Office of the Revisor of Statutes

Administrative Rules

TITLE: Adopted Permanent Rules Relating to Wells and Borings

AGENCY: Department of Health

MINNESOTA RULES: Chapters 4625, 4630, 4717, 4725

INCORPORATIONS BY REFERENCE:

Part 4725.0150: American Association of State Highway and Transportation Officials (AASHTO); American Petroleum Institute (API); American National Standards Institute (ANSI); American Society for Testing and Materials (ASTM); National Sanitation Foundation (NSF); Geology of Minnesota: A Centennial Volume, Paleozoic Lithostratigraphy of Southeastern Minnesota; and United States Department of Agriculture, Agricultural Handbook Number 18, Soil Survey Manual.

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The attached rules are approved for filing with the Secretary of State

Marie O'Neill

Marie E. O'Neill
Assistant Revisor

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DEPARTMENT OF STATE
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Secretary of State

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Department of Health

Adopted Permanent Rules Relating to Wells and Borings

Rules as Adopted

4625.3901 PHYSICAL FACILITIES AND SANITATION.

Subpart 1. **Water supply.** Every food and beverage establishment must be provided with a supply of water which is adequate for the needs of the establishment. The water must be obtained from a public water supply system, or a source of supply and system which is located, constructed, and operated in accordance with rules governing public water supplies, chapter 4720 and water wells, chapter 4725.

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

4630.0600 WATER SUPPLY.

Subpart 1. **Requirement.** An adequate supply of water of safe, sanitary, and potable quality shall be provided in each mobile home park and recreational camping area. Water supplies must meet the requirements of chapter 4720 for public water supplies, or chapter 4725 for wells.

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

Subp. 3. **Location.** In recreational camping areas, water from the drinking water supply shall be available within at least 400 feet of every campsite.

Subp. 4. **Design.** All water storage reservoirs shall be covered, watertight, and constructed of impervious material. Overflows and vents of such reservoirs shall be effectively screened. Manholes shall be constructed with covers which will prevent the entrance of foreign material. The system shall be so designed and maintained as to provide a pressure of not less than 20 pounds per square inch under normal operating conditions at service buildings and other locations requiring a potable water supply. In mobile home parks and on recreational camping sites provided with individual water service connections, riser pipes shall be so located and constructed that they will not be

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damaged by the parking of mobile homes or recreational camping vehicles. Water riser pipes shall extend at least four inches above the ground elevation and the minimum pipe size shall be three-fourths inch. Adequate provisions shall be made to prevent freezing of service lines, valves, and riser pipes. If underground stop and waste valves are installed, they shall be at least ten feet from the nearest buried portion of the sewage system. Water risers on unoccupied sites shall be valved off. There shall be a horizontal distance of at least ten feet between water and sewer riser pipes; provided, that where the sewer riser is constructed of cast iron pipe and the water riser is constructed of copper pipe, the distance between may be less than ten feet. The commissioner shall grant a variance to subparts 2 to 4 only according to the procedures and criteria specified in parts 4717.7000 to 4717.7050.

4630.1801 VARIANCE TO RULES RELATING TO MOBILE HOME PARKS AND RECREATIONAL CAMPING AREAS.

The commissioner shall grant a variance to parts 4630.0400; 4630.0600, subparts 2 to 4; and 4630.0900 to 4630.1700 only according to the procedures and criteria specified in parts 4717.7000 to 4717.7050.

4717.7000 VARIANCE REQUEST.

Subpart 1. **Request.** A party may ask the commissioner of health to grant a variance from the following rules:

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

F. manufactured home parks and recreational camping areas, parts 4630.0400; 4630.0600, subparts 2 to 4; and 4630.0900 to 4630.1700;

[For text of items G to P, see M.R.]

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

4725.0050 GENERAL.

This chapter is adopted according to and must be read in conjunction with Minnesota Statutes, chapter 103I, relating to wells, borings, and underground uses.

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4725.0100 DEFINITIONS.

Subpart 1. **Scope.** Terms used in this chapter that are defined in Minnesota Statutes, section 103I.005, have the meanings given in statute. For the purposes of this chapter, the terms defined in this part have the meanings given them.

Subp. 4. [See repealer.]

Subp. 5. [See repealer.]

Subp. 8. [See repealer.]

Subp. 9. [See repealer.]

Subp. 10. [See repealer.]

Subp. 11. [See repealer.]

Subp. 12. [See repealer.]

Subp. 13. [See repealer.]

Subp. 14. [See repealer.]

Subp. 17. [See repealer.]

Subp. 19. **Annular space.** "Annular space" means the space between two cylindrical objects one of which surrounds the other, such as the space between a bore hole and a casing pipe, or between a casing pipe and liner pipe.

Subp. 20. [See repealer.]

Subp. 21. **Aquifer.** "Aquifer" means unconsolidated material or rock capable of producing water to supply a well.

Subp. 21a. **At-grade.** "At-grade" means the termination of a well or boring at the established ground surface.

Subp. 21b. **Bentonite.** "Bentonite" means an aluminum silicate clay that contains at least 85 percent of the mineral montmorillonite and meets API specification 13A.

Subp. 21c. **Bentonite grout.** "Bentonite grout" means:

A. water and a minimum of ten percent by weight of bentonite, with no additives to promote temporary viscosity; and

B. ~~an equal volume of~~ ten percent by weight of either washed sand, cuttings taken from the bore hole, or granular bentonite.

Subp. 22. **Casing.** "Casing" means a pipe or curbing placed in a well or boring to:

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A. prevent the walls from caving;

B. seal off surface drainage; or

C. prevent gas, water, or other fluids from entering the well or boring except through the screen, open hole, or perforated casing.

Subp. 22a. **Casing vent.** "Casing vent" means an outlet at the upper terminal of a casing to allow equalization of air pressure in the casing and escape of toxic or flammable gases when present.

Subp. 23. **Cesspool.** "Cesspool" means an underground pit into which raw household sewage or other untreated liquid waste is discharged and from which the liquid seeps into the surrounding soil.

Subp. 23a. **Concrete grout.** "Concrete grout" means a mixture of Portland cement, sand, and water in the proportion of 94 pounds of Portland cement and not more than an equal volume of dry sand and not more than six gallons of water. Admixtures to reduce permeability or control setting time must meet ASTM Standard C 494-86.

Subp. 24. [See repealer.]

Subp. 24a. **Confining layer.** "Confining layer" means a stratum of a geologic material at least ten feet thick that has a vertical hydraulic conductivity of less than 10^{-6} centimeters per second, including clay as defined by the United States Department of Agriculture in Handbook 18, and shale.

[For text of subp 24b, see M.R.]

Subp. 24c. **Council.** "Council" means the Advisory Council on Wells and Borings created under Minnesota Statutes, chapter 103I.

Subp. 24d. **Dewatering well.** "Dewatering well" has the meaning given in Minnesota Statutes, section 103I.005, subdivision 4a.

Subp. 26. [See repealer.]

Subp. 26b. **Drilling machine.** "Drilling machine" means a machine or mechanical device mounted on a truck, trailer, or skid used to excavate, drill, or bore a well or boring. A

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drilling machine includes a cable tool, hollow rod, auger, or rotary tool.

Subp. 27. **Dug well.** "Dug well" means a well in which the side walls may be supported by material other than standard weight steel casing, stainless steel casing, or plastic casing as specified in this chapter. Water enters a dug well through the side walls and bottom.

Subp. 27a. **Environmental bore hole.** "Environmental bore hole" has the meaning given in Minnesota Statutes, section 103I.005, subdivision 8, and includes excavations used to:

A. measure groundwater levels;

B. determine groundwater flow direction or velocity;

C. measure earth properties such as hydraulic conductivity, bearing capacity, or resistance;

D. obtain samples of geologic materials for testing or classification; or

E. remove gaseous pollution or contamination from groundwater or soil through the use of a vent, vapor recovery system, or sparge point.

Subp. 28. **Established ground surface.** "Established ground surface" means the intended or actual finished grade (elevation) of the surface of the ground at the site of a well or boring.

Subp. 29. [See repealer.]

Subp. 29a. **Groundwater.** "Groundwater" has the meaning given in Minnesota Statutes, section 115.01, subdivision 21.

Subp. 30. **Grout.** "Grout" means a material used to fill the annular space around a casing, or to seal a well or boring. Grout is either neat cement grout, concrete grout, bentonite grout, or high solids bentonite grout.

Subp. 30a. **High solids bentonite grout.** "High solids bentonite grout" means a fluid mixture of water and a minimum of 15 percent by weight of bentonite, with no additives to promote temporary viscosity.

Subp. 30b. [See repealer.]

Subp. 30c. **Hoist.** "Hoist" means a machine or mechanical device, mounted on a truck, trailer, or skid, which is used to:

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A. remove or install a pump or pumping equipment, casing, screen, pitless adapter, or pitless unit;

B. remove an obstruction from a well or boring; or

C. install a tremie pipe when sealing a well or boring.

Subp. 30d. **Holding tank.** "Holding tank" means a watertight tank for storage of sewage until it can be transported to a point of approved treatment and disposal.

Subp. 30e. **Individual well contractor.** "Individual well contractor" means an individual licensed according to Minnesota Statutes, section 103I.525.

Subp. 30f. **Licensee.** "Licensee" means a person who is licensed as a well contractor, limited well contractor, or elevator shaft contractor under this chapter and Minnesota Statutes, chapter 103I.

Subp. 30g. **Monitoring well.** "Monitoring well" has the meaning given in Minnesota Statutes, section 103I.005, subdivision 14.

Subp. 30h. **Neat cement grout.** "Neat cement grout" means a mixture in the proportion of 94 pounds of Portland cement and not more than six gallons of water. Bentonite up to five percent by weight of cement (4.7 pounds of bentonite per 94 pounds of Portland cement) may be used to reduce shrinkage. Admixtures to reduce permeability or control setting time must meet ASTM Standard C494-86.

[For text of subp 31a, see M.R.]

Subp. 31b. [See repealer.]

Subp. 32. **Pitless adapter.** "Pitless adapter" means a watertight device allowing discharge through one or more openings of a casing.

Subp. 33. **Pitless unit.** "Pitless unit" means a watertight assembly with a cap that extends the upper termination of the casing above the established ground surface.

[For text of subp 34, see M.R.]

Subp. 34a. **Portland cement.** "Portland cement" means a construction material that conforms to ASTM Standard C150-85a,

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"Standard Specification for Portland Cement."

[For text of subps 35 to 37, see M.R.]

Subp. 37a. **Public water supply.** "Public water supply" means a system regulated under chapter 4720.

Subp. 38. [See repealer.]

Subp. 39. [See repealer.]

[For text of subp 40, see M.R.]

Subp. 40a. **Rapid setting cement.** "Rapid setting cement" means a Type III Portland cement as designated in ASTM Standard C150-85a, or any Portland cement containing an accelerated admixture.

Subp. 40b. **Regional flood.** "Regional flood" has the meaning given in Minnesota Statutes, section 103F.111, subdivision 10.

[For text of subp 41a, see M.R.]

Subp. 41b. **Remedial well.** "Remedial well" means a well used to lower a groundwater level to control or remove contamination in groundwater and excludes horizontal trenches.

Subp. 41c. **Representative.** "Representative" means someone who acts on behalf of the licensee or registrant.

Subp. 41d. **Rock.** "Rock" means a consolidated or coherent, hard, naturally formed aggregation of mineral matter including the rocks described in part 4725.1851, subpart 4, item B. Rock excludes alluvium, glacial drift, glacial outwash, and glacial till.

Subp. 41e. **Sealing.** "Sealing" means the process of preparing a well or boring to be filled with grout and the process of filling a well or boring with grout.

Subp. 42. **Sewage.** "Sewage" has the meaning given in Minnesota Statutes, section 115.01.

Subp. 43. **Seepage pit, leaching pit, or dry well.** "Seepage pit," "leaching pit," or "dry well" means an underground pit into which a sewage tank discharges effluent or other liquid waste and from which the liquid seeps into the surrounding soil through the bottom and openings in the side of the pit.

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[For text of subp 44, see M.R.]

Subp. 45. **Sewer.** "Sewer" means a pipe or conduit carrying sewage or into which sewage may back up, including floor drains and traps.

Subp. 46. **Subsurface disposal system.** "Subsurface disposal system" means a system that discharges sewage effluent to the soil through open-jointed tile lines or perforated pipe buried in stones, shallow trenches, or beds. Subsurface disposal system includes the pipes or tile of a seepage bed, drainfield, percolation system, mound system, or tile absorption field.

[For text of subps 47 to 49, see M.R.]

Subp. 49a. [See repealer.]

Subp. 49b. **Total coliform bacteria.** "Total coliform bacteria" means all of the aerobic and facultative anaerobic, gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose with gas formation within 48 hours at 35 degrees centigrade.

Subp. 49c. **Tremie pipe.** "Tremie pipe" means a pipe or hose used to insert grout into an annular space, well, or boring.

Subp. 49d. **Unconsolidated materials.** "Unconsolidated materials" means geological materials that are not rock and includes alluvium, glacial drift, glacial outwash, glacial till, and those materials specified in part 4725.1851, subpart 4, item A.

Subp. 50. [See repealer.]

Subp. 50a. **Water supply well.** "Water supply well" means a well as defined in Minnesota Statutes, section 103I.005, subdivision 21, that is not a dewatering well or a monitoring well. A water supply well includes wells used:

A. for potable water;

B. for irrigation;

C. for agricultural, commercial, or industrial water supply;

D. for heating or cooling; or

E. as a remedial well.

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Subp. 50b. **Water table.** "Water table" has the meaning given in part 7060.0300, subpart 8.

Subp. 51. **Well.** "Well" has the meaning given in Minnesota Statutes, section 103I.005, subdivision 21.

Subp. 51a. **Well pump or pumping equipment.** "Well pump or pumping equipment" means a device, machine, or material used to withdraw or otherwise obtain water from a well, and all necessary seals, fittings, and pump controls. Well pump or pumping equipment does not include:

A. water tanks except for buried pressure tanks;

B. sampling devices ~~installed~~ placed in a monitoring well to obtain a water sample and are then removed after the sample is collected; or

C. devices used in the construction or rehabilitation of a well.

Subp. 52. [See repealer.]

Subp. 53. [See repealer.]

Subp. 54. [See repealer.]

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.

A. American Association of State Highway and Transportation Officials (AASHTO), 341 National Press Building, Washington, D.C. 20004.

(1) AASHTO Standard H20-44, "Standard Specifications for Highway Bridges," 14th Edition, 1989, part 3.7.2.

(2) AASHTO Standard M306-89, "Standard Specification for Drainage Structure Castings," part 7.

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B. American Petroleum Institute (API), 211 North Ervoy, Suite 1700, Dallas, Texas 75201.

(1) Specification 13A, "API Specification for Oil Well Drilling Fluid Materials," 11th Edition, July 1985 or Supplement One to the 11th Edition.

(2) API Standard 5L (May 31, 1985), "API Specification for Line Pipe."

C. American National Standards Institute (ANSI), 1430 Broadway, New York, New York 10018.

(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," and the appendix to ASTM Standard A312-86a.

(2) ANSI Standard B36, 10M-1985, "Welded and Seamless Wrought Steel Pipe."

(3) ANSI Standard Z34.1-1987, "American National Standards for Certification - Third Party Certification Program."

D. American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103.

(1) ASTM Standard A53-90b, "Standard Specifications for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless."

(2) ASTM Standard A589-89a, Types I, II, and III, "Standard Specification for Seamless and Welded Carbon Steel Water-Well Pipe."

(3) ASTM Standard A312-86a, "Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipe."

(4) ASTM Standard C150-85a, "Standard Specification for Portland Cement."

(5) ASTM Standard C494-86, "Standard Specification for Chemical Admixtures for Concrete."

(6) ASTM Standard D2487-85, "Standard Test Method for Classification of Soils for Engineering Purposes."

(7) ASTM Standard F480-88, "Standard Specification for Thermoplastic Water Well Casing Pipe and

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Couplings Made in Standard Dimension Ratios (SDR)."

(8) ASTM Standard F480-88, Table 3, "Thermoplastic Water Well Casing Pipe Couplings Socket Dimensions and Laying Length Dimensions."

(9) Schedule 40, as referenced in Polyvinyl Chloride (PVC) Materials, contained in the Annual Book of ASTM Standards, Volume 8, "Designation D1785-88 Standard Specifications for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120," Tables 1 and 2, published December 1988.

E. National Sanitation Foundation (NSF), 3475 Plymouth Road, P.O. Box 1468, Ann Arbor, Michigan 48106.

(1) NSF Standard 14-1990, "Plastic Piping Components and Related Materials."

(2) NSF Standard 60-1988, "Drinking Water Treatment Chemicals - Health Effects."

(3) NSF Standard 61-1991, "Drinking Water System Components - Health Effects."

F. 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.

G. United States Department of Agriculture, Agricultural Handbook Number 18, Soil Survey Manual pages 205 to 213, August 1951.

4725.0200 APPLICATION TO ALL WELLS AND BORINGS.

Subpart 1. **Applicability.** This chapter applies to all wells and borings except exploratory borings regulated under chapter 4727 and those wells and borings specifically exempted by Minnesota Statutes, chapter 103I.

Subp. 2. **Owner responsibility.** The owner of a well or boring is bound by all the provisions of this chapter which relate to location, construction, maintenance, and sealing of wells or borings.

4725.0410 VARIANCE.

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

Subp. 2. **Additional standards for construction, repair, or sealing variance requests.** In addition to subpart 1, a request to vary a construction, repair, or sealing provision related to wells or borings in parts 4725.2010 to 4725.7450 must also include:

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

D. a scaled map showing the location of the well or boring in relation to all property lines, structures, utilities, and contamination sources cited in part 4725.4450;

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

Subp. 3. **Additional standards for variance request from isolation distance.** In addition to the information in subparts 1 and 2, a variance request to part 4725.4450 must include:

A. information on special construction methods or precautions proposed to prevent contamination of the well and groundwater;

B. a description of the age, design, size, and type of construction of any existing or potential contamination source as specified in part 4725.4450;

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

LICENSING AND REGISTRATION

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 (d), a person must hold a license or registration to:

A. construct, repair, modify, or seal a well or boring;

B. construct or seal a vertical heat exchanger or groundwater thermal exchange device;

C. excavate a hole for an elevator shaft hydraulic cylinder;

D. install a well pump or pumping equipment;

E. install a screen, pitless unit, or pitless

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adapter; or

F. modify or materially affect the yield, water quality, diameter, depth, or casing of a well or boring including:

(1) attachment of water conditioning or other devices to the casing of the well or boring;

(2) chemical treatment of the well or boring with acid or other chemicals; or

(3) development or stimulation of a well or boring including the use of explosives or hydrofracturing.

Subp. 2. **Exceptions to licensure or registration.** Nothing in this part shall prohibit:

A. a person from ~~installing~~ placing a water sampling device including a well pump or pumping equipment in a monitoring well or remedial well to obtain a water sample if the device is immediately removed after the sample is collected;

B. a plumber or plumbing contractor from installing and servicing pressure water service lines according to chapter 4715, from the source of supply;

C. a water conditioning contractor from installing water conditioning equipment within a building according to chapter 4715; and

D. a limited well contractor from repairing, installing a pump or pumping equipment, or repairing or sealing a well that the limited well contractor is licensed to construct.

Subp. 3. **Well contractor license.** A person must be licensed as a well contractor to:

A. construct, repair, modify, or seal a well or boring except exploratory borings;

B. install a pump or pumping equipment; and

C. any of the activities in subpart 1, item F.

Subp. 4. **Limited well contractor licenses.** A person performing any of the activities in items A to E must have either a well contractor's license or have a separate limited well contractor license for each of the limited licensure areas listed in items A to E.

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A. limited licensure to construct, repair, modify as specified in subpart 1, item F, or seal a dug well or drive point well;

B. limited licensure to install or repair well screens or pitless units or adapters and well casings from the pitless unit or adaptor to the upper termination of the well casing;

C. limited licensure to install a well pump or pumping equipment or any of the activities in subpart 1, item F, subitems (1) and (2);

D. limited licensure to seal wells, remove obstructions from a well before sealing, remove or perforate well casing before sealing, or other activities to seal a well; or

E. limited licensure to construct, repair, seal, or modify as specified in subpart 1, item F, a dewatering well.

Subp. 5. **Elevator shaft contractor license.** A person must have an elevator shaft contractor's license or a well contractor's license to construct, repair, or seal excavations or borings for an elevator shaft hydraulic cylinder.

Subp 6. **Monitoring well contractor registration.** A person must be either licensed as a well contractor or registered as a monitoring well contractor to:

A. construct, repair, modify, or seal monitoring wells or environmental bore holes; or

B. install pumps in monitoring wells.

A person with a limited license to install a well pump or pumping equipment may install pumps in monitoring wells.

Subp. 7. **Individual well contractor license.** A person who is licensed as an individual well contractor must meet the requirements for licensure for a well contractor, except the requirements for a bond as specified in part 4725.1250.

4725.0550 REPRESENTATIVE OR INDIVIDUAL WELL CONTRACTOR.

Subpart 1. **Application to represent a licensee, registrant, or to be an individual well contractor.** Anyone

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applying to be a representative of a licensee or registrant or an individual well contractor must submit to the commissioner a properly completed application. The applicant must submit written documentation of the experience required in part 4725.0650. Written documentation includes, but is not limited to, well or boring construction or sealing records, letters from employers verifying employment, and work reports.

Subp. 2. **Application fee.** The applicant to be a representative or individual well contractor must submit a nonrefundable application fee of $50 to the commissioner.

Subp. 3. **Ongoing qualifications.** A representative and individual well contractor must have honesty and integrity.

A. The representative must be named on the license or registration for the licensee or registrant, or be an individual. A representative must not represent more than one licensee or registrant.

B. The representative must be responsible for conducting all operations under the representative's supervision and as delegated by the licensee or registrant in accordance with Minnesota Statutes, chapter 103I, and this chapter.

C. The representative and individual well contractor must annually complete the continuing education requirements in part 4725.1650.

D. When a representative no longer works for the registrant or licensee, the registrant or licensee must inform the commissioner within five days of that fact. If a licensee or registrant has only one representative and the representative no longer works for the registrant or licensee, the registrant or licensee must name an acting representative until a representative who meets the requirements in parts 4725.0550 to 4725.1000 is approved by the commissioner. The licensee or registrant may operate with an acting representative for no more than 90 days.

4725.0650 EXPERIENCE REQUIREMENTS.

Subpart 1. **Well contractor.** Anyone applying to be a

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representative of a well contractor or to be an individual well contractor must have four years of experience. A year of experience is a year in which the applicant personally, and under the supervision of a licensed well contractor, constructed and sealed wells and installed pumps for 1,000 hours, and:

A. constructed a minimum of five wells; or

B. constructed at least one or more multiple cased wells with an outer casing diameter of ten inches or more. The well depth or cumulative depth of the wells must exceed 700 feet.

Supervision of a drilling operation shall not be considered as an equivalent to personally drilling a well.

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

A. The applicant must be:

(1) a professional engineer registered with the Board of Architecture, Engineering, Land Surveying, and Landscape Architecture according to Minnesota Statutes, sections 326.02 to 326.15;

(2) a hydrologist or hydrogeologist certified by the American Institute of Hydrology; or

(3) a geologist certified by the American Institute of Professional Geologists.

B. The applicant must have three years of experience. A year of experience is a year in which the applicant worked a minimum of 500 hours in construction, repair, and sealing of monitoring wells, or environmental bore holes including design, field supervision, or actual construction.

C. The applicant must have designed, field supervised, or actually constructed 50 monitoring wells or environmental bore holes.

D. The applicant must have three years of experience in construction, repair, and sealing of monitoring wells ~~or~~ and environmental bore holes. A year of experience is a year in which the ~~representative~~ applicant, personally and under the

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supervision of a registered monitoring well contractor or licensed well contractor, constructed a minimum of 20 monitoring wells or environmental bore holes, of which at least five must be monitoring wells, and constructed, sealed, and repaired monitoring wells or environmental bore holes for 1,000 hours.

Subp. 3. **Limited well contractor; dug wells and drive point wells.** Anyone applying to be a representative for a limited well contractor licensed to construct, repair, and seal dug wells and drive point wells must have three years of experience. A year of experience is a year in which the applicant personally constructed five dug wells or drive point wells and worked for a minimum of 1,000 hours constructing, repairing, or sealing dug wells or drive point wells, and installing pumps in dug wells or drive point wells. An applicant must have gained the experience under a licensed well contractor or a limited well contractor licensed to construct, repair, and seal dug wells and drive point wells.

Subp. 4. **Limited well contractor; well screens, pitless adapters, and pitless units.** Anyone applying to be a representative for a limited well contractor licensed to install or repair well screens or pitless adapters or units and well casing from the pitless device to the upper termination of the well must have two years of experience. A year of experience is a year in which the applicant worked a minimum of 1,000 hours and personally installed or repaired five well screens or pitless units or adapters and well casings from the pitless unit or adapter to the upper termination of the well. The experience must have been gained under the supervision of a licensed well contractor or limited well contractor licensed to install or repair well screens or pitless units or adapters and well casings from the pitless unit or adapter to the upper termination of the well.

Subp. 5. **Limited well contractor; pumps and pumping equipment.** Anyone applying to be a representative for a limited well contractor licensed to install a pump or pumping equipment must have two years of experience in pump installation and

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repair. The applicant must have personally installed 20 pumps. The work must include a minimum of 1,000 hours installing well pumps or pumping equipment.

Subp. 6. **Limited well contractor; well sealing.** Anyone applying to be a representative for a limited well contractor licensed to seal wells must have three years of experience. A year of experience is a year in which the applicant:

A. personally sealed a minimum of five wells; and

B. worked a minimum of 1,000 hours constructing wells, clearing obstructions, removing or perforating well casings, and grouting wells.

The applicant must have gained the experience under a licensed well contractor or limited well sealing contractor.

Subp. 7. **Limited well contractor; dewatering wells.** Anyone applying to be a representative for a limited well contractor licensed to construct, repair, or seal dewatering wells must have two years of experience. A year of experience is a year in which the applicant:

A. worked a minimum of 500 hours designing, constructing, or field supervising the construction, repair, or sealing of dewatering wells; and

B. designed, constructed, or field supervised the construction of a minimum of five dewatering wells.

Subp. 8. **Elevator shaft contractor.** Anyone applying to be a representative for an elevator shaft contractor licensed to construct, repair, or seal excavations for an elevator shaft hydraulic cylinder must have two years of experience related to the construction, repair, and sealing of excavations or borings for the installation of elevator shaft hydraulic cylinders. A year of experience is a year in which the applicant designed, supervised, or actually constructed three borings for elevator shaft hydraulic cylinders.

Subp. 9. **Experience outside state.** If all or part of the experience required in this part was gained by an applicant outside Minnesota, the applicant must provide the commissioner with information satisfactorily demonstrating that the

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experience was gained constructing, repairing, and sealing wells or borings in geological conditions substantially similar to conditions in Minnesota and in a jurisdiction with licensing or registration requirements comparable to those in Minnesota.

4725.1000 EXAMINATION.

Subp. 2. **Examination.** Anyone applying to be a representative of a licensee or registrant or to be an individual well contractor must pass an examination which may be a combination of written and oral questions as determined by the commissioner with the advice of the council on wells and borings established by Minnesota Statutes, section 103I.105. The applicant must pass the examination within one year from the date notified by the commissioner that the applicant is qualified to take the examination. If, upon passing the examination, the applicant is not licensed as an individual well contractor or listed as a representative of a licensee or registrant within one year, reapplication as a representative must be made according to parts 4725.0550 to 4725.1000.

4725.1075 APPLICATION FOR LICENSURE; FEES.

Subpart 1. **Application for licensure or registration; application fee.** A person must apply for licensure or registration on a form provided by the commissioner.

A. The application must include the name, address, and telephone number of the person applying for licensure or registration and list the name, business address, and telephone number, if different, of all representatives of the licensee or registrant who meet the qualifications in parts 4725.0550 to 4725.1000.

B. The application form must be signed by an officer or other legally authorized representative of the person making application for licensure or registration.

C. The application for licensure or registration must be accompanied by the nonrefundable fee specified in Minnesota Statutes, section 103I.525, subdivision 2.

Subp. 2. **Licensure and registration fee.** A person

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applying for licensure or registration must pay a nonrefundable fee of:

A. $250 for a well contractor license; and

B. $50 for an individual well contractor license, each of the categories of limited well contractor license, an elevator shaft contractor license, or a monitoring well contractor license.

4725.1250 BONDING.

At the time the fee is submitted for initial licensure or registration, or licensure or registration renewal, the licensee or registrant must show proof of holding a corporate surety bond as required by Minnesota Statutes, chapter 103I. The bond must be submitted to the commissioner. One bond is required for each licensee or registrant. If on proof to the commissioner it is shown that multiple licenses or registrations are held by one licensee or registrant, the bond held by that licensee or registrant may cover all licenses and registrations. The licensee or registrant must be named as the principal. The bond must be signed by an official of the company who is legally authorized to represent the company. The bond may be used by the commissioner to compensate persons injured or suffering financial loss because of failure of a licensee or registrant to properly perform the duties under part 4725.0450 and Minnesota Statutes, chapter 103I. The term of the bond must be continuous or concurrent with the term of the license or registration. The penal sum of the bond is noncumulative and is not to be aggregated every year that the bond is in force. The bond must be written by a corporate surety licensed to do business in Minnesota. The corporate surety shall be responsible for providing 30 days' written notice to the commissioner of cancellation of a licensee's or registrant's bond. If a bond is canceled, a licensee or registrant must not perform work requiring the license or registration until the licensee or registrant obtains another bond meeting the requirements of this part. An individual well contractor, as described in Minnesota

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Statutes, section 103I.525, subdivision 1, paragraph (c), is exempt from the requirements of this part.

4725.1300 LICENSE OR REGISTRATION RENEWAL.

Licenses expire on January 31 of each year and registrations expire on December 31 of each year. Each licensee or registrant shall submit an application for license or registration renewal on forms provided by the commissioner no later than January 31 for licenses and December 31 for registrations. The renewal application must be accompanied by the license and registration fees required by Minnesota Statutes, chapter 103I. A penalty fee of $10 must also be paid if the renewal is submitted after the January 31 license or December 31 registration deadline. At the time of license or registration renewal, the approved continuing education courses completed by the individual well contractor or representative as required by part 4725.1650 must be listed and the licensee or registrant must provide the bond required under part 4725.1250.

4725.1500 DISCIPLINARY ACTION AGAINST LICENSEE OR REGISTRANT; RETURN OF DOCUMENTS.

Subpart 1. **Commissioner action.** The commissioner may suspend, revoke, or impose limitations or conditions on a license or registration if the registrant or licensee:

A. violates a provision of this chapter or Minnesota Statutes, chapter 103I;

B. obtains a license or registration through error, fraud, or cheating;

C. provides false or fraudulent information on renewal forms, construction or sealing reports, water sample reports, or other required reports;

D. knowingly aids or allows an unlicensed or unregistered person to engage in activities requiring a license or registration under Minnesota Statutes, section 103I.205;

E. engages in conduct, in the course of performing work requiring licensure or registration, that is likely to harm the public, or conduct that demonstrates a willful or careless

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disregard for the health or safety of a property owner or other person; or

F. has been convicted during the previous five years of a felony or gross misdemeanor reasonably related to the business of well or boring construction, repair, or sealing.

Subp. 2. [See repealer.]

Subp. 3. [See repealer.]

Subp. 4. **Revoked license or registration.** A suspended or revoked license or registration along with the current drilling machine and pump hoist registration decals must be returned to the commissioner when the license or registration is revoked or suspended.

4725.1600 REAPPLICATION AFTER LICENSE OR REGISTRATION REVOCATION.

Subpart 1. **Revoked license or registration.** A person whose license or registration has been revoked may not reapply for licensure or registration within one year of the date of revocation. A licensee or registrant whose license or registration has been revoked must reapply as required by part 4725.1075.

Subp. 2. [See repealer.]

Subp. 3. [See repealer.]

4725.1650 CONTINUING EDUCATION REQUIREMENTS.

An individual well contractor or representative must successfully complete six contact hours of continuing education activities annually.

An individual well contractor or representative is exempt from the continuing education requirements for one year following the completion of the examination in part 4725.1000.

An individual well contractor or representative who fails to complete six contact hours of continuing education annually must reapply and pass the examination as required by parts 4725.0550 to 4725.1000.

4725.1700 PLACEMENT OF DECALS AND LICENSE OR REGISTRATION NUMBER.

A licensee or registrant shall place in a conspicuous

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location on both sides of each drilling machine or hoist the license or registration number in figures not less than three inches high and 1-1/2 inches wide. The figures must be in a contrasting color to the rest of the machine or hoist. Decals issued by the commissioner designating the year for which the license or registration was issued or renewed must be affixed directly adjacent to and below the license or registration number on each drilling machine or hoist. Contractors using small drilling machines or hoists or other devices for well or elevator shaft installation, well repair, or well or elevator shaft sealing shall attach their decal on a portable display to be shown at the well or boring site. The decals shall be issued by the commissioner upon licensure or registration and renewal.

4725.1820 NOTIFICATION FOR CONSTRUCTION OF WATER SUPPLY WELLS.

The owner of the property where a water supply well is to be located, the property owner's agent, a licensed well contractor, or a limited well contractor licensed to construct dug wells and drive point wells must submit notification of construction of the proposed well to the commissioner according to this part. This part does not apply to the construction of monitoring wells; dewatering wells; or drive point wells installed by the well owner on the owner's property for residential or agricultural use.

A. A well must not be constructed, deepened through a confining layer or have casing installed or removed below the frost line until notification is made to the commissioner.

B. Notification must be made on a form provided by the commissioner. The notification must be legible, accompanied by the fee required in this part, and signed by the representative of the licensee or the owner of the property where the well is located, or the property owner's agent.

C. A notification must be completed for each well.

D. The notification must include the following information for each well:

(1) the name and license number of the licensed

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contractor;

(2) the name, address, and telephone number of the well owner, and property owner if different;

(3) the township number, range number, section and one quartile, or street address if the property is located in an incorporated area, of the proposed well location; and

(4) a determination of whether the anticipated capacity of the well pump will be less than or greater than 50 gallons per minute.

E. The owner of the property where a well is to be located must pay the notification fee required in Minnesota Statutes, section 103I.208.

F. A new notification must be filed with the commissioner if:

(1) a licensed contractor other than the one listed on the original notification completes the well; and/or

(2) the well is completed on property other than that listed on the original notification.

A new fee is not required for a new notification filed under this item.

G. The notification is valid for 18 months from the date it is filed.

4725.1825 DEWATERING WELL CONSTRUCTION PERMITS.

This part applies to all dewatering wells including drive point wells used for dewatering.

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

C. A permit application must be completed for each dewatering well or dewatering well project including any wells deepened through a confining layer, having casing installed or removed below the frost line, or converted to an at-grade well. The application must indicate whether the dewatering project will affect wells used for potable purposes, and if so, what measures will be taken to provide potable water to persons adversely affected by the dewatering project.

D. The permit application must include the following

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information for each well:

(1) the name and license number of the limited dewatering well contractor or well contractor;

(2) the name and address of the dewatering well owner, and property owner if different;

(3) the township number, range number, section and one quartile, or street address if the property is located in an incorporated area, of the proposed dewatering well location; and

(4) the anticipated depth of the dewatering well.

[For text of items E and F, see M.R.]

G. The permit is valid for 18 months from the date issued.

H. The owner of the property where a dewatering well or wells are to be located must pay the permit fee required by Minnesota Statutes, section 103I.208.

4725.1830 MONITORING WELL CONSTRUCTION PERMIT.

This part applies to all monitoring wells, including drive point wells used as monitoring wells.

A. A monitoring well must not be constructed, deepened through a confining layer, have casing installed or removed below the frost line, or be converted to an at-grade well until a permit has been issued by the commissioner to the monitoring well contractor or well contractor.

B. A well contractor or monitoring well contractor must submit to the commissioner a permit application on a form provided by the commissioner. The application must be legible and signed by the monitoring well contractor or well contractor and the property owner or agent.

C. A permit application must be completed for each monitoring well.

(1) ~~However,~~ For monitoring wells used as leak detection devices at a petroleum bulk storage site or a motor fuel retail outlet, a single permit application may be completed for all wells on a site drilled under a single contract. A site

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consists of a single continuous piece of property on which the petroleum bulk storage facility or motor fuel retail outlet is located. The site does not include other properties on which monitoring wells are constructed to evaluate a spill or leak associated with the petroleum facility. All proposed monitoring wells on a site must be listed on the permit.

(2) A permit is not required for a monitoring well if the monitoring well is sealed within 48 hours of the time construction on the well begins.

D. A permit application for a monitoring well owned by a person other than the property owner must verify that a written agreement exists according to Minnesota Statutes, section 103I.205, subdivision 8.

E. The permit application must include the following information for each well:

(1) the name and registration number of the monitoring well contractor or license number of the well contractor;

(2) the name and address of the monitoring well owner, and property owner, if different;

(3) the township number, range number, section and one quartile, or street address if the property is located in an incorporated area, of the proposed monitoring well location; and

(4) the anticipated well depth.

F. Permit applications for monitoring wells constructed through a confining layer or into rock must include the following information for each well in addition to that required in item E:

(1) the diameter of the well;

(2) the drilling method;

(3) the casing materials;

(4) the materials and methods used to grout the well; and

(5) a cross-sectional diagram of the well.

G. Permit applications for at-grade wells must

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include the following information for each well in addition to that required in item E:

(1) an explanation of why the well casing cannot terminate 12 inches above the established ground surface;

(2) a map showing the location of the proposed well; and

(3) a cross-sectional diagram of the well cap and vault or manhole.

H. Permits are not transferable. Only the permit holder is authorized to construct the well.

I. The permit is valid for 18 months from the date issued.

J. The owner of the property on which a monitoring well is to be located must pay the fee for each monitoring well as required by Minnesota Statutes, section 103I.208.

4725.1831 GROUNDWATER THERMAL EXCHANGE DEVICE PERMITS.

This part applies to the construction of a groundwater thermal exchange device (heat pump) with reinjection to an aquifer.

A. A groundwater thermal exchange device with reinjection to an aquifer must not be constructed until a permit has been issued by the commissioner to the property owner.

B. The property owner or the property owner's agent must submit to the commissioner a permit application on a form provided by the commissioner. The application must contain:

(1) the name, license number, and signature of the well contractor constructing the wells;

(2) the name, address, and signature of the owner of the property on which the device will be installed;

(3) the township number, range number, section, and one quartile, or the street address if the property is located in an incorporated area, of the proposed device location;

(4) a description of existing wells and any wells proposed to be constructed including the unique well numbers,

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locations, well depth, diameters of bore holes and casing, depth of casing, grouting methods and materials, and dates of construction;

(5) a description of the heat pump unit including the manufacturer's name, model number, maximum water flow rate in gallons per minute, name of proposed installer, and proposed installation date;

(6) water withdrawal information, pumping schedule with rates in gallons per minute, times and duration, and the total amount of water to be injected into the aquifer;

(7) the specifications for piping including the materials to be used for piping, the flow control valve setting, the provisions for pressure testing the system, and the provisions for disinfection of the completed system; and

(8) a diagram of the proposed piping system.

C. The diagram must show that the proposed piping system includes:

(1) a 15 psi pressure valve at the discharge well;

(2) a solenoid valve on the discharge side of heat pump unit;

(3) a pressure gauge in-line between the pressure valve and solenoid valve;

(4) a device to provide automatic shutdown of the system if the discharge line pressure is below 15 psi;

(5) an in-line thermometer in the heat pump inlet and outlet lines;

(6) a check valve in-line from the supply well;

(7) unthreaded taps and shutoff valves in the supply and discharge lines;

(8) a filter in the discharge line from the heat pump;

(9) a flow control valve and flow meter in the supply line;

(10) air release valves; and

(11) any other devices to be installed such as

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pressure tanks or isolation valves.

D. The system must comply with chapter 4715.

E. The permit is valid for 18 months from the date issued.

F. The owner of the property where the groundwater thermal exchange device is to be located must pay the fees required in Minnesota Statutes, section 103I.208, for permit and notification.

4725.1832 NOTIFICATION FOR WELL SEALING.

This part applies to the sealing of wells as provided by Minnesota Statutes, sections 103I.231, 103I.301, and 103I.315.

A. A well must not be sealed until the owner of the property where the well is located, the owner's agent, or a licensee or registrant submits notification of proposed sealing of the well. Notification must be on a form provided by the commissioner or be made by telephone or facsimile. The notification must include the following information for each well:

(1) the name and licensee number or registrant number;

(2) the name, address, and telephone number of the well owner, and property owner if different; and

(3) the township number, range number, section and one quartile, or street address if the property is located in an incorporated area.

B. A new notification must be filed with the commissioner if a licensee or registrant other than the one listed on the original notification seals the well.

C. The notification is valid for 18 months from the date filed.

4725.1833 VERTICAL HEAT EXCHANGER CONSTRUCTION PERMITS.

This part applies to the construction of vertical heat exchangers.

A. A vertical heat exchanger must not be constructed, except for normal maintenance, until a permit has been issued by

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the commissioner to the well contractor.

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

C. A permit application must be completed for each vertical heat exchanger and must include:

(1) the name and license number of the well contractor;

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

(3) the township number, range number, section and one quartile, or the street address if the property is located in an incorporated area, of the proposed vertical heat exchanger;

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

(5) a system piping diagram;

(6) the number, diameter, and depth of all bore holes drilled to install the vertical 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.

D. Only the permit holder is authorized to construct the vertical heat exchanger.

E. The permit is valid for 18 months from the date issued.

F. The owner of the property where the vertical heat exchanger is located must pay the fee required in Minnesota Statutes, section 103I.208.

4725.1835 ELEVATOR SHAFT CONSTRUCTION PERMITS.

This part applies to an excavation or hole for installation

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of an elevator shaft or hydraulic cylinder for an elevator shaft.

A. An excavation or hole for an elevator shaft must not be constructed until a permit has been issued by the commissioner to the elevator shaft contractor or well contractor.

B. An elevator shaft contractor or well contractor must submit to the commissioner an elevator shaft permit application on a form provided by the commissioner. The application must be legible and signed by the elevator shaft contractor or well contractor.

C. The permit must include the following information for each hole or excavation for the elevator shaft:

(1) the name and license number of the elevator shaft contractor or well contractor;

(2) the name and address of the elevator shaft owner, and property owner if different;

(3) the township number, range number, section and one quartile, or street address if the property is located within an incorporated area, of the proposed excavation location; and

(4) the anticipated depth of the elevator shaft hole or excavation.

[For text of items D and E, see M.R.]

F. The permit is valid for 18 months from the date issued.

G. The owner of the property where the elevator shaft is to be located must pay the permit fee required by Minnesota Statutes, section 103I.208.

4725.1836 NOTIFICATION AND PERMIT FEES.

The fees specified in Minnesota Statutes, section 103I.208, must accompany all notifications and permit applications. Notification or permit fees may be paid electronically and the permit or notification may be submitted by facsimile. Notification and permit application fees shall not be refunded.

4725.1837 EXCEPTION TO NOTICE AND PERMIT REQUIREMENTS.

A permit or notification is not required for installation

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of a pump, pumping equipment, pitless unit, pitless adapter, screen, or the repair of an existing well or boring if the repair does not involve deepening the well or boring through a confining layer or having casing installed or removed ~~through~~ below the frost line.

4725.1848 WELL MAINTENANCE PERMITS.

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

Subp. 3. **Permit conditions.** The conditions in this subpart apply to maintenance permits.

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

D. The commissioner may deny a permit application or revoke a permit for violation of this chapter. The commissioner shall give the applicant or permit holder written notice of the permit application denial or permit revocation. The notice shall state the reason for denial or revocation.

Subp. 4. **Water supply well maintenance permits.** An annual well maintenance permit is required for an unsealed water supply well that is not in use or that is inoperable. The owner of the property on which such a well is located must submit the annual permit fee as required by Minnesota Statutes, section 103I.208, along with the permit application, or have the well sealed.

Subp. 5. **Monitoring well maintenance permits.** The provisions in items A to C apply to monitoring well maintenance permits.

A. The owner of property on which an unsealed monitoring well is located must obtain a maintenance permit starting 14 months after construction of the well and must pay the fee required by Minnesota Statutes, section 103I.208. The permit must be renewed annually until the well is sealed.

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

Subp. 6. **Dewatering well maintenance permits.** The conditions in items A to C apply to dewatering well maintenance permits.

A. No later than 14 months after construction of a dewatering well, the owner of the property on which a dewatering

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well is located must obtain a maintenance permit for an unsealed dewatering well and must pay the fee required in Minnesota Statutes, section 103I.208. The permit must be renewed annually for wells that are in use.

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

4725.1851 WELL AND BORING RECORDS.

Subpart 1. **General.** A licensee or registrant must submit a written record of well or boring construction and sealing of a well or boring on forms containing the information in subparts 2 to 4 within 30 days after completion of the work. A written construction record is not required for any well or boring sealed within 30 days of the time construction began and for which a sealing report is submitted.

A. A new record is required if a notification or permit is required under parts 4725.1820 to 4725.1837.

B. The licensee or registrant must furnish the owner or owner's agent one copy, retain one copy, and submit the remaining copies to the commissioner or the local board of health delegated under Minnesota Statutes, section 103I.111.

C. A single record may be used to report more than one well or boring if all the wells or borings on the record are located at the same depth and geological conditions on a continuous parcel of property.

Subp. 2. **Construction records.** Construction records for wells and borings must contain the information in subpart 3, items A to G, and the following information:

A. intended use;

B. depth;

C. drilling method;

D. casing material, diameter, and depth;

E. bore hole diameters and depths;

F. screen type and depth interval, or open hole interval;

G. static water level;

H. type, amount, and intervals of grout;

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I. well head description including pitless adapter manufacturer and model if installed, and type of casing protection if installed;

J. date of completion; and

K. pump description.

Subp. 3. **Sealing record.** A sealing record signed by a representative must be submitted for all wells and borings sealed.

The sealing record must contain the following information:

A. name and address of the property owner;

B. name, license or registration number of the contractor doing the work, name of the driller performing the work, and the signature of the representative;

C. date work was completed;

D. in an unincorporated area, the county, township, range, section and three quartiles, and the street address or fire number of the well or boring;

E. in an incorporated area, the township, range, section and one quartile, and the numerical street address;

F. for records submitted under subpart 1, item C, the location data at the center of the project, the number of wells or borings included on the record, and a sketch map showing the location of each well or boring;

G. a description of the geological materials penetrated by the well or boring <u>or a description of material penetrated by the nearest well or boring for which records are available,</u> using terms in subpart 4 or ASTM Standard D2487-85;

H. the original <u>well or boring depth, if known,</u> and current well or boring depth;

I. the approximate date of construction;

J. the grout or sealing materials, quantities, and intervals;

K. the casing type, diameter, and depth if present;

L. the screen or open hole depth interval if present;

M. a description of any obstruction or pump, if present; and

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N. the method of sealing the annular space around the casing, if present.

Subp. 4. **Geological materials.** The geological materials penetrated in drilling a well or boring must include the color, relative hardness, and be described using the following terms:

A. Unconsolidated materials:

Material	Diameter Millimeters	Diameter Inches	Screen Slot No. From	To
(1) Clay	Up to 0.005	Up to 0.0002	-	-
(2) Silt	0.005-0.062	0.0002-0.0025	-	-
(3) Fine Sand	0.062-0.250	0.0025-0.0100	2	10
(4) Medium Sand	0.250-0.500	0.0100-0.0200	10	20
(5) Coarse Sand	0.500-1.000	0.0200-0.0400	20	40
(6) Very Coarse Sand	1.000-2.000	0.0400-0.0800	40	80
(7) Fine Gravel	2.000-4.000	0.0800-0.1600	80	160
(8) Coarse Gravel	4.000-62.500	0.1600-2.5000	160 and larger	
(9) Cobbles	62.500-250.000	2.5000-10.0000	-	-

B. Rock:

(1) shale, which is rock consisting of hardened silts and clays;

(2) sandstone, which is cemented or otherwise compacted sediment composed predominately of sand-sized particles generally of quartz;

(3) limestone, which is rock that contains at least 80 percent of carbonates of calcium and has a strong reaction with hydrochloric, or muriatic acid;

(4) dolomite, which is rock that contains at least 80 percent of carbonates of magnesium and has a weak reaction with HCl, or muriatic acid;

(5) granite, which is an igneous rock composed primarily of quartz and feldspar;

(6) basalt, which is a ~~black~~ volcanic igneous rock; and

(7) igneous and metamorphic rock, which are hard crystalline rocks.

4725.1855 WELL CUTTING FORMATION SAMPLES.

A licensee or registrant must submit well-cutting samples as specified in this part when the commissioner determines that samples are needed to provide subsurface geological and

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hydrological information for the state water information system.

A. The commissioner shall notify licensees and registrants of the areas from which well-cutting samples are required and provide licensees and registrants operating within the areas with maps or lists indicating counties, townships, sections, or other designated areas where cutting samples are required.

B. Licensees and registrants so notified and supplied shall collect cutting samples during the course of drilling wells in the designated areas according to the requirements specified. Licensees or registrants not supplied with sample collecting materials but who drill in an area designated for sampling shall notify the commissioner. Licensees or registrants shall collect the cutting samples in a manner representative of the materials encountered. Samples must be taken at five-foot intervals and at every change in rock or sediment type. The cuttings must be placed in the sample bags provided, which shall have an attached tag on which the unique well number, well owner's name, well location, and sample depth must be written.

C. Licensees or registrants shall notify the commissioner within 30 days of a well's completion so that the cutting samples can be collected. Until collected, the licensee or registrant shall store the samples protected from weather and disturbance and segregated by unique well number and depth interval.

WELL AND BORING GENERAL CONSTRUCTION AND USE REQUIREMENTS

4725.2010 APPLICABILITY.

The general construction and use requirements specified in parts 4725.2010 to 4725.3950 apply to all wells and borings except exploratory borings regulated under chapter 4727.

4725.2020 INTERCONNECTION OF AQUIFERS PROHIBITED.

Subpart 1. **Aquifer interconnections.** A well or boring must not be constructed to interconnect aquifers separated by a

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confining layer. A permanent open bore hole or screened portion must not extend through more than ten feet of a confining layer.

Subp. 2. **Aquifers in unconsolidated materials.** Aquifers in unconsolidated materials separated by a confining layer ten feet or more in thickness must not be interconnected.

Subp. 3. **Aquifers in rock.** Aquifers in rock separated by the Decorah, Glenwood, ~~basal Saint Peter,~~ Saint Lawrence, and Eau Claire confining layers must not be interconnected. The confining layers specified are defined in "Geology of Minnesota: A Centennial Volume" by Sims, P.K. and Morey, G.B., pages 459-473, "Paleozoic Lithostratigraphy of Southeastern Minnesota" by George Austin, pages 205 to 213, which is incorporated by reference in part 4725.0150.

4725.2050 USE OF WELLS OR BORINGS FOR DISPOSAL PROHIBITED.

A well or boring must not be used for disposal of surface water, groundwater, or any other liquid, gas, or chemical.

A. Water used to cool parts of engines, air compressors or other equipment, or air conditioning equipment must not be returned to a well or any part of a potable water system except if permitted as a groundwater thermal exchange device under part 4725.1831 and Minnesota Statutes, section 103I.621.

B. A well may be used for the injection of water to conduct a slug test if the injected water was originally taken from that well or is potable water.

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

Subpart 1. **General distance.** A well or boring must be at least ~~ten~~ five feet horizontally from a pipe with flammable or volatile gas, an overhead or underground electric transmission line, or a liquid propane tank. If an electric transmission line is in excess of 50 kilovolts or of unknown voltage, a well must be at least 25 feet horizontally from the electric transmission line. This subpart does not apply to the electrical service line for the well or boring.

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A well or boring between five and ten feet from a pipe with flammable or volatile gas or an electric transmission line or liquid propoane tank must be marked by the licensee or registrant with a permanent sign warning of the location of the electric transmission line and gas pipe.

Subp. 2. **~~Exception~~ Safety precaution.** During construction, repair, or sealing, ~~a well or boring may be closer~~ any work within ten feet of a pipe with flammable or volatile gas, an overhead or underground electric transmission line, or a liquid propane tank must not be performed unless:

A. ~~to an~~ the electric transmission line ~~than the distance specified in subpart 1 if the line~~ has been deenergized and visibly grounded, or insulating barriers not a part of or an attachment to the equipment or machinery have been erected to prevent physical contact with the line during well or boring construction, repair, or sealing; and

B. ~~to a~~ the gas pipe or propane tank ~~than the distances specified in subpart 1 if the pipe or tank~~ does not contain flammable or volatile gas.

~~The well or boring must be marked by the licensee or registrant with a permanent sign warning of the location of the electric transmission line and gas pipe if it is closer than the distance specified in subpart 1.~~

4725.2175 LOCATION OF WELL OR BORING WITHIN BUILDING.

Subpart 1. **Location in a building.** A well or boring must not be located within a building unless the building is constructed according to this part over the well or boring exclusively to protect the well, boring, pump, and water treatment equipment. Environmental bore holes and monitoring wells are exempt from this subpart if sealed within 48 hours of the time construction begins on the well or bore hole.

Subp. 2. **Access.** The building must have adequate access for maintaining and repairing the well, boring, pump, and water treatment equipment. The building must be constructed at or above the established ground surface. A floor drain must

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discharge to the established ground surface, a gravel pocket, or a sewer constructed to prevent backup of sewage within 50 feet of the bore hole. Materials or chemicals that may cause contamination of the well or groundwater, including fertilizers, pesticides, petroleum products, paints, and cleaning solvents, must not be stored in the building.

Subp. 3. **Protections.** A well or boring located in a separate building must:

A. have casing extending at least 12 inches above the floor;

B. be protected by a durable watertight concrete slab, platform, or floor, extending horizontally at least one foot in every direction from the casing, and be sloped to divert water away from the casing; and

C. have a watertight gasket or caulk between the casing and the platform, floor, or slab.

4725.2185 DISTANCE FROM A BUILDING.

A well or boring must be at least three feet horizontally from the farthest exterior projection of a building, including the walls, roofs, decks, and overhangs unless located in a building constructed according to part 4725.2175. Environmental bore holes and monitoring wells are exempt from this subpart if sealed within 48 hours of the time construction begins on the well or bore hole.

4725.2250 GENERAL CASING REQUIREMENTS.

Subpart 1. **Casing types.** If casing is used in a well or boring, the casing must be:

A. steel casing as specified in part 4725.2350;

B. stainless steel casing as specified in part 4725.2450;

C. poured concrete or concrete curbing as specified for dug or bored water supply wells in part 4725.5750; or

D. plastic casing as specified in part 4725.2550.

Subp. 2. **Watertight casing required.** All casing except concrete curbing must be watertight throughout its length, with

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threaded, solvent welded, or welded joints. Recessed couplings, reamed and drifted couplings, or other couplings that match the design, taper, and thread type of the casing must be used on threaded casing. Thread must not be exposed on the pipe when the casing is joined to the coupling.

Subp. 3. **New casing required.** Casing used in the permanent construction of a well or boring must be new casing produced to specifications. Casing salvaged within 120 days of installation is acceptable for reuse if it meets the specifications for new casing. A potable water well must be constructed with new casing or casing salvaged from a potable water well.

Subp. 4. **Casing markings required.** Steel, stainless steel, and plastic casing except flush-threaded PVC casing must be marked by the manufacturer in accordance with casing specifications in parts 4725.2350 to 4725.2550. Markings must be rolled, stamped, or stenciled by the manufacturer.

Subp. 5. **Casing testing.** Casing rejected by the manufacturer must not be used. The commissioner may require that casing be submitted to an independent testing agency to evaluate if it meets or exceeds specifications when the casing:

A. lacks markings or has illegible or altered markings;

B. contains pits, cracks, patches, partial welds, bends, or other manufacturing defects; or

C. lacks mill certification papers from the original manufacturer.

Subp. 6. **Casing rejection.** The commissioner shall reject pipe for use in a well or boring if:

A. the casing is not submitted for evaluation and verification when required by the commissioner;

B. the casing fails to meet the specifications in part 4725.2350, 4725.2450, 4725.2550, or 4725.5750; or

C. the lot of casing contains defective lengths, including casing with girth welded joints, casing with welded patches, and a lot having more than five percent of the casing

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with lengths less than five feet.

Subp. 7. **Temporary casing.** Casing installed temporarily during drilling is not required to meet the specifications for casing in parts 4725.2350 to 4725.2550, but must be of sufficient strength to withstand the structural load imposed by conditions both inside and outside the well or boring. The casing must be removed on completion of the well or boring.

Subp. 8. **Inner and outer casing.** The inside diameter of an outer casing must ~~have an inside diameter~~ be at least 3.25 inches larger than the outside diameter of the inner casing, couplings or bell-end, whichever is larger, for inner casings with 12 inches inside diameter and smaller. The inside diameter of an outer casing must be at least 3.5 inches larger than the outside diameter of the inner casing, couplings, or bell end, whichever is larger, for inner casings larger than 12 inches inside diameter. The annular space between an inner casing and an outer casing must be grouted for its entire length by pumping neat cement grout through a tremie pipe or through the casing as specified in part 4725.3050. The inner casing must extend above the established ground surface at least 12 inches.

Subp. 9. **Outer casing in unconsolidated materials.** An outer casing installed in unconsolidated materials is not required to meet the specifications for casing in parts 4725.2350 to 4725.2550 if the casing is of sufficient strength to withstand the structural load imposed by conditions both inside and outside the well or boring and if an inner casing meeting the requirements of subpart 1 is installed and the annular space between the casings is filled with neat cement.

Subp. 10. **Casing inside diameter.** The inside diameter of a casing must not be less than two inches ~~except that~~ for a well or boring ~~less~~ greater than ~~100~~ 50 feet in depth ~~may have a casing with a minimum 1.25 inches inside diameter~~.

Subp. 11. **Casing height.** A casing or casing extension must extend vertically at least 12 inches above the established ground surface or the floor of a building as specified in part 4725.2175. The established ground surface or floor immediately

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adjacent to the casing must be graded to divert water away from the casing. Termination of the top of the casing below the established ground surface, such as in a well pit, is prohibited except that an outer casing may terminate immediately below a pitless adapter installed on an inner casing.

Subp. 12. **Casing offsets.** Casing offsets are prohibited.

4725.2350 STEEL CASING REQUIREMENTS.

Subpart 1. **General.** Steel casing used in the permanent construction of a well or boring must be new casing produced to:

A. ASTM Standard A53-90b;

B. ASTM Standard A589-89a, Types I, II, and III; or

C. API Standard 5L.

Steel casing must have the minimum weights and thicknesses specified in the table in subpart 2 subject to the tolerances in the specifications in this subpart.

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Subp. 2. **Steel casing pipe weight and dimensions.**

Size in Inches	Standard weight Plain End	Standard weight Wgt. Lbs. Per Ft. Thrds. & Cplgs.*	Schedule 40 Thrds. R&D Cplgs.	Schedule 40 Thickness in Inches	Schedule 40 Diameter-Inches External	Schedule 40 Diameter-Inches Internal	Couplings Thrds. per Inch	Couplings Minimum External Diameter Inches	Couplings Minimum Length Inches
1	1.68	1.68	1.70	.133	1.315	1.049	11-1/2	1.576	2-5/8
1-1/4	2.27	2.28	2.30	.140	1.660	1.380	11-1/2	1.900	2-3/4
1-1/2	2.72	2.73	2.75	.145	1.900	1.610	11-1/2	2.200	2-3/4
2	3.65	3.68	3.75	.154	2.375	2.067	11-1/2	2.750	2-7/8
2-1/2	5.79	5.82	5.90	.203	2.875	2.469	8	3.250	3-15/16
3	7.58	7.62	7.70	.216	3.500	3.068	8	4.000	4-1/16
3-1/2	9.11	9.20	9.25	.226	4.000	3.548	8	4.625	4-3/16
4	10.79	10.89	11.00	.237	4.500	4.026	8	5.200	4-5/16
5	14.62	14.81	15.00	.258	5.563	5.047	8	6.296	4-1/2
6	18.97	19.18	19.45	.280	6.625	6.065	8	7.390	4-11/16
8	28.55	29.35		.322	8.625	7.981	8	9.625	5-1/16
10	40.48	41.85		.365	10.750	10.020	8	11.750	5-9/16
12	49.56	51.15		.375	12.750	12.000	8	14.000	5-15/16
14	54.57	57.00		.375	14.000	13.250	8	15.000	6-3/8
16	62.58	65.30		.375	16.000	15.250	8	17.000	6-3/4
18	70.59	73.00		.375	18.000	17.250	8	19.000	7-1/8
20	78.60	81.00		.375	20.000	19.250	8	21.000	7-5/8
22	86.61			.375	22.000	21.250			
24	94.62			.375	24.000	23.250			
26	102.63			.375	26.000	25.250			
30	118.65			.375	30.000	29.250			
32	126.66			.375	32.000	31.250			
34	134.67			.375	34.000	33.250			
36	142.68			.375	36.000	35.250			

* Nominal weight based on length of 20 feet including coupling.

Steel casing up to ten inches in diameter must be Schedule 40.

Larger diameter casing must be standard weight.

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4725.2450 STAINLESS STEEL CASING REQUIREMENTS.

Stainless steel casing used in the permanent construction of a well or boring must meet ASTM Standard A312-86a and meet at least:

A. ANSI Schedule 5 for welded joints; or

B. ANSI Schedule 40 for threaded joints.

4725.2550 PLASTIC CASING AND COUPLING REQUIREMENTS.

Subpart 1. **General requirements.** Plastic casing and couplings used in the permanent construction of a well or boring must:

A. meet ASTM Standard F480-88; and

B. withstand internal pressures of 200 pounds per square inch (psi).

Standard dimension ratios (SDR) and water pressure ratings (PR) at 23 degrees Celsius (73 degrees Fahrenheit) for nonthreaded polyvinyl chloride (PVC) and acrylonitrile-butadiene-styrene (ABS) plastic casing equal to or greater than 200 psi are as follows:

(1) pressure rating of PVC casing materials:

SDR	PVC 1120	PVC 1220	PVC 2112	PVC 2116	PVC 2120
13.5	315 psi	315 psi	200 psi	250 psi	315 psi
17	250 psi	250 psi	-	200 psi	250 psi
21	200 psi	200 psi	-	-	200 psi

(2) pressure rating of ABS casing materials:

SDR	ABS 1316	ABS 2112
13.5	250 psi	200 psi
17	200 psi	-

The sources of the pressure rating in item B are the American Society for Testing and Materials Standard D2241-88 "Standard Specifications for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)" Table XI.I Standard Thermoplastic Pipe Dimension Ratios (SDR) and Water Pressure Rating (PR) at 73 degrees Farenheit (23 degrees Celsius) for Nonthreaded Plastic Pipe; and Standard D2282-88 "Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR)," Table XI.I Standard Plastic Pipe Dimension

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Ratios (SDR) and Water Pressure Ratings (PR) at 73 degrees Farenheit (23 degrees Celsius) for Nonthreaded ABS Plastic Pipe.

Subp. 2. **Additional approved couplings.** In addition to the plastic couplings approved under subpart 1, couplings with socket dimensions meeting the requirements of ASTM Standard F480-88, Table 3 and having a water pressure rating of at least 200 psi are also approved.

Subp. 3. **NSF standard.** All plastic casings, couplings, components, and related joining materials including solvents, cements, or primers used in the construction of a well or boring must conform with the requirements of NSF Standard 61-1991 or the health effects portion of NSF Standard 14-1990 and be tested as conforming by an agency certified by the ANSI. Conformance to the NSF standard must be coded, stamped, or marked on the casings, couplings, components, and related joining materials including solvents, cements, or primers.

4725.2650 PLASTIC CASING INSTALLATION.

Subpart 1. **General.** When preparing to install plastic casing, a person must:

A. inspect casing and couplings carefully for cuts, gouges, deep scratches, damaged ends, and other major imperfections and not use any plastic casing or coupling having such defects or imperfections;

B. use solvent cement meeting the requirements of the specifications for the plastic that will be used;

C. use only casing and coupling combinations that give interference fits;

D. use plastic couplings with molded or formed threads and thread lubricants suitable for the plastic material that will be used; and

E. use a coupling appropriate for the specific transition intended when a nonplastic screen is attached to a plastic casing.

Subp. 2. **Cutting.** When cutting plastic casing, casing ends must be cut square using fine-tooth blades with little or

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no set or a plastic pipe cutter equipped with extra wide rollers and thin cutting wheels. Standard steel pipe or tubing cutters must not be used for cutting plastic casing.

Subp. 3. **Cleaning.** All dirt, dust, moisture, and burrs must be cleaned from casing ends and couplings using chemical or mechanical cleaners suitable for the particular plastic material. All burrs must be removed.

Subp. 4. **Primer.** A primer must be used when the ~~casing and coupling surfaces must be softened and dissolved to form a continuous bond between the mating surfaces, or when the~~ type of solvent cement used requires one.

Subp. 5. **Cementing.** An even coat of cement must be applied to the inside of the couplings to cover the distance of the joining surface only. An even coat of solvent cement must then be applied to the outside of the casing being joined to a distance equal to the depth of the casing coupling socket.

Subp. 6. **Assembling.** When assembling plastic casing, a person must:

A. make the joint with solvent cement before the solvent cement dries;

B. reapply cement before assembling if the solvent cement dries partially;

C. turn the casing to evenly distribute the solvent cement while inserting the coupling into the coupling socket;

D. insert the casing to the full depth of the coupling socket, and assemble casing ~~by using casing joiners~~;

E. remove excess solvent cement from the exterior of the joint with a clean, dry cloth;

F. tighten a threaded joint by no more than one full turn using a strap wrench;

G. not disturb the coupling joint until after the solvent cement has set; and

H. allow sufficient time for the solvent cemented joint to set.

Subp. 7. **Screws.** Screws must not be used to join plastic casing.

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Subp. 8. **Drilling inside casing.** A person must not drill inside plastic casing. Drilling tools such as drill bits must not be inserted in plastic casing. This prohibition does not include the installation or repair of screens or development of the well or boring.

Subp. 9. **Limestone, dolomite restriction.** Plastic casing must not be used as an outside casing in wells and borings cased more than five feet into limestone or dolomite. In limestone and dolomite, plastic casing may be used as an inner casing if surrounded by an outer steel casing.

Subp. 10. **Driving prohibition.** Plastic casing must not be driven. Use of a drive shoe with plastic casing is prohibited.

Subp. 11. **Sealing, removal, or replacement.** A person installing plastic casing must either seal a well or boring or remove and replace all casing when:

A. the plastic casing cannot be installed without driving the casing;

B. a screen or pump cannot be installed without force; or

C. the casing fails during construction or pumping of the well or boring.

4725.2750 SCREENS.

A screen must be attached or connected to the casing by a threaded, solvent-welded or welded joint or by a nontoxic packer. Lead packers must not be used. Leaders or blank screens must not extend more than ten feet above or below the screen.

4725.2850 GRAVEL PACKS.

Gravel packs, filter sand, or stabilizer materials must contain less than five percent calcareous material and must be graded, cleaned, and washed. Gravel packs, filter sand, or stabilizer materials must not extend more than ten feet above the static water level or more than ten feet above the top or below the bottom of the screen.

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4725.2950 DRILLING FLUIDS.

Subpart 1. **Water.** Water used for drilling, development, or rehabilitation, other than water from the well or boring itself, must:

A. come from a potable water system or from a well or boring of similar use and construction;

B. contain a free chlorine residual at all times; and

C. be conveyed in clean, sanitary tanks and water lines.

Subp. 2. **Drilling additives.** Drilling additives must meet the requirements of NSF Standard 60-1988 as determined by a person accredited by the ANSI under ANSI Standard Z34.1-1987. A drilling additive is a substance added to the air or water used in the fluid system of drilling a well or boring.

4725.2975 DISPOSAL OF MATERIALS.

The disposal of drilling mud, cuttings, treatment chemicals, and discharged water must be according to applicable state and local regulations. Drilling mud, cuttings, and discharged water must not be disposed in a manner that creates a health hazard. During test pumping, discharged water must be piped to a point of overland drainage.

4725.3050 GROUTING.

Subpart 1. **Grouting materials.** The following grout materials as listed in part 4725.0100 are approved:

A. neat cement grout, except that rapid setting cement must not be used with plastic casing;

B. concrete grout when used in the dry portion of the open annular space;

C. bentonite grout when used in unconsolidated materials; and

D. high solids bentonite grout when used in unconsolidated material. Shoveling of no more than an equal volume of sand, cuttings taken from the bore hole, or granular bentonite is allowed.

Subp. 2. **Grouting methods.** Grouting must start

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immediately on completion of drilling and be completed before placing a well or boring in service. Grout must be pumped into the annular space from the bottom up through the casing or through a tremie pipe ~~except that a well or boring may be grouted with bentonite grout by shoveling the equal volume of washed sand, cuttings taken from the bore hole, or granular bentonite~~. The sand, granular bentonite, and cuttings specified in the definition of bentonite grout, part 4725.0100, subpart 21c, item B, must be mixed prior to placement or shoveled while pumping the mixture specified in part 4725.0100, subpart 21c, item A. The bottom of the tremie pipe must remain submerged in grout while grouting. Neat cement grout or concrete grout must be allowed to set a minimum of 48 hours. Rapid setting cement must be allowed to set a minimum of 12 hours. Drilling, well development, or pump operation is prohibited during the time the cement is setting.

Subp. 3. **Grouting depth requirement.** When constructing a well or boring with a method such as mud or air rotary, auger, or jetting that creates an open annular space, a grouting material specified in subpart 1 and the grouting methods specified in subpart 2 must be used to fill the annular space between the casing and the bore hole.

A. If the depth of the casing is 30 feet or less, the grout must extend from the bottom of the casing or top of the gravel pack, to the established ground surface, or the base of the pitless adapter or unit.

B. If the depth of the casing is more than 30 feet, the annular space below 30 feet must be filled with grout except that the portion of the well or bore hole in unconsolidated formations below 30 feet in depth may be filled with cuttings taken from the bore hole. The annular space above 30 feet must be filled from:

(1) a depth of at least 30 feet to the established ground surface or the base of a pitless adapter or unit; or

(2) the top of the gravel pack to the established

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ground surface or the base of a pitless adapter or unit.

~~C.--The annular space below 30 feet in depth must be filled with grout except that the portion of the well or bore hole in unconsolidated formations below 30 feet in depth may be filled with cuttings taken from the bore hole.~~

Subp. 4. **Grouting between casings.** The annular space between an inner and outer casing constructed according to part 4725.2250, subpart 8, must be filled with neat cement grout according to subpart 2.

Subp. 5. **Driving casing.** When driving casing, a cone-shaped depression or temporary outer casing filled with bentonite grout, bentonite powder, granular bentonite, or high solids bentonite grout must be maintained around the outside of the casing. The bottom of driven casing must be equipped with a drive shoe.

Subp. 6. **Grouting near screen.** If a bore hole extends more than ten feet below the bottom of a screen, the bore hole must be filled with grout from the bottom of the bore hole to within ten feet or less of the screen.

Subp. 7. **Grouting in rock.** The additional requirements in items A to D apply to grouting a well or boring in rock.

A. When rock is encountered in the construction of a well or boring, the casing must be equipped with a drive shoe driven firmly into stable rock or the casing must be grouted with neat cement from the bottom of the casing to the top of the rock.

B. When the casing of a well or boring extends more than ten feet into rock, the casing must be installed in a bore hole 3.25 inches larger than the outside diameter of the casing or couplings, whichever is larger, except that a well or boring may be completed in a sandstone formation by driving steel or stainless steel casing in the sandstone if the sandstone:

~~(1) is the first rock unit; and~~

~~(2) has no shale, limestone, or dolomite layers greater than one foot in thickness.~~

C. A water supply well constructed in or below

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dolomite or limestone rock, in addition to the requirements in this subpart, must meet the requirements in subitems (1) to (3).

(1) If the ~~pumping~~ static water level of a water supply well completed in limestone or dolomite is less than ten feet above the top of the dolomite or limestone rock formation, the bore hole must be at least 3.25 inches larger in diameter than the outside diameter of the casing or couplings, whichever is larger. The casing must extend at least ~~ten~~ 20 feet below the ~~pumping~~ static water level. The annular space must be grouted with neat cement grout or concrete grout.

(2) If a water supply well is constructed in a geological formation overlaid by limestone or dolomite, the casing must extend at least ten feet into the underlying formation. The bottom of the casing must be at least ten feet below the ~~pumping~~ static water level. The bore hole extending through the limestone or dolomite formation and ten feet into the underlying formation must be at least 3.25 inches larger in diameter than the outside diameter of the casing or the couplings, whichever is larger. The rock portion of annular space must be grouted with neat cement grout or concrete grout and the unconsolidated materials portion of the annular space must be grouted according to subparts 1 to 3.

(3) A water supply well used to supply potable water must not be completed in limestone or dolomite rock unless the limestone or dolomite is overlaid by at least 50 feet of unconsolidated material or firm insoluble rock such as sandstone or shale that extends around the well for a one mile radius.

D. If a cavern more than twice the diameter of the bore hole exists or the grout level fails to rise after insertion of either more than one cubic yard of grout or the quantity of grout necessary to fill ten vertical feet of hole, then the following grouting materials and methods may also be used in the portions where the conditions exist:

(1) pouring of a mixture of gravel or stone aggregate not larger than one-half inch in diameter while simultaneously pumping neat cement grout or concrete grout in a

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ratio not to exceed five parts aggregate to one part grout;

(2) pumping a mixture of gravel not larger than one-half inch in diameter and concrete grout or neat cement grout in a ratio not to exceed five parts gravel to one part Portland cement; or

(3) pumping of alternate, equal thickness layers of concrete or neat cement grout and pouring gravel or stone aggregate not larger than one-half inch in diameter. Individual layers of aggregate must not exceed ~~20~~ ten feet in thickness. Aggregate must not be emplaced in a confining layer.

Neat cement grout or concrete grout must be pumped through the casing or through a tremie pipe. The aggregate must be poured into the bore hole at a rate that prevents bridging.

4725.3150 CASING CONNECTIONS.

Subpart 1. **Above ground.** A connection above the established ground surface into the top or side of a casing must be constructed to be weatherproof and insect proof. The connection must consist of:

A. a threaded connection;

B. a welded connection;

C. a rubber expansion sealer;

D. a bolted flange with rubber gasket;

E. an overlapping well cap with compression gasket; or

F. an extension of the casing at least one inch into the base of a power pump mounted and sealed on a concrete pedestal and at least 12 inches above the established ground surface or the floor of a building as specified in part 4725.2175.

Subp. 2. **Below ground.** A connection below the established ground surface into the side of a casing must be constructed to be watertight. The connection must consist of a:

A. threaded connection;

B. welded connection;

C. rubber expansion sealