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DATE: December 13, 2006

TO: Licensed and Registered Well Contractors
Mr. Michael Wiste, Spring Grove Township
Mr. Paul Morken, City of Spring Grove
Mr. Richard Frank, Houston County
Advisory Council on Wells and Borings

FROM: John Linc Stine, Director
Environmental Health Division
P.O. Box 64975
St. Paul, Minnesota 55164-0975

SUBJECT: Notice of Designation of a Special Well Construction Area in Spring Grove Township and the City of Spring Grove, Houston County

The Minnesota Department of Health (MDH) is designating a SPECIAL WELL CONSTRUCTION AREA (SWCA), which includes the city of Spring Grove and an area bordering the city to the north, east, and south of the city, in Houston County (Figure 1). The SWCA designation, which becomes effective January 1, 2007, applies to the construction, repair, modification, and sealing of wells and borings, and remains in effect until further notice.

SITE HISTORY

The city of Spring Grove is the third largest city in Houston County and is located along State Highway 44, approximately 15 miles southwest of Caledonia. In 1984, routine monitoring of the Spring Grove municipal wells identified contamination by 1,1,2-trichloroethylene (TCE) in Municipal Well Number 3 located in easternmost Spring Grove. Subsequent sampling of private wells and monitoring wells identified TCE contamination in all three municipal wells and a number of private wells, particularly east and southeast of the city.

The source of contamination was identified as the site of the Northern Engraving Corporation (NEC), which had previously been used by Control Data Corporation (now Ceridian) as a printed circuit board plant.

A number of remedial actions have been taken, including:

- Installation of an air stripper on Municipal Well Number 3 in 1989.

- Pumpage of Recovery Well Number 5A, starting in 1991, with conversion to a dual-phase, vapor extraction system in 2000. Discharge is treated by carbon treatment before discharge to sanitary sewer.
- Pumpage of Municipal Well Number 1, starting in 1989, with discharge to storm sewer and Seven Mile Creek (Aeration reduces TCE contamination).
- Conversion of a private well to a monitoring well/recovery well, with pumping and discharge to the sanitary sewer system, starting in 1993.
- Excavation of 30-35 cubic yards of TCE-contaminated soil at the NEC facility in 2000, and capping the remaining source area soils with asphalt.
- Installation of carbon treatment systems on six private wells used for potable water supply (currently four wells are still in use).

In July 2000, the Minnesota Pollution Control Agency (MPCA) requested that the MDH consider establishing a SWCA for Spring Grove. In 2002, the United States Environmental Protection Agency (USEPA) reevaluated the health risks associated with TCE, the primary contaminant of concern in Spring Grove. Subsequently, the MDH issued an interim recommended exposure limit of 5 micrograms/liter (5 μg/l). Ongoing monitoring conducted by Gannett Fleming, consultant to Northern Engraving Corporation (NEC) and Ceridian Corporation (CDC), indicates that the extent of groundwater contamination has stabilized and does not appear to be migrating. However, TCE at concentrations exceeding 5 μg/l persists in groundwater in and near Spring Grove.

SITE HYDROGEOLOGY

The city of Spring Grove is located on a bedrock plateau, with deeply incised valleys radiating out to the north and the south, with a drop in elevation on the order of 200-250 feet. This area is within the "driftless" area, and the unconsolidated materials consist of approximately 10-15 feet of loess on top of bedrock.

The first bedrock within the city of Spring Grove is the Galena limestone. The first bedrock in the valleys near the city is St. Peter sandstone or Shakopee dolomite (part of the Prairie du Chien group). Groundwater within the Galena limestone, Platteville limestone, and St. Peter sandstone is perched, the units are not fully saturated, and they generally have not been used for water supply.

Prior to implementation of state-wide well regulation in 1974, the construction of many wells simply involved placement of casing to rock, with open-hole completion through all of the geologic units from the Galena limestone through the Prairie du Chien group.

This construction method perforated two major regional confining layers--the Decorah shale and the Glenwood shale, which normally would provide excellent protection of the underlying hydrogeologic units from surface contamination migrating downwards. Even wells that were cased through these confining layers may not have been grouted to seal the annular spaces, making them, in effect, multiaquifer wells. It appears that multiaquifer wells on or near the NEC site may have played some role in contamination migrating at least into the Prairie du Chien group. These well construction problems also create uncertainty as to exactly where the TCE contamination occurs, since any water sample from a particular well may reflect contributions from more than one aquifer.

PUBLIC HEALTH CONCERNS

The primary contaminant of concern within the SWCA is TCE. TCE was most commonly used as a degreasing agent for cleaning metal parts and surfaces. Exposure to high levels of TCE in drinking water can damage the liver, kidneys, immune system, and nervous system. Exposure to low levels of TCE over a long period of time may be linked to an increased risk of several types of cancer. TCE may also harm a developing fetus if consumed in high concentrations by an expectant mother. The interim recommended exposure limit for TCE in drinking water is 5µg/l.

BOUNDARIES OF THE SPECIAL WELL CONSTRUCTION AREA

The location of the SWCA is shown on the attached map (Figure 1). This area includes Sections 11, 12, 13, and 14 of Township 101 North and Range 7 West. The entire limits of the city of Spring Grove are within the SWCA.

REQUIREMENTS IN THE SPECIAL WELL CONSTRUCTION AREA

1. All wells and borings regulated by the MDH are subject to the requirements of this SWCA. Wells include water-supply wells (domestic, public, irrigation, commercial/industrial, cooling/heating, remedial), monitoring wells, and dewatering wells. Borings include environmental bore holes, elevators, and vertical heat exchangers. Permit applications and notifications must be submitted to MDH.

2. Construction of a new well or boring, or modification of the depth of an existing well or boring, may not occur until plans have been reviewed and approved, in writing, by MDH. In addition to the normally required notification or permit application, the plan must include the following information: street address; well or

boring depth; casing type, diameter, and depth; construction method(s), including grout materials and grout methods; pumping rate, and; use.

3. Special well construction and/or monitoring requirements may be imposed on well or boring completion, location, and use in order to protect public health and groundwater quality, and to prevent contaminant migration. These requirements will be based on available knowledge of groundwater contamination and movement near the well site, and the proposed use and pumping rate of the well.

4. Under Minnesota Rules, part 4725.3050, subpart 7, item C.(3) a water-supply well for potable uses must not be completed in a limestone or dolomite unless these geologic units are overlain by at least 50 feet of unconsolidated material or insoluble rock that extends around the well for one mile radius. This rule requirement prohibits completing potable water-supply wells in the Galena limestone, Platteville limestone, and Prairie du Chien group within the designated SWCA.

5. No potable water-supply wells, except as provided in item 6, may be completed within the St. Peter sandstone or the Jordan sandstone within the limits of the city of Spring Grove. Potable water-supply wells within the city of Spring Grove must be completed within the Franconia formation or deeper. For purposes of this SWCA, potable uses include any consumptive or other uses involving human contact, including drinking, cooking, bathing, manufacturing or processing of food, drink, or pharmaceuticals, or to supply water to fixtures accessible to humans.

6. Approval of plans and specifications for construction or modification of a community public water-supply well and of the well site is required by Minnesota Rules, part 4725.5850. The MDH may consider completion of a community public water-supply well in the Jordan sandstone if the system operator/owner can demonstrate that the water delivered to the distribution system meets U.S. EPA Maximum Contaminant Limits (MCLs), either through treatment, blending with other sources, monitoring, or other mechanisms. The MDH regularly monitors public water supplies for contaminants. The MCL for TCE is 5 µg/l.

7. A well used for nonpotable purposes, or a regulated boring may be completed into the Galena limestone, Platteville limestone, St. Peter sandstone, Prairie du Chien group, Jordan sandstone, or deeper bedrock formations, in accordance with Minnesota Rules, Chapter 4725, anywhere within the SWCA, provided that the MDH and MPCA determine that use of the well or boring will not interfere with remediation efforts, cause further spread of contamination, or result in human exposure to contaminants at

concentrations exceeding MCLs levels, Minnesota Health Risk Limits (HRLs), interim recommended exposure limits, or other relevant public health standards.

8. Water-supply wells for potable purposes may be completed in the Jordan sandstone in those areas within the SWCA but outside the city of Spring Grove with the permission of the MDH. Before permission to construct the well is granted, the well owner must agree to pay the MDH for a volatile organic chemical (VOC) analysis on a water sample collected from the well prior to grouting the annulus of the casing. The well contractor must contact the MDH Rochester district office and arrange for district staff to collect a pre-grout sample and send the sample to the MDH laboratory for analysis. The well may not be grouted until analysis of the water sample indicates that contaminant levels are below HRLs or interim recommended exposure limits.

9. If VOC concentrations in the well water exceed interim recommended exposure limits, the contractor and the well owner, at the well owner's expense, have the option of inserting a packer to seal off the Jordan sandstone and having a water sample collected from below the packer for VOC analysis to obtain a representative sample of that aquifer. The contractor must contact MDH-Rochester district staff to arrange for MDH staff to take a sample and to send the sample to the MDH laboratory for analysis. The well may not be grouted until analysis of the water sample indicates that contaminant are levels below HRLs or interim recommended exposure limits.

10. If VOC concentrations exceed the HRLs or interim recommended exposure limits in the pregrout sample or, if performed, in the sample with packer, the contractor must remove the casing, continue drilling the well through the St. Lawrence formation and into the Franconia formation or deeper, install the casing into the Franconia formation or deeper, and grout the annular space around the casing from the bottom of the casing to the surface with neat cement.

11. For a water-supply well completed within the Jordan sandstone, the casing must extend a minimum of 10 feet into the formation.

12. If VOC testing indicates the presence of any VOC below HRLs or interim recommended exposure limits, the well owner must test the well again for VOC's one year following completion of the well. Samples must be analyzed by a laboratory certified by the MDH under Minnesota Rules, Chapter 4740. The well owner must report the results to the MDH Rochester district office within 30 days of receipt of the test results.

13. Well and boring construction or reconstruction will not be approved if the MDH, in consultation with the MPCA, concludes that the proposed construction or reconstruction and the well use will interfere with remediation efforts, cause further spread of contamination, or result in human exposure to contaminants at concentrations exceeding MCLs, HRLs, interim recommended exposure limits, or other relevant standards.

14. Completion of wells and borings in bedrock formations below the St. Lawrence formation is allowed without any VOC testing requirement.

15. No well or boring in bedrock may be permanently sealed until after MDH has reviewed and approved, in writing, the plans for the proposed sealing. In addition to the required notification, the plan must include the following information: street address; original well/boring depth; current well/boring depth (if different); casing type(s), diameter(s), depth(s); methods of identifying and sealing any open annular space; methods for identifying and removing any obstructions; grout materials and grouting methods.

16. All provisions of Minnesota Rules, Chapter 4725, are in effect.

PERSONS TO CONTACT

For additional information regarding this SWCA, please contact Mr. Michael Convery of the MDH at 651/201-4586.

Plans for construction, modification, or sealing of wells and borings within the SWCA must be submitted to:

Mr. Chris De Mattos
Minnesota Department of Health, Rochester district office
18 Woodlake Drive Southeast
Rochester, Minnesota 55904
Chris.demattos@health.state.mn.us

Notifications for either construction, modification, or sealing of wells must still be mailed or faxed to the MDH central office at:

Minnesota Department of Health
Well Management Section
P.O. Box 64975
St. Paul, Minnesota 55164-0975
Fax Number: 651/201-4599

For information regarding health effects, please contact:

Ms. Rita Messing
Minnesota Department of Health
Site Assessment and Consultation Unit
P.O. Box 64975
St. Paul, Minnesota 55164-0975
Rita.messing@health.state.mn.us

For information regarding the investigation, monitoring, and remediation of the Spring Grove groundwater contamination site, please contact:

Mr. Dan Card
Minnesota Pollution Control Agency
Remediation Division
Superfund Section
520 Lafayette Road North
St. Paul, Minnesota 55155-4194
Phone: 651/297-8379
Dan.card@pca.state.mn.us

REFERENCES

Gannett Fleming, Inc., 2006, 2005, 2004 Annual Monitoring Report for Spring Grove, Minnesota, Site, 34p.

JLS:MPC:jmw
cc: Dan Card, MPCA

Figure 1

Special Well Construction Area
Spring Grove, Houston County