboratory.

At the time of this article, 160 flooded well sample kits were distributed to the local public health agencies. Approximately 30 samples have been received and tested. Well Management Section staff have provided technical assistance to local public health staff and to well owners regarding flood contamination, water testing, water use, and well disinfection. Well Management Section staff provided information on well and water system disinfection and referred well owners to licensed well contractors, especially in instances where the well may have been damaged or submerged by floodwaters. MDH issued two press releases regarding water-supply wells. The first release, issued March 24, 2009, urged well owners to take certain precautions to protect their wells from potential flood impacts. The second release, issued April 22, 2009, made recommendations on disinfection, testing, and other corrective actions to owners of flooded wells.

Disaster Recovery Centers:

Disaster Recovery Centers were established in Bemidji, Breckenridge, Crookston, Fosston, Grygla, Hendrum, Moorhead, and Oslo. MDH staff from various programs assisted with staffing the centers, providing information to the public on many issues associated with flood recovery, and providing referrals to other support services.

The Red River flooding events occur on a regional scale, are slow in developing and in subsiding, typically cause significant damage to buildings and public infrastructure (roads, utilities, and communications), delay spring planting of crops, disrupt businesses, and divert monies and manpower for sandbagging and other flood control activities. The impact of this flood event on private wells has not been as extensive as previous Red River floods. Many of the properties prone to flooding in the past have been purchased through government buyouts, the buildings demolished, and the wells sealed. Flood control structures have been constructed, wells flood proofed, and additional controls are being considered. The citizens and local governments were better prepared to deal with flooding after their recent flood experiences in the 1990's.

The Case of an Unlicensed Person Doing Pump Work

The Minnesota Department of Health (MDH) recently completed enforcement actions against an unlicensed person performing pump work.

During July 2007, a property owner in Crow Wing County hired a plumbing contractor (who did not have a well contracting license, nor a limited pump installers license) to replace a pump on a water-supply well. The plumbing contractor sent an employee out to replace the pump.

During September 2007, the pump reportedly would not pump water. The property owner reported the problem to the plumbing contractor and he sent the same employee back to the property to perform additional repairs. In October 2007, the plumbing contractor sent out a different employee to work on the pump and water system.

In February 2008, the property owner filed a complaint with the Minnesota Department of Labor and Industry (DLI) regarding the contractor's inability to repair the pump and his billing practices. The DLI referred the complaint to the MDH. The property owner provided copies of invoices for the pump work and a copy of a letter written by the plumbing contractor to the property owner, documenting the pump work that his company did. The MDH determined that the plumbing contractor was not licensed to do well work of any kind in Minnesota. Enforcement records also showed that in 1996, the MDH had issued the plumbing contractor an Administrative Penalty Order (APO) concerning similar violations related to installing a pump and pumping equipment in a well.

On April 23, 2008, the MDH issued the plumbing contractor a 10-day letter. The plumbing contractor responded to the 10-day letter and denied the allegations that he installed a pump on the well. On May 29, 2008, the MDH issued the plumbing contractor a second APO assessing a monetary penalty of $1,750 for performing pump work without a license.

Obituaries

Hillard Maynard Mathews, age 80, owner and operator of Mathews Well Company passed away on Monday, January 5, 2009.

Hillard Mathews moved to Lester Prairie in 1951 and started his own well drilling business which he worked at until his death. He enjoyed the daily work that went into his well drilling business and the people he met. He was a lifetime member of the Minnesota Water Well Association.

Hillard is preceded in death by his wife Elizabeth and is survived by his daughters LuAnn Priebe, and Debbie Mathews and her special friend Ron Koester, and his grandson, Anthony Priebe.

The funeral service for Hillard was held on January 8, 2009, at St. Paul Evangelical Lutheran Church in Lester Prairie. Burial was at St. Paul Evangelical Lutheran Cemetery. Pastor Eric Nelson officiated.

James Frederick Volk, age 67, formerly with St. Peter Well Company, died Friday, February 6, 2009, at his home in Kasota.

James "Jim" Volk was born on July 29, 1941, in Nicollet, Minnesota, to Reinhard and Eunice Volk. He grew up in Nicollet and graduated from Nicollet High School in 1959. He then went on to work at the Nicollet Creamery. On January 22, 1966, Jim was united in marriage to Sandra Flowers. The couple then moved to Kasota, Minnesota, where Jim worked for St. Peter Well Drilling until his retirement in 2003. Jim was a member of the St. Peter Evangelical Lutheran Church and the Kasota Fire Department, where he served as the Fire Chief for eight years. Jim enjoyed wood working, fishing, auto racing, and the television show Gunsmoke.

Jim is survived by his wife Sandra; children, Douglas Volk of Kasota, and Sheila Volk of Kasota; brothers, Jerald "Pete" (Diane) Volk of Nicollet, Roger (Vicki) Volk of New Ulm; twin sister, Janice Wagner of Nicollet; mother-in-law, Clara Flowers of St. Peter; many nieces, nephews, and cousins. Jim was preceded in death by his parents; father-in-law, Ed Flowers; brothers-in-law, Dick Wagner, and Arno Flowers.

Jim's funeral service was held on Tuesday, February 10, 2009, at St. Peter Evangelical Lutheran Church with Reverend Charles Degner officiating. Burial was at the Kasota Hill Cemetery.

MINNESOTA WELL MANAGEMENT NEWS
Published twice per year by the Well Management Section, Minnesota Department of Health
www.health.state.mn.us/divs/eh/wells
Editor: Patrick Sarafolean, 651/643-2110
Contributors: Well Management Section Staff unless otherwise noted.

To request this document in another format, call 651/201-4600
Deaf and hard-of-hearing: TTY 651/201-5797

New Contractors

The following individuals have become certified representatives or responsible individuals since the last issue of this newsletter was published.

Well Contractor
David F. Sampson
GeoTechnologies, LLC
Minneapolis, Minnesota

Haden B. Shipman
Antonsen Well Drilling, Inc.
Dent, Minnesota

Individual Contractor
Wesley E. Salverda
Forest Lake, Minnesota

Explorer
Brian D. Goldner
Kennecott Exploration Company
Tamarack, Minnesota

Neil D. Smith
Franconia Minerals Corp. USA
Babbitt, Minnesota

Well Sealing Contractor
Adam C. Rowland
Rowland Well Company, Inc.
Chatfield, Minnesota

Gary R. Edblad
Cambridge Plumbing and Heating, Inc.
Stanchfield, Minnesota

Steve L. McCullough
Lauren McCullough Well Drilling, Inc.
Wyoming, Minnesota

Pump Installer
Robert A. Hofschulte
Hofschulte Well and Pump Service
Elgin, Minnesota

Adam C. Rowland
Rowland Well Company, Inc.
Chatfield, Minnesota

Terry P. Siebenaler
H & M Plumbing and Heating, Inc.
Altura, Minnesota

Pitless/Screen Contractor
Robert A. Hofschulte
Hofschulte Well and Pump Service
Elgin, Minnesota

Adam C. Rowland
Rowland Well Company, Inc.
Chatfield, Minnesota

Terry P. Siebenaler
H & M Plumbing and Heating, Inc.
Altura, Minnesota

Corrections:

In the Fall 2008/Winter 2009 issue of Minnesota Well Management News, we incorrectly reported that Gary Edblad, Cambridge Plumbing and Heating, Inc., Stanchfield, Minnesota and Steve L. McCullough, Lauren McCullough Well Drilling, Inc., Wyoming, Minnesota had recently earned certified representative status for Pump Installer licenses; and also that Steve L. McCullough earned certified representative status for a Pitless/Screen Contractor license. Both individuals have held these certifications for many years. What should have been reported is that both individuals had just earned certified representative status for Well Sealing Contractor licenses. We apologize for this error and any confusion it may have caused.

Continuing Education Calendar

The Internet link to the Minnesota Department of Health (MDH), Well Management Section's, Continuing Education Calendar is: www.health.state.mn.us/divs/eh/wells/lwcinfo/training.html.

This calendar lists the upcoming continuing education courses that have been approved for renewal of certification for representatives of Minnesota licensed and registered well and boring contractors. The calendar also lists the number of credits available for each course. The calendar is updated monthly and, if you subscribe, you will be notified by e-mail when this page changes (new classes added, changes to existing classes).

For additional information about any of these training opportunities, call the contact person listed for the program of interest. For general information about continuing education, more current CEU listings, or to request approval for other continuing education activities not listed, contact Mike Convery, Minnesota Department of Health, Well Management Section Operations Unit Supervisor, at 651/201-4586, or michael.convery@state.mn.us.

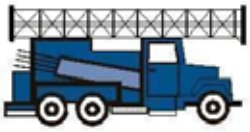
Restricted Plumbing License Application Period Re-Opened

Legislation passed in 2007 requires statewide licensing of plumbers. Previously, licensing was required only in cities with a population over 5,000. The 2007 legislation established a restricted license for persons doing plumbing in rural areas outside of cites with a population over 5,000. The license application period ended in December 2007.

On May 22, 2009, Governor Pawlenty signed a bill, (Senate File 1219, Laws of Minnesota, Chapter 153), amending Minnesota Statutes, Chapter 326B, re-opening the restricted plumbing license application period for two weeks starting October 1, 2009, and ending October 15, 2009. The law indicates that the commissioner of Minnesota Department of Labor and Industry shall grant a restricted journeyman or restricted master plumber license to an individual if the individual completes an application, pays a $30 fee, submits the application by October 15, 2009, and demonstrates that the applicant has experience: two years of practical plumbing experience for a restricted journeyman plumber license; and four years of practical plumbing experience or two years of practical plumbing experience as a plumbing contractor for a restricted master plumber license.

It should be noted that plumbing contractors are required to have liability insurance and a $25,000 plumbing code compliance bond. Licenses expire each year. The Master Plumbing license renewal fee is $120 and the Journeyman plumbing license renewal fee is $55.

For more information, visit the Minnesota Department of Labor and Industry Web site at: www.dli.mn.gov/CCLD/Plumbing.asp, or call 651/284-5067.



Minnesota
Well Management News

MINNESOTA DEPARTMENT OF HEALTH
WELL MANAGEMENT SECTION
625 ROBERT ST N
PO BOX 64975
ST PAUL MN 55164-0975
651/201-4600 or 800/383-9808