



*Protecting, maintaining and improving the health of all Minnesotans*

## MEMORANDUM

**DATE:** October 15, 2010

**TO:** Well Management Section Staff  
Eric Buitenwerf, Hubbard County Environmental Services Department

**FROM:** Daniel Wilson, Manager  
Well Management Section  
Environmental Health Division  
P.O. Box 64975  
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**SUBJECT:** Reissuance of the Notice of Designation of a Flowing Well and Boring  
Special Construction Area at Benedict Lake and Kabekona Lake,  
Hubbard County, Minnesota

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The Minnesota Department of Health (MDH) designated a Flowing Well and Boring Advisory Area, effective March 1, 1995, for portions of Lakeport Township and Steamboat River Township in Hubbard County, in north-central Minnesota. At that time, the designation was announced in the March 1995 issue of the *Minnesota Well Management Newsletter*, which has a circulation to all licensed and registered well and boring contractors, many groundwater professionals, and other interested parties. The designation is now formally referred to as a Flowing Well and Boring Special Construction Area and is being documented in this memorandum for purposes of posting on the Well Management Section Web site and for future circulation.

### AUTHORITY

Minnesota Rules, part 4725.3450, subpart 2, item A (3), grants the commissioner of health the authority to “designate an area where the use of standard construction techniques have resulted in uncontrolled flows, or where hydrogeologic conditions such as eroded or unstable confining layers require special construction to successfully complete a well or boring and confine the artesian pressure.” The requirements for a well or boring to be constructed within the designated area are detailed in Minnesota Rules, part 4725.3450, subpart 2, item B.

## **CONCERNS WITH FLOWING WELLS OR BORINGS**

Flowing wells and borings are excavations or drill holes where the artesian pressure is great enough to cause water to flow at the land surface without the use of a pump. Flowing conditions can present major problems for casing completion and sealing of wells and borings. Uncontrolled flows can cause serious land erosion and land subsidence problems, create unsafe conditions, damage drilling equipment and structures, and waste groundwater. Poorly grouted casings can allow water to migrate up around the outside of the casing, causing bore hole erosion and uncontrolled flows. Once a flow becomes out of control, it is often very difficult to regain control or even simply to reestablish the bore hole to complete construction of the well or boring. Seeps from a poorly controlled flowing well or boring may appear at locations far from the original bore hole.

Following the requirements of the Flowing Well and Boring Special Construction Area should substantially reduce the problems with controlling flows during the construction of new wells and borings and the ultimate sealing of these wells and borings in the future.

## **BACKGROUND CONDITIONS**

The Benedict Lake/Kabekona Lake Flowing Well and Boring Special Construction Area was established on March 1, 1995, in response to uncontrolled flowing well problems in the designated area. MDH staff had observed some well contractors having difficulty controlling flows when constructing new wells in the area. Some wells in the area flow at several hundred gallons per minute. MDH staff have observed water flowing from around the casing of some older wells constructed with driven casings. Attempts to seal the uncontrolled flowing wells have generally been unsuccessful. In one case, the uncontrolled flow from a well threatened to undermine a cabin.

## **BOUNDARIES OF THE FLOWING WELL AND BORING SPECIAL CONSTRUCTION AREA**

This Flowing Well and Boring Special Construction Area includes portions of Sections 33 and 34, Township 143 North, Range 32 West (Lakeport Township) and of Sections 2, 3, 4, and 11 of Township 142 North, Range 32 West (Steamboat River Township), as shown on the attached map.

The Flowing Well and Boring Special Construction Area includes two distinct zones – the southeast shore of Kabekona Lake and the southwest shore of Benedict Lake. The primary concern is regarding properties in these two zones that have elevations within 25 feet of lake level, or below an elevation of 1320 feet above sea level. The standard lake levels recognized by the U.S. Army Corps of Engineers are 1296 feet above sea level for Kabekona Lake and 1295 feet above sea level for Benedict Lake. Drill sites located higher than 25 feet above lake level may be exempt from the requirements of this designation, following consultation with MDH staff.

### **REQUIREMENTS OF THE FLOWING WELL AND BORING SPECIAL CONSTRUCTION AREA**

Minnesota Rules, part 4725.3450, details the requirements for construction of flowing wells and borings for both low flow, low pressure conditions and for high flow, high pressure conditions. The rule also establishes requirements for flow control and discharge of overflow.

Any regulated well or boring constructed within the designated Flowing Well and Boring Special Construction Area must be constructed in accordance to Minnesota Rules, part 4725.3450, subpart 2, item B and the following requirements. Specifically, the “high flow, high pressure, or special construction area standards” must be followed by:

- Drilling a bore hole a minimum of 3 inches larger than the outside diameter of the outer casing or couplings (or 3.5 inches larger for casings deeper than 100 feet and larger than 12 inches inside diameter), which ever is larger, a minimum of 20 feet into the confining layer overlying the flowing artesian aquifer. The confining layer in this area generally extends from the ground surface to a depth of approximately 45 feet. Intermittent sand layers up to several feet thick, with possible low flows, may be encountered in the upper 20 feet of the confining layer. The bore hole must not penetrate the entire thickness of the confining layer.
- Installing a minimum of 20 feet of outer steel casing, extending from the ground surface through the upper part of the confining layer. The outer casing must not penetrate the entire thickness of the confining layer. The outer steel casing is not required to meet the material specifications for casing in Minnesota Rules, part 4725.2350, but it must be able to withstand the structural load imposed by conditions both inside and outside of the casing.
- Pumping neat-cement grout or cement-sand grout into the annular space surrounding the outer casing from the bottom of the casing to the established ground surface, or to the base of the pitless adapter or unit. Neat-cement grout or cement-sand grout must be allowed to set a minimum of 24 hours (12 hours for hi-early cement) before resuming drilling activities.
- Drilling a bore hole at least 3 inches larger in diameter than the outer diameter of the inner casing or coupling, through the confining layer into the flowing aquifer (or 3.5 inches larger for casings deeper than 100 feet and larger than 12 inches inside diameter).

- Installing an inner casing into the aquifer in accordance to Minnesota Rules, part 4725.2250, subpart 8. The inner casing may be steel or plastic. However, drilling through plastic casing is not allowed and plastic casing may present installation problems due to properties of plastic casing.
- Grouting the annular space between the inner and outer casings with neat-cement grout or cement-sand ground. Grouting must be in accordance with Minnesota Rules, part 4725.3050.

**Contractors must contact MDH staff in the Bemidji district office by phone at least 24 hours prior to beginning construction of a well or boring.**

Contractors are cautioned that flowing conditions may be encountered outside the designated area. If flow rates encountered outside the designated area exceed 70 gallons per minute (g.p.m.) or have pressures exceeding 10 pounds per square inch (psi), well and boring construction must be in accordance with Minnesota Rules, part 4725.3450, subpart 2. If flows encountered outside the designated area are less than 70 g.p.m. or 10 psi, wells or borings must be constructed in accordance with Minnesota Rules, part 4725.3450, subpart 1a.

**PERSONS TO CONTACT**

For additional information regarding this Flowing Well and Boring Special Construction Area, please contact: Mr. Mark Malmanger  
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Well Management Section  
Bemidji District Office, Suite A  
705 Fifth Street Northwest  
Bemidji, Minnesota 56601  
218-308-2118  
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Notifications for construction and sealing of wells and permit applications for construction of monitoring wells, elevator borings, groundwater thermal exchange devices and vertical heat exchangers must be mailed or faxed to: Minnesota Department of Health  
Well Management Section  
P.O. Box 64502  
St. Paul, Minnesota 55164-0502  
Phone: 651-201-4600  
Fax: 651-201-4599

Special Well and Boring Construction Area  
 (SWBCA) for Flowing Wells and Borings  
 Kabekona Lake and Benedict Lake

