




Protecting, maintaining and improving the health of all Minnesotans

MEMORANDUM

DATE: February 3, 2014

TO: Licensed and Registered Well Contractors
Advisory Council on Wells and Borings

FROM: Thomas P. Hogan, Director 
Environmental Health Division
P.O. Box 64975
St. Paul, Minnesota 55164-0975

PHONE: 651-201-4675

SUBJECT: Notice of Designation of a Special Well and Boring Construction Area,
Former Finland Air Force Station, Lake County, Minnesota

The Minnesota Department of Health (MDH) is designating a **Special Well and Boring Construction Area (SWBCA)**, which includes the area at and around the former Finland Air Force Station near Finland, Minnesota (see Figure 1). The SWBCA designation is effective February 15, 2014, and applies to the construction, repair, modification, and sealing of wells and borings. The SWBCA designation remains in effect until further notice.

AUTHORITY

Minnesota Statutes, section 103I.101, subdivision 5, clause 7, grants the commissioner of health the authority to establish standards for the construction, maintenance, sealing, and water quality monitoring of wells in areas of known or suspected contamination. Minnesota Rules, part 4725.3650, details the requirements for construction, repair, and sealing of wells within a designated SWBCA, including plan review and approval, water quality monitoring, and other measures to protect public health and prevent degradation of groundwater.

SITE HISTORY

The United States Air Force (USAF) operated a long-range radar station at the site of Lookout Mountain during 1951 through 1984. A total of 96 buildings and structures were on the site, which covered approximately 200 acres. USAF operations ceased in 1984. In 1984, the property was transferred to Finlandia, LLC of Minneapolis, Minnesota (MWH 2006). Approximately 140 acres of the original site is currently owned by Eagle Ministry, which plans to develop the site as a religious retreat and prayer center.

During 1990-1996, a variety of investigations were conducted assessing possible sources and the extent and magnitude of soil and groundwater contamination. During this time, 11 underground storage tanks, 4 above-ground storage tanks, 40 electrical transformers containing polychlorinated biphenyls (PCBs), and approximately 1000 cubic yards of contaminated soil were removed (MWH 2006). Subsequently, the United States Army Corps of Engineers, MWH Americas, Inc., and a variety of consultants and subcontractors have conducted numerous investigations, including bore hole imaging fracture analysis, dye tracing, electromagnetic surveys, ground penetrating radar surveys, hydrophysical logging, rock coring, and soil gas surveys, summarized in the Remedial Investigation Report (MWH 2006).

In 1995, a community water-supply (CWS) well, Minnesota Unique Well Number (UN) 566974, was constructed to supply the planned development of Finlandia, LLC. The total well depth was 1015 feet. However, the well casing depth was only 17 feet (see Figure 2). When initially tested, 1,1, 2-Trichloroethylene (TCE) was detected at 74 micrograms/liter ($\mu\text{g/L}$), much greater than the TCE Maximum Contaminant Level (MCL) of 5 $\mu\text{g/L}$ (see "Public Health Concerns" below). In 1996, this well was reconstructed for use only as a monitoring well by sealing the lower portion of the bore hole and completing a 2-inch diameter monitoring well at a depth of 265.5 feet. A 150-foot deep replacement CWS well UN 569172, was constructed in January 1996 approximately 1 mile south of UN 566974 and the USAF Finland Station site. TCE has not been detected in UN 569172. The status as a community public-water supply (MDH PWSID Number 1380007-Lookout Mountain Village) was changed to inactive on April 22, 2008.

A total of 30 monitoring wells and 12 domestic water-supply wells have been tested for volatile and semi-volatile organics and metals. The monitoring wells indicate the presence of a variety of ethanes and ethenes related to past storage and use of solvents and fuel products. Contaminants have not been detected in any of the domestic wells, which are tested annually.

