Department of Health

Proposed Permanent Rules Governing Wells and Borings

4725.0100 DEFINITIONS.

[For text of subp 1, see M.R.]

Subp. 1a. **Absorption area.** "Absorption area" has the meaning in part 7080.1100, subpart 2, ~~as proposed in State Register, Volume 31, Number 33, page 1025, published on February 12, 2007, and not yet adopted,~~ and includes the area of soil designed to absorb sewage effluent.

[For text of subps 1b to 21d, see M.R.]

Subp. 21e. **Bored geothermal heat exchanger.** "Bored geothermal heat exchanger" has the meaning given in Minnesota Statutes, section 103I.005, subdivision 1a, and includes bored geothermal heat exchanger piping installed in a boring for thermal conductivity testing. Bored geothermal heat exchanger does not include a closed-loop piping system installed in a boring 15 feet or less below the established ground surface.

Subp. 21f. **Bored geothermal heat exchanger contractor.** "Bored geothermal heat exchanger contractor" means a person issued a limited well/boring contractor's license for constructing, repairing, and sealing bored geothermal heat exchangers.

Subp. 21g. **Bored geothermal heat exchanger piping.** "Bored geothermal heat exchanger piping" means the pipe and fittings of a bored geothermal heat exchanger installed and buried below the ground surface and includes:

A. the pipe loop installed in a bore hole;

B. the buried pipe between a bore hole and a header or manifold;

C. the buried header or manifold; and

D. buried supply and return pipe between a buried header or manifold and the heat pump.

Subp. ~~21e~~ 21h. **Boring.** "Boring" has the meaning given in Minnesota Statutes, section 103I.005, subdivision 2, and includes environmental bore holes, bored geothermal heat exchangers, and elevator borings, except that for the purposes of this chapter, ~~"~~boring~~"~~ does not include exploratory borings regulated under chapter 4727.

[For text of subps 22 to 23, see M.R.]

Subp. 23a. **Community water system.** "Community water system" has the meaning given in Code of Federal Regulations, title 40, section 141.2, and means a public water system ~~which~~ that serves at least 15 service connections used by year-round residents, or regularly serves at least 25 year-round residents.

[For text of subps 23b to 24g, see M.R.]

Subp. 24h. **Directional drilling.** "Directional drilling" means a drilling method that utilizes a steerable drill bit to cut a bore hole for installing underground pipe. Directional drilling is also known as horizontal directional drilling, or HDD.

[For text of subps 25 to 30g, see M.R.]

Subp. 30h. **Interceptor.** "Interceptor" has the meaning given in ~~part 4715.0100, subpart 66~~ Uniform Plumbing Code (UPC) section 211.0 as incorporated by part 4714.0050.

[For text of subps 30i to 48, see M.R.]

Subp. ~~49.~~ 48a. **Suction line.** "Suction line" means a pipe or line connected to the inlet side of a pump or pumping equipment or any connection to a casing that may conduct nonsystem water into the well or boring because of negative pressures.

Subp. 48b. **Thermally enhanced bentonite grout.** "Thermally enhanced bentonite grout" means a bentonite-based grout that is mixed with sand or graphite to improve the thermal efficiency of a bored geothermal heat exchanger system.

[For text of subps 49a to 49d, see M.R.]

Subp. 49e. [See repealer.]

Subp. 49f. [See repealer.]

Subp. 49g. [See repealer.]

[For text of subps 49h to 54, see M.R.]

4725.0150 INCORPORATIONS BY REFERENCE AND ABBREVIATIONS.

This part indicates documents, specifications, and standards that are incorporated by reference in this chapter. This material is not subject to frequent change~~,~~ and is available from the source listed~~, for loan or inspection from the Barr Library of the Minnesota Department of Health, or through the Minitex interlibrary loan system~~. The abbreviations listed in parenthesis after the source name are used in this chapter.

[For text of items A and B, see M.R.]

C. American National Standards Institute (ANSI), ~~1430 Broadway~~ 25 West 43rd Street, New York, New York ~~10018~~ 10036.

~~(1)~~ ANSI Schedule 5 and Schedule 40, "Dimensions of Welded and Stainless Steel Pipe" as contained in ASA Standard B36.19 - 1965, "Welded and Seamless Wrought Steel Pipe."

~~(2) ANSI Standard Z34.1-1993, "Third Party Certification Programs for Products, Processes, and Services."~~

[For text of item D, see M.R.]

E. American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

[For text of subitems (1) to (7), see M.R.]

(8) ASTM D2683-14, "Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing."

~~(8)~~ (9) ASTM ~~D3035-03a~~ D3035-15, "Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter."

~~(9)~~ (10) ASTM F480-02, "Standard Specification for Thermoplastic Water Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40, and SCH 80."

(11) ASTM F714-13, "Standard Specification for Polyethylene (PE) Pipe (DR-PR) Based on Outside Diameter."

(12) ASTM F876-15a, "Standard Specification for Crosslinked Polyethylene (PEX) Tubing."

(13) ASTM F877-11a, "Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems."

(14) ASTM F1055-16, "Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing."

(15) ASTM F2080-16, "Standard Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Crosslinked Polyethylene (PEX) Pipe and SDR9 Polyethylene of Raised Temperature (PE-RT) Pipe."

(16) ASTM F2620-13, "Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings."

[For text of item F, see M.R.]

G. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, NFPA 30, "Flammable and Combustible Liquids Code, 2015 Edition."

~~G~~ H. NSF International, 789 Dixboro Road, P.O. Box 130140, Ann Arbor, Michigan 48113.

(1) ANSI/NSF 14-2003, "Plastics Piping System Components and Related Materials."

(2) ANSI/NSF ~~60-2003e~~ 60-2016, "Drinking Water Treatment Chemicals - Health Effects."

(3) ANSI/NSF 61-2003e, "Drinking Water System Components - Health Effects."

(4) NSF White Book™ - Nonfood Compounds Listing Directory.

~~H~~ I. Sims, P.K. and Morey, G.B., "Geology of Minnesota: A Centennial Volume," pages 459-473, "Paleozoic Lithostratigraphy of Southeastern Minnesota" by George Austin, 1972.

~~I~~ J. United States Department of Agriculture, Agricultural Handbook Number 18, Soil Survey Manual pages 136 to 140, October 1993.

4725.0200 APPLICATION TO ALL WELLS AND BORINGS.

[For text of subps 1 to 3, see M.R.]

Subp. 4. **Access to information and property.** Upon presentation of credentials, the commissioner or an employee or agent authorized by the commissioner, may examine records or data related to matters governed by Minnesota Statutes, chapter 103I, and section 144.99, of any person subject to regulation under Minnesota Statutes, chapter 103I, and,

for the purpose of taking an action authorized under statute, or rule, or otherwise identified in Minnesota Statutes, section 144.99, subdivision 1, relating to the enforcement of this chapter, may:

[For text of items A to D, see M.R.]

[For text of subp 5, see M.R.]

4725.0475 ACTIVITIES REQUIRING LICENSURE OR REGISTRATION.

Subpart 1. **Activity requiring licensure or registration.** Except for those persons exempted under Minnesota Statutes, section 103I.205, subdivision 4, paragraph (e), a person must hold a license or registration issued by the commissioner to:

[For text of items A to F, see M.R.]

[For text of subps 2 to 7, see M.R.]

4725.0650 EXPERIENCE REQUIREMENTS; CERTIFIED REPRESENTATIVE AND INDIVIDUAL WELL CONTRACTOR.

[For text of subp 1, see M.R.]

Subp. 2. **Monitoring well contractor certified representative.** Anyone applying to be certified as a representative of a monitoring well contractor must meet the requirements in items A to C, or meet the requirements in item D.

[For text of items A to D, see M.R.]

[For text of subps 3 to 7, see M.R.]

Subp. 7a. **Limited well/boring contractor certified representative; bored geothermal heat exchanger.** Anyone applying to be certified as a representative for a limited well/boring contractor licensed to construct, repair, or seal bored geothermal heat exchangers must meet the requirements in item A or ~~meet the requirements in items~~ B ~~and C~~.

A. The applicant must have ~~two~~ three years of experience constructing, repairing, and sealing bored geothermal heat exchangers. A year of experience is a year in which the applicant ~~personally, and under the supervision of a licensed well contractor or licensed bored geothermal heat exchanger contractor,~~:

(1) constructed ~~a minimum of~~ at least three ~~separate~~ permitted bored geothermal heat exchanger systems~~,~~;

(2) ~~with a minimum total footage of~~ constructed at least 2,000 feet of bored geothermal heat exchanger~~,~~ bore hole; and

(3) worked ~~a minimum of~~ at least 500 hours designing, constructing, or field supervising the construction, repair, or sealing of bored geothermal heat exchangers.

Experience must be obtained under the supervision of a licensed well contractor or licensed bored geothermal heat exchanger contractor, unless that experience was obtained during directionally drilling bored geothermal heat exchanger systems that were not regulated by this chapter at the time of construction. Experience on unregulated systems shall be counted toward an applicant's experience, whether or not the work was done under the supervision of a licensed well contractor or licensed bored geothermal heat exchanger contractor.

B. The applicant must:

(1) have ~~a minimum of two~~ three years of experience in well drilling. A year of experience is a year in which the applicant ~~personally and~~, under the supervision of a licensed well contractor:

(a) constructed ~~a minimum of five~~ at least ten water-supply wells; and

(b) ~~constructed, repaired, or sealed~~ worked at least 1,000 hours constructing, repairing, or sealing wells and ~~environmental bore holes for 500 hours.~~ borings; and

~~C.~~ (2) ~~The applicant must~~ be ~~certified~~ accredited by the International Ground Source Heat Pump Association or certified by the National Ground Water Association as a ground source heat pump driller or installer, or have an equivalent certification, as determined by the commissioner, based on number of hours of training, subject material, and testing.

[For text of subps 8 and 9, see M.R.]

4725.0900 COUNCIL EVALUATION OF APPLICANTS.

Upon request by the commissioner, the council may conduct oral examinations using a standardized examination developed by the commissioner in consultation with the council. Upon request by the commissioner, the council may also provide recommendations as to the appropriate disciplinary action for representatives, licensees, and registrants found to be in violation of this chapter and Minnesota Statutes, chapter 103I ~~and this chapter~~.

4725.1675 CRITERIA FOR CONTINUING EDUCATION.

A continuing education activity must meet the criteria in items A to E for credit to be given.

A. The activity must be related to wells ~~and~~ or borings, drilling technology, groundwater contamination, health aspects of water quality, groundwater monitoring, geology, hydrology, well or boring construction ~~and~~ or sealing, water systems ~~and water~~ or treatment, geothermal systems, dewatering, elevator borings, or other subjects approved by the commissioner.

[For text of items B to E, see M.R.]

4725.1833 BORED GEOTHERMAL HEAT EXCHANGER CONSTRUCTION PERMITS.

This part applies to the construction of bored geothermal heat exchangers, including bored geothermal heat exchanger piping installed in a boring for thermal conductivity testing.

A. A bored geothermal heat exchanger must not be constructed, or have piping installed or removed below the frost line, until a permit has been issued by the commissioner to the well ~~contractor~~ or ~~limited well/boring contractor licensed to construct~~ bored geothermal heat ~~exchangers~~ exchanger contractor.

B. The well contractor or bored geothermal heat exchanger contractor must submit to the commissioner a bored geothermal heat exchanger permit application on a form provided by the commissioner. The application must be legible and signed by the well contractor or bored geothermal heat exchanger contractor and the property owner or property owner's agent. The application must include:

~~C. A permit application must be completed for each bored geothermal heat exchanger and must include:~~

(1) the name and license number of the well contractor or bored geothermal heat exchanger contractor;

(2) the name and address of the owner of the property on which the bored geothermal heat exchanger will be installed;

(3) the township number, range number, section and one quartile, and the property street address if assigned, of the proposed bored geothermal heat exchanger;

(4) a plan diagram showing the location of the bored geothermal heat exchanger borings, property lines, and structures on the property;

(5) the geological materials expected to be encountered by the borings;

(6) the number, diameter, and depth of all bore holes drilled to install the bored geothermal heat exchanger piping;

(7) the grout materials and grouting method;

(8) the type of heat transfer fluid to be used; and

(9) the system operating pressure.

C. The well contractor or bored geothermal heat exchanger contractor must inform the commissioner of the proposed construction starting time 24 hours before starting construction of bored geothermal heat exchanger borings. The information must be reported by telephone, facsimile, electronically, or in person between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, excluding holidays.

[For text of item D, see M.R.]

4725.1851 WELL AND BORING RECORDS.

[For text of subp 1, see M.R.]

Subp. 2. **Construction records.** Construction records for wells and borings must be completed on a form provided by the commissioner and must contain the information in subpart 3, items A to F, and the following information:

[For text of items A to L, see M.R.]

M. hydrofractured interval if hydrofractured; ~~and~~

N. drilling fluid used.; and

O. for bored geothermal heat exchangers, the following additional information must be provided either on the commissioner's form or on an accompanying document:

(1) the location where each pipe loop enters the drilled hole must be shown on a scaled map with angles and directions from surveyed property corners, a permanent benchmark, or the corner of a permanent structure;

(2) for bored geothermal heat exchanger piping installed using directional drilling technology, a scaled map showing the location of the entire length of each pipe loop and a cross-sectional profile showing the depth profile of the pipe loops;

(3) GPS coordinates for the location where each pipe loop enters the drilled hole or GPS coordinates marking the corners or perimeter of the loop field;

(4) the number of pipe loops in each bore hole; and

(5) the results of the required pressure test.

[For text of subps 3 and 4, see M.R.]

4725.2050 USE OF WELLS OR BORINGS FOR DISPOSAL OR INJECTION PROHIBITED.

A well or boring must not be used for disposal or injection of surface water, groundwater, or any other liquid, gas, or chemical, except for groundwater thermal exchange devices, bored geothermal heat exchangers, drilling fluids, vertical turbine prelubrication water, treatment chemicals, priming water, water used for hydrofracturing, and water used for disinfection according to parts 4725.1831, 4725.1833, 4725.2950, 4725.3250, 4725.3725, 4725.5050, 4725.5475, and 4725.5550. This does not prohibit the injection of air for drilling, development, or sparging.

[For text of items A and B, see M.R.]

4725.2150 REQUIRED DISTANCE FROM GAS PIPES, LIQUID PROPANE TANKS, AND ELECTRIC LINES.

[For text of subps 1 and 2, see M.R.]

Subp. 3. **Exceptions.** Subpart 1 does not apply to:

[For text of items A to C, see M.R.]

D. an overhead electric line when the repairing or sealing of a well or boring does not involve the use of a drilling machine or hoist; ~~or~~

E. a buried electric line or buried gas pipe when the repairing or sealing of a well or boring does not involve excavation~~.~~; or

F. a buried electric line or gas pipe when a nonvertical bored geothermal heat exchanger boring is installed using directional drilling technology, provided that:

(1) the notice of excavation and location of buried utilities are completed according to Minnesota Statutes, chapter 216D; and

(2) the point where the drill bit penetrates the ground surface complies with the isolation distances in subpart 1.

The requirements of this part are minimum standards~~,~~ and do not exempt persons from more restrictive requirements of the Occupational Safety and Health Administration.

4725.2185 DISTANCE FROM A BUILDING.

A minimum horizontal isolation distance of three feet must be maintained between a well or boring and the farthest exterior projection of a building, including the walls, roofs, decks, overhangs, and other permanent structures unless the well or boring is located in a building constructed according to part 4725.2175. A building, deck, or other permanent structure, except a well house, must not be built to enclose a well or boring. The well or boring must be accessible for repair and sealing. Environmental bore holes and monitoring wells are exempt from this subpart if sealed within 72 hours of the time construction begins on the well or boring. A directionally drilled bored geothermal heat exchanger is exempt from this provision if constructed according to part 4725.7050, subpart 3.

4725.2250 GENERAL CASING REQUIREMENTS.

[For text of subps 1 to 6, see M.R.]

Subp. 7. **Temporary casing.** Casing installed temporarily during drilling is not required to meet the specifications for casing in this part except subparts 2, 7, and 16 and part 4725.2350, 4725.2550, or 4725.6650, ~~or this part except subparts 2, 7, and 16,~~ but must be of sufficient strength to withstand the structural load imposed by conditions both inside and

outside the well or boring, and free of oil or other contaminants. The casing must be removed on completion of the well or boring.

[For text of subps 8 to 17, see M.R.]

4725.2950 DRILLING FLUIDS.

[For text of subp 1, see M.R.]

Subp. 2. **Drilling additives.** Drilling additives, including bentonite, must meet the requirements of ANSI/NSF Standard ~~60-2003e~~ 60-2016 as determined by a person accredited by ~~the~~ ANSI ~~under ANSI Standard Z34.1-1993~~. A drilling additive is a substance added to the air or water used in the fluid system of drilling a well or boring.

4725.3350 INTERCONNECTIONS AND CROSS CONNECTIONS.

No connection between a well or boring and another well, boring, water supply system, or contamination source is allowed unless the connection is:

A. protected by an air gap as described in ~~part 4715.2010~~ UPC section 603.3.1 as incorporated by part 4714.0050;

B. protected with a backflow prevention device as specified in ~~parts 4715.2020 to 4715.2170~~ UPC sections 603.0 to 603.5.23.4 as incorporated by part 4714.0050;

[For text of item C, see M.R.]

D. between wells or borings that meet the construction standards of this chapter, are used for the same purpose, and have equivalent water quality.

This part does not apply to a water distribution system after the pressure tank; however, this part does not exempt water distribution systems otherwise regulated by chapter ~~4715~~ 4714.

4725.3450 FLOWING WELL OR BORING.

[For text of subp 1, see M.R.]

Subp. 1a. **Low flow and low pressure.** A flowing well or boring that flows 70 gallons per minute or less, and that has an artesian pressure ten pounds per square inch or less, must be constructed by ~~either~~:

A. drilling a bore hole larger than the casing into the flowing aquifer, installing casing into the flowing aquifer, and grouting the annular space surrounding the casing with neat-cement grout or cement-sand grout from the bottom of the casing to the base of the pitless adapter or unit, or to the established ground surface according to part 4725.3050; ~~or~~

B. driving steel casing with welded or threaded and coupled joints into the flowing aquifer.; or

C. for a bored geothermal heat exchanger, grouting the annular space surrounding the bored geothermal heat exchanger piping with neat-cement grout or cement-sand grout from the bottom of the bore hole to the established ground surface or upper termination of the bored geothermal heat exchanger piping.

Subp. 2. **High flow, high pressure, or special construction area.**

A. A well or boring, including a bored geothermal heat exchanger boring, must be constructed according to the requirements in this subpart when:

[For text of subitems (1) to (3), see M.R.]

[For text of item B, see M.R.]

[For text of subps 3 and 4, see M.R.]

Subp. 5. **Overflow discharge.** A water discharge from a flowing well or boring that disposes of water to the surface, a surface water body, sewer, or subsurface must:

A. be protected with an air gap according to ~~part 4715.2010~~ UPC section 603.3.1 as incorporated in part 4714.0050;

[For text of items B and C, see M.R.]

[For text of subp 6, see M.R.]

4725.3725 CHEMICAL TREATMENT AND REHABILITATION.

Subpart 1. **Treatment chemicals.** Chemicals placed in a well or boring to increase the yield, remove or treat contaminants or objectionable tastes or odors, or rehabilitate the well or boring must meet the requirements of ANSI/NSF Standard ~~60-2003e~~ 60-2016 as determined by a person accredited by ~~the~~ ANSI ~~under ANSI Standard Z34.1-1993~~. Sodium or calcium hypochlorite may be used if registered by the United States Environmental Protection Agency according to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), section 3(c)(7)(A), as an antimicrobial pesticide for use in potable water. Treatment chemicals must be neutralized or removed from the well, boring, and any connected piping systems prior to use of the well or boring. This part does not apply to chlorine or other treatment chemicals added to a water distribution system, or to a drilling additive used according to part 4725.2950.

[For text of subp 2, see M.R.]

4725.3750 REPAIR, CORRECTION, OR SEALING OF WELLS AND BORINGS.

Subpart 1. **Repair, correction, or sealing required.** The property owner must:

[For text of items A and B, see M.R.]

C. disconnect a cross-connection between a well or boring and a public water system unless approved by the public water supplier and protected with an air gap or backflow prevention device ~~in accordance with parts 4715.2020 to 4715.2170~~ according to UPC sections 603.0 to 603.5.23.4 as incorporated by part 4714.0050.

A well or boring not repaired or corrected must be permanently sealed.

[For text of subps 2 to 6, see M.R.]

4725.4450 WATER-SUPPLY WELL DISTANCES FROM CONTAMINATION.

Subpart 1. **Isolation distances.** A water-supply well must be located where there is optimum surface drainage and at the highest practical elevation. Whenever possible, water-supply wells should not be located down slope or down gradient of a contamination source. A water-supply well must be constructed as far as practical from a contamination source, but no less than the distances in this part.

The isolation distances in this part are minimum distances measured horizontally from the closest part of the upper termination of the water-supply well casing to the closest part of the contamination source, or the vertical projection of the contamination source on the established ground surface, whichever is closer.

Where this chapter establishes a minimum regulatory volume of a liquid, the volume of multiple tanks, each below the minimum, are not additive, unless the tanks are interconnected without backflow protection.

The minimum isolation distances must be maintained between a new well and a source of contamination no longer in use, unless all contaminants have been removed from the source, and visibly contaminated soils have been removed.

A contamination source must not be placed, constructed, or installed any closer to a water-supply well than the distances in this part.

A water-supply well must be no less than:

[For text of items A to D, see M.R.]

E. 50 feet from:

[For text of subitems (1) to (11), see M.R.]

(12) a buried sewer, except as provided in item G, subitem (5), that:

[For text of units (a) and (b), see M.R.]

(c) is constructed of materials that do not meet the specifications, methods, and testing protocol in ~~parts 4715.0530 and 4715.2820~~ UPC table 701.1 and section 723.0 as incorporated by part 4714.0050;

[For text of subitems (13) to (15), see M.R.]

(16) the buried piping of a ~~horizontal ground source closed loop~~ bored geothermal heat exchanger or any other closed loop geothermal heat exchanger, except as provided in ~~item~~ items F, subitem (1), and H, subitem (2);

[For text of subitems (17) to (30), see M.R.]

F. 35 feet from:

(1) the buried piping of a bored geothermal heat exchanger ~~piping as specified in parts 4725.0100, subpart 49g, and~~ or any other closed loop geothermal heat exchanger that is more than 15 feet below the established ground surface, provided that the geothermal heat exchanger conforms to part 4725.7050, subpart 1~~, item G~~; and

[For text of subitem (2), see M.R.]

G. 20 feet from:

(1) a sewage sump with a capacity of less than 100 gallons ~~which~~ that has been successfully tested ~~in accordance with part 4715.2820, subpart 2 or 3,~~ according to UPC section 712.0 or 723.0 as incorporated by part 4714.0050 and ~~is~~ constructed according to ~~part 4715.2440, subparts 1 and 4~~ UPC sections 710.8, 710.10, and 710.12 as incorporated by part 4714.0050;

[For text of subitems (2) to (4), see M.R.]

(5) a buried sewer serving one building, or two or less single-family residences, constructed of cast iron or plastic pipe according to the material specifications, methods, and testing protocol described in ~~parts 4715.0530 and 4715.2820, subpart 2 or 3,~~ UPC table 701.1 and section 723.0 as incorporated by part 4714.0050 or a floor drain connected to the buried sewer, except for:

[For text of units (a) and (b), see M.R.]

[For text of subitems (6) to (12), see M.R.]

H. ten feet from:

[For text of subitem (1), see M.R.]

(2) ~~the horizontal piping of a bored geothermal heat exchanger, or a horizontal ground source closed loop heat exchanger constructed of materials, and using a heat transfer fluid, according to~~ the buried piping of a bored geothermal heat exchanger or any other closed loop geothermal heat exchanger that is 15 feet or less below the established ground surface, provided that the geothermal heat exchanger conforms to part 4725.7050, subpart 1.

[For text of subps 2 and 3, see M.R.]

4725.4825 NONPOTABLE WATER-SUPPLY WELLS.

[For text of subps 1 and 2, see M.R.]

Subp. 3. **Identification required.** A nonpotable well water system providing water to a building with a potable water system, or accessible to the public, must be marked as nonpotable according to ~~part 4715.1910~~ UPC section 601.2 as incorporated by part 4714.0050.

4725.5150 WATER-SUPPLY WELL SUCTION LINE.

Subpart 1. **Construction.** As specified in ~~part 4715.0510,~~ UPC section 604.1 as incorporated by part 4714.0050, a suction line for a water-supply well must be constructed of:

[For text of items A to D, see M.R.]

[For text of subps 2 and 3, see M.R.]

4725.5475 HYDROFRACTURING WATER-SUPPLY WELLS.

[For text of subp 1, see M.R.]

Subp. 2. **Injection materials, water, and proppants.**

[For text of item A, see M.R.]

B. Additives must meet the requirements of ANSI/NSF Standard ~~60-2003e~~ 60-2016 as determined by a person accredited by ~~the~~ ANSI ~~under ANSI Standard Z34.1-1993~~.

[For text of item C, see M.R.]

[For text of subps 3 and 4, see M.R.]

4725.5550 WATER-SUPPLY WELL DISINFECTION.

[For text of subps 1 to 3, see M.R.]

Subp. 4. **Disinfection materials.** Chlorine materials must meet the requirements of ANSI/NSF Standard ~~60-2000e~~ 60-2016 as determined by a person accredited by ANSI ~~under ANSI Standard 234.1-1993~~ or be registered by the United States Environmental Protection Agency according to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), section 3(c)(7)(A), as an antimicrobial pesticide for use in potable water. Chlorine compounds with additives such as perfumes or algaecides must not be used for disinfection. An alternate disinfection material may be used if the material is a biocide meeting the

material and use standards of this part and provides biocidal activity equivalent to the chlorine concentrations and contact times required in this part.

[For text of subps 5 and 6, see M.R.]

4725.5825 PUBLIC WATER-SUPPLY WELLS.

[For text of subp 1, see M.R.]

Subp. 2. **Notification of drilling required.** The licensee must notify the commissioner of the proposed construction starting time of a community or noncommunity public water-supply well 24 hours in advance of beginning construction. The information may be placed on the notification form required in part 4725.1820 or may be reported by telephone, facsimile, or in person. The notification must be made between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, excluding holidays.

[For text of subps 3 to 6, see M.R.]

4725.6050 REMEDIAL WATER-SUPPLY WELLS.

Subpart 1. **Additional requirements.** In addition to the general standards in parts 4725.2010 to 4725.3875, and the standards for water-supply wells, in parts 4725.4050 to 4725.5550, a remedial well must:

[For text of items A and B, see M.R.]

C. have connections protected with an air gap or back flow prevention device as specified in ~~parts 4715.2010 to 4715.2170,~~ UPC sections 602.0 to 603.5.23.4 as incorporated by part 4714.0050 if the well discharges to a sewer or surface water.

[For text of subps 2 to 4, see M.R.]

4725.7050 BORED GEOTHERMAL HEAT EXCHANGERS.

Subpart 1. **Construction.** A bored geothermal heat exchanger must be constructed according to the ~~general~~ construction standards in this part and the general construction standards in parts 4725.2010 to 4725.3875 ~~and the provisions in this part~~.

A. Bored geothermal heat exchanger piping must be ~~a minimum 160 psi pressure-rated, SDR 11 high density~~ high-density polyethylene~~, meeting ASTM Standard D3035-03a.~~ or cross-linked polyethylene that meets the following requirements:

(1) for high-density polyethylene:

(a) the walls of the pipe must be SDR 11 or thicker;

(b) pipe must meet ASTM Standard D3035-15 or ASTM Standard F714-13;

(c) pipe connections must be made with socket fusion, butt fusion, or electrofusion joining methods that meet ASTM Standard F2620-13 or ASTM Standard F1055-16; and

(d) fittings must be manufactured in accordance with ASTM Standard D2683-14;

(2) for cross-linked polyethylene:

(a) pipe must be manufactured by the high-pressure peroxide method and designated as PEXa;

(b) pipe must meet ASTM Standard F876-15a and ASTM Standard F877-11a;

(c) all components of the PEXa system must be from the same manufacturer;

(d) a fitting for a PEXa system must not be buried in a pipe loop boring or between a pipe loop boring and the heat pump unit, unless the fitting is located in a vault or other structure accessible from the ground surface or floor of the building; and

(e) fittings must meet ASTM Standard F2080-16; and

(3) high-density polyethylene and cross-linked polyethylene pipe must have a minimum pressure rating of 160 psi.

~~B. Connections to bored geothermal heat exchanger piping must use socket fusion or butt fusion joining methods.~~

~~C~~ B. The licensee must complete a successful pressure test of the bored geothermal heat exchanger piping after the piping is installed in the bore holes. Pipe must be pressure tested with ~~air or~~ potable water ~~for 15 minutes~~ at a pressure of 1.5 times the system operating pressure or ~~75 pounds per square inch~~ 100 psi, whichever is greater~~, after installation in the bore hole~~. The pressure must remain constant for 30 minutes without adding additional water.

~~D~~ C. The annular space between the bored geothermal heat exchanger piping and ~~the~~ a bore hole must be ~~grouted with neat-cement grout or cement-sand grout in bedrock, and neat-cement grout, cement-sand grout, thermally enhanced bentonite grout, or bentonite grout in unconsolidated materials~~ filled with grout according to the procedures in part 4725.3050, subpart 2, and according to the procedures in part 4725.3450 for a bored geothermal heat exchanger boring from which groundwater flows above the established ground surface. ~~Thermally enhanced bentonite grout must consist of a fluid mixture of not more than 17.5 gallons of water, not more than 200 pounds of sand with 80 percent or more of the sand smaller than 0.0117 inch (passing U.S. Sieve #50), and a minimum of 50 pounds of bentonite.~~ The annular space must be filled with:

(1) neat-cement grout or cement-sand grout in bedrock;

(2) neat-cement grout or cement-sand grout in a boring from which groundwater flows above the established ground surface; or

(3) neat-cement grout, cement-sand grout, bentonite grout, or thermally enhanced bentonite grout in unconsolidated materials. Thermally enhanced bentonite grout must consist of:

(a) a maximum of 17.5 gallons of water per 50 pounds of bentonite; and

(b) thermal enhancement material, including:

i. a maximum of 200 pounds of sand per 50 pounds of bentonite, with 80 percent or more of the sand smaller than 0.0117 inch (passing U.S. Sieve #50); and

ii. a maximum of 20 pounds of graphite that meets the ANSI/NSF Standard 60-2016 requirements per 50 pounds of bentonite.

~~E~~ D. ~~Only food-grade or USP-grade propylene glycol must be used as heat transfer fluid. No other materials or additives must be used except for potable water. A permanent sign must be attached to the heat pump specifying that only approved heat transfer fluids must be used.~~ Heat transfer fluids must be propylene glycol or ethanol that meets the following requirements:

(1) propylene glycol must be food grade or USP grade;

(2) a propylene glycol with additives, including corrosion inhibitors and dyes, shall be approved by the commissioner if documentation is provided to the commissioner verifying that all ingredients are food grade or USP grade, and that the product is listed in the NSF White Book™ listing of nonfood compounds;

(3) ethanol products must be designed by the manufacturer for use in bored geothermal heat exchanger systems. Ethanol products must not be used unless approved in

writing by the commissioner. A complete list of product ingredients and concentrations must be submitted for review;

(4) ethanol may be used in an ethanol-water solution of not more than 20 percent ethanol by volume. Ethanol concentrates used to prepare heat transfer fluid must be diluted to not more than 20 percent ethanol by volume before being brought into a building where the heat transfer fluid is to be used;

(5) storing, handling, and using ethanol is subject to the safety precautions and procedures specified by the ethanol manufacturer, the applicable requirements of chapters 1305 and 7511, and NFPA Standard 30: Flammable and Combustible Liquids Code, 2015 Edition; and

(6) no other fluids or additives may be used except for potable water.

E. A permanent sign must be attached to the heat pump identifying the heat transfer fluid in the bored geothermal heat exchanger and specifying that only heat transfer fluids approved in this part may be used.

F. Water make-up lines to the bored geothermal heat exchanger must be protected with backflow prevention according to ~~parts 4715.2010 to 4715.2170~~ UPC sections 602.0 to 603.5.23.4 as incorporated by part 4714.0050.

G. The isolation distance between a water-supply well and a bored geothermal heat exchanger constructed according to this part must be no less than ~~35 feet from a water-supply well. The horizontal piping must be no less than ten feet from a water-supply well~~ the distances specified in part 4725.4450, subpart 1, items F and H.

Subp. 2. [See repealer.]

Subp. 3. **Marking locations.** The locations of all buried bored geothermal heat exchanger piping from the point where the pipe loop exits the bore hole to the point where

the pipe is exposed above the ground surface or floor of a building must be marked by one of the following methods:

A. tracer wire;

B. underground marking tape detectable from the ground surface; or

C. a ferromagnetic metal marker, detectable from the ground surface, located above the point where the pipe loop exits the bore hole.

Subp. 4. **Separation under buildings.** A bored geothermal heat exchanger boring installed using directional drilling technology that extends under a building or within three feet horizontally of the farthest exterior projection of the building must be located a minimum of ten feet below the lowest part of the building, including the foundation and footings. Supply-return piping that is plumbed through the building wall or floor is exempt from this requirement.

Subp. 5. **Isolation distances from certain contaminant sources.** The point where the drill bit penetrates the ground surface for a geothermal heat exchanger boring must be located at least ten feet horizontally from a contaminant source that has contaminants directly entering the soil, including:

A. the absorption area of a soil dispersal system;

B. animal feedlot, confining area, or feeding or watering area;

C. cesspool;

D. landspreading area for sewage, septage, or sludge;

E. manure basin, lagoon, or storage area;

F. rapid infiltration basin;

G. seepage pit, leaching pit, or dry well; or

H. wastewater spray irrigation area.

Subp. 6. **Bored geothermal heat exchanger borings onto the property of another.** Bored geothermal heat exchanger piping must not be installed on or under property other than the property identified in the approved permit without the affected property owner's written consent or other legal authority.

Subp. 7. **Accessibility.** The ends of each pipe loop must be accessible within a building or buried no deeper than ten feet below the ground surface. The buried ends of a pipe loop must not be built over or otherwise made inaccessible.

Subp. 8. **Pipe loop not connected to a geothermal heat exchanger system.** A pipe loop that is not connected to a geothermal heat exchanger system, such as a loop installed for thermal conductivity testing, must be protected by:

A. extending the ends of the pipe loop to at least one foot above the ground surface;

B. encasing the ends of the pipe loop in an ASTM Schedule 40 steel or plastic outer protective pipe that is at least four inches in diameter and extends at least one foot above and two feet below the ground surface; and

C. covering the outer protective pipe with an overlapping cap or cover.

Subp. 9. **Sealing of bored geothermal heat exchangers.** When sealing all or part of a bored geothermal heat exchanger:

A. all heat transfer fluid must be removed from the bored geothermal heat exchanger piping that is to be sealed;

B. the heat transfer fluid must be contained and recycled or disposed according to applicable federal, state, and local requirements;

C. the ends of each pipe loop must be accessed and grouted by pumping grout through a tremie pipe inserted to within ten feet of the bottom of the loop, or by pumping

grout into one end of the loop until grout flowing from the other end of the loop meets the minimum specifications and densities in part 4725.0100, subpart 21d, 22b, or 30n;

D. the portion of the piping in unconsolidated geologic materials must be filled with bentonite grout, neat-cement grout, or cement-sand grout; and

E. the portion of the piping in bedrock must be filled with cement-sand grout or neat-cement grout.

Subp. 10. **Notice of loss or leak.** The owner of a bored geothermal heat exchanger system must:

A. notify the commissioner of leakage from the system piping or loss of pressure in the system within 24 hours after the owner becomes aware of the loss or leak; and

B. notify the Minnesota duty officer of a bored geothermal heat exchanger leak according to Minnesota Statutes, section 115.061.

REPEALER. Minnesota Rules, parts 4725.0100, subparts 49e, 49f, and 49g; and 4725.7050, subpart 2, are repealed.

TERM CHANGE. In Minnesota Rules, part 4720.9025, subpart 1, change "part 4715.1770" to "chapter 4714."

Office of the Revisor of Statutes
Administrative Rules

TITLE: Proposed Permanent Rules Governing Wells and Borings

AGENCY: Department of Health

REVISOR ID: R-4192

MINNESOTA RULES: Chapter 4725

The attached rules are approved for
publication in the State Register

Sandy Glass-Sirany

Sandy Glass-Sirany
Senior Assistant Revisor