SWBCA HYDROGEOLOGY

The site of the former USAF Finland Station is Lookout Mountain, part of the Sawtooth Range. The regional relief reaches 600 feet and Lookout Mountain has a maximum elevation of approximately 1950 feet above sea level. The geology consists of a very thin (0-13.5 feet) layer of soil, sand, and fill over the Duluth Complex, which includes igneous intrusions of gabbro and some more felsic units. The bedrock at the site is identified as the Finland Granophyre, consisting of a granular quartz ferromonzonite and a finer-grained leuxogranite (MWH 2006, Miller 1993).

Fractures, joints, and other secondary structural features and unit contacts dominate the occurrence and flow of groundwater and contaminant transport. The upper 50-80 feet of the mountain is characterized by extensive fracturing. Groundwater flow at Lookout Mountain is radial, with discharges to local seeps, wetlands, and small ponds. Flow within this zone can be

very rapid (up to 100 feet/day) and is highly responsive to precipitation events. At a depth of approximately 150 feet, groundwater flow is regional to the southeast, towards the Baptism River and, ultimately, Lake Superior.

PUBLIC HEALTH CONCERNS

Groundwater at the former USAF Finland Station has been impacted by a variety of chlorinated ethanes and ethenes. The primary contaminant of concern within the SWBCA is TCE, which was most commonly used as a degreasing agent for cleaning metal parts and surfaces for equipment and tower maintenance. It was stored in tanks at the facility and may have been discharged from the wastewater treatment plant that received building discharges (MWH 2006).

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 (kidney, liver, and non-Hodgkin lymphoma). TCE may also harm a developing fetus if the pregnant mother is exposed in the first trimester. The MDH Health Based Value (HBV) for TCE in drinking water is 0.4 µg/L. The MCL established by the United States Environmental Protection Agency is 5 µg/L for TCE. This standard applies to water delivered by community and nontransient, noncommunity public-water supplies.

BOUNDARIES OF THE SWBCA

The SWBCA includes the following areas of Lake County, Minnesota:

Township 57 North, Range 7 West

- All of Sections 3, 4, 5, 8, 9.
- East half (northeast quarter and southeast quarter) of Section 6.
- West half (northwest quarter and southwest quarter) of Section 10.
- Northwest quarter of Section 16.
- Northeast quarter of Section 17.

Township 58 North and Range 7 West

- All of Section 33.
- South half (southeast quarter and the southwest quarter) of Section 28.
- Southeast quarter of Section 29.
- Northeast, southeast, and southwest quarters of Section 32.

See Figure 1 for the area included within the SWBCA.

REQUIREMENTS OF THE SWBCA

1. All wells and borings regulated by the MDH are subject to the requirements of the SWBCA. Wells include water-supply wells (domestic, public, irrigation, commercial/industrial, cooling/heating, remedial); monitoring wells; and dewatering wells. Borings include environmental bore holes, elevator borings, and bored geothermal heat exchanger. Notifications and permit applications, and their respective fees, must be submitted to the MDH.
2. Construction of a new well or boring, or modification of an existing well or boring, may not occur until plans have been reviewed and approved in writing by the MDH. In addition to the normally required notification or permit application, with fee, the plan must include the following information: street address; well or boring depth; casing type(s), diameter(s), and depth(s) for each casing; construction methods, including grout materials and grouting methods; anticipated pumping rate; and use.
3. As a condition of the well construction plan approval, the well owner must agree to pay for a volatile organic chemical (VOC) analysis, to be performed by the MDH Public Health Laboratory. The MDH will review the analytical results and determine if the well can be completed, if the well can be reconstructed in another manner, or if the well must be permanently sealed.
4. Construction of a potable water-supply well is prohibited within the northeast quarter of Section 5 and northwest quarter of Section 4 in Township 57 North, Range 7 West and the southeast quarter of Section 32 and the southwest quarter of Section 33 of Township 58 North, Range 7 West in Lake County.
5. All other water-supply wells (not including dewatering wells, monitoring wells, or remedial wells) within the SWBCA, but beyond the area described in item 4, must be cased and grouted with cement-sand or neat-cement grout to a minimum depth of 100 feet and to an elevation of 1600 feet or less above sea level.
6. Hydrofracturing of a well or boring within the boundaries of the SWBCA is prohibited.
7. A well completed for a nonpotable use, such as groundwater quality monitoring, groundwater remediation, or construction dewatering may be allowed, provided that the MDH and the Minnesota Pollution Control Agency determine the well will not interfere with remediation efforts, cause further spread of contamination, or result in environmental or human exposures in excess of environmental and public health standards.
8. Borings, including environmental bore holes, elevator borings, and bored geothermal heat exchanger, may be allowed, provided that they are grouted with neat-cement or cement-sand grout to their full depth.
9. No well or boring in bedrock may be permanently sealed until the MDH has reviewed and approved the plan for the proposed sealing. In addition to the required notification and fee, the plan must include the following information: street address; original well/boring depth; current well/boring depth (if different); casing type(s), diameters(s), and depth(s); methods of identifying and sealing any open annular spaces; methods for identifying and removing any obstruction(s); grout materials; and placement methods.
10. All other provisions of Minnesota Rules, chapter 4725, are in effect.

PERSONS TO CONTACT

For additional information regarding this SWBCA, please contact Mr. Michael Convery of the MDH Well Management Section at 651-201-4586 or *michael.convery@state.mn.us*.

Plans for the construction, modification (including repair), or sealing of wells or borings within the SWBCA must be submitted to: Ms. Sandra Beck

Minnesota Department of Health – Northeastern District
Well Management Section
Duluth Technology Village, Suite 290
11 East Superior Street
Duluth, Minnesota 55802
218-302-6145
sandra.beck@state.mn.us

Notifications/permit applications for the construction, modification, or sealing of wells and borings must still be mailed or faxed, if appropriate, to the MDH Central Office at:

Minnesota Department of Health
Well Management Section
P.O. Box 64502
St. Paul, Minnesota 55164-0502
651-201-4599 (Fax)

For information regarding public health concerns, please contact:

Mr. Daniel Pena
Minnesota Department of Health
Site Assessment and Consultation Unit
P.O. Box 64975
St. Paul, Minnesota 55164-0975
651-201-4920
daniel.pena@state.mn.us

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

Mr. Michael Bares
Minnesota Pollution Control Agency
Site Remediation & Redevelopment Section
520 Lafayette Road
St. Paul, Minnesota 55155-4194
651-757-2210
mike.bares@state.mn.us

REFERENCES

Lake County Planning Commission – Public Hearing Notice for Conditional Use Application, February 17, 2012, 4p.

Miller, J. D., Green, J. C., Boerboom, T. J. and Chandler, V. W. 1993. *Geologic Map of the Doyle Lake and Finland Quadrangles, Lake County, Minnesota*. University of Minnesota, Minnesota Geological Survey.

Minnesota Pollution Control Agency Memorandum – Request for Special Well and Boring Construction Area, January 23, 2012, 9p.

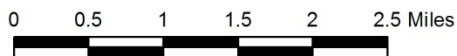
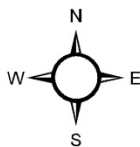
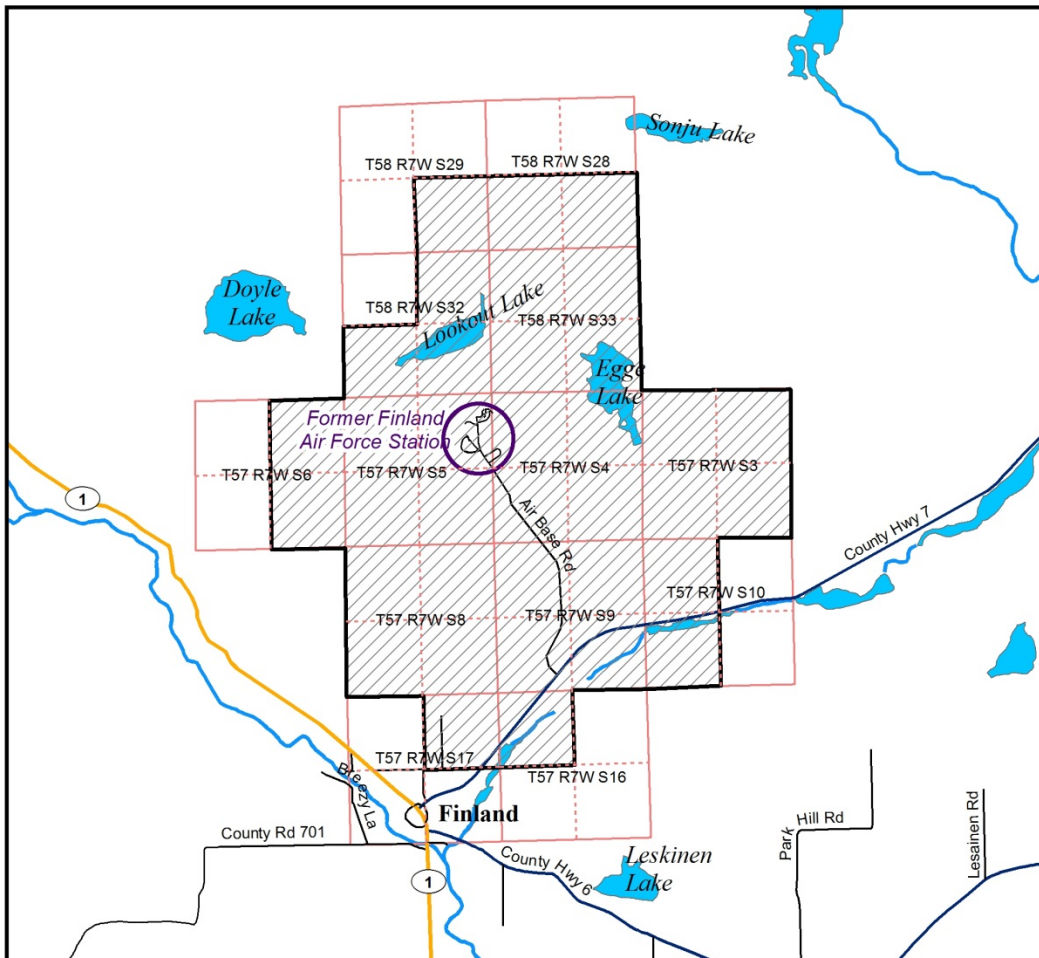
MWH Americas, Inc. (MWH), 2006. Final Remedial Investigation Report – Former Finland Air Force Station, Finland, Minnesota, 8056p

Minnesota Department of Health, 2013. Trichloroethylene (TCE) and Drinking Water, 2p.

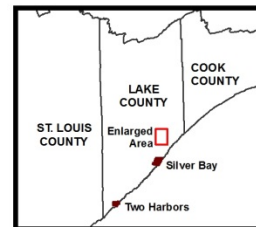
United States Army Corps of Engineers, 2010. Long-Term Monitoring Report for 2010, 13p

TPH:MPC:fal
Enclosures

Figure 1. Special Well and Boring Construction Area
Former Finland Air Force Station, Lake County



Special Well and Boring
Construction Area
(SWBCA)



Minnesota Department of Health - Well Management Section
February 1, 2014
Finland AFS SWBCA.mxd

Figure 2

**MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD**
Minnesota Statutes Chapter 103J

MINNESOTA UNIQUE WELL NO. **566974**

WELL LOCATION
County Name: Lake

Township Name: Crystal Bay Township No. 57 Range No. 07 Section No. 04 Fraction NE NE

House Number, Street Name, City, and Zip Code of Well Location: 100 Airbase Road, Finland MN
or Fire Number: _____
55603

DRILLING METHOD:
 Cable Tool Driven Dug
 Auger Rotary Jetted
X Air

WELL DEPTH (completed): 1015 ft. Date Work Completed: 8-3-95

DRILLING FLUID: water

USE:
 Domestic Monitoring Heating/Cooling
 Irrigation Community PWS Industry/Commercial
 Test Well Noncommunity PWS Remedial
 Dewatering _____

CASING: Drive Shaft? Yes No
 Steel Threaded Welded
 Plastic _____

HOLE DIAM.: _____

CASING DIAMETER: 6 in. to 17 ft. WEIGHT: 19.45 lbs./ft. 6 in. to 1015 ft.
_____ in. to _____ ft. _____ lbs./ft. _____ in. to _____ ft.
_____ in. to _____ ft. _____ lbs./ft. _____ in. to _____ ft.

PROPERTY OWNER'S NAME: Western Development Corporation
Property owner's mailing address if different than well location address indicated above:
1501 University Avenue SE
Minneapolis, MN 55414

SCREEN: NONE OPEN HOLE: from _____ ft. to _____ ft.
Make: _____ Type: _____ Diam.: _____
Slot/Gauge: _____ Length: _____
Set between _____ ft. and _____ ft. FITTINGS: _____

WELL OWNER'S NAME: Finlandia LLC
Well owner's mailing address if different than property owner's address indicated above:
1501 University Ave. Southeast #30
Minneapolis MN 55414

STATIC WATER LEVEL: _____ ft. below above land surface Date measured: _____

PUMPING LEVEL (below land surface): _____ ft. after _____ hrs. pumping 41 g.p.m.

WELL HEAD COMPLETION:
 Pileless adapter manufacturer _____ Model _____
 Casing Protection _____ 12 in. above grade
 As-grout (Environmental Wells and Borings ONLY)

GROUTING INFORMATION:
Well grouted? Yes No
Grout Material: Neat cement Bentonite Concrete High Solids Bentonite
from 15 to 6 ft. _____ yds. bags
from _____ to _____ ft. _____ yds. bags
from _____ to _____ ft. _____ yds. bags

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
loamy clay	red/brown	S	0	8
ledge	red	M	8	63
ledge	light red	MS	63	140
ledge	green/red	M	140	460
ledge	red	M	460	505
ledge	green/red	M	505	568
ledge	red	M	568	580
ledge	light red	MS	580	940
ledge	black red	H	940	978
ledge	red	M	978	1015

NEAREST KNOWN SOURCE OF CONTAMINATION: _____ feet _____ direction _____ type
Well disinfected upon completion? Yes No

PUMP: Not installed Date installed: _____
Manufacturer's name: _____
Model number: _____ HP _____ Volts _____
Length of drop pipe: _____ ft. Capacity: _____ g.p.m.
Pressure Tank Capacity: _____
Type: Submersible L.S. Turbine Ractroosting Jet _____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? Yes No

VARIANCE: Was a variance granted from the MDH for this well? Yes No

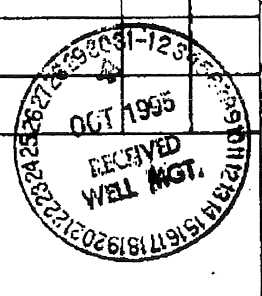
WELL CONTRACTOR CERTIFICATION:
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.
Rasmussen Well Drilling 38019
License Business Minn. _____ Lic. or Reg. No. _____
John Rasmussen 8-6-95
Authorized Representative Signature Date
Robert Rasmussen 8-6-95
Name of Driller Date

REMARKS: ELEVATION, SOURCE OF DATA, etc.
MAR 18 1997
DATA RECEIVED From: MM By: [Signature]

MINN. DEPT. OF HEALTH COPY **566974**

HE-01205-05 (Rev. 1/89)

OCT 30 1995



ADDITIONAL DATA ADDED TO THIS DOCUMENT. Use a second sheet if needed.
ELEVATION, SOURCE OF DATA, etc.
MAR 18 1997
DATA RECEIVED From: MM By: [Signature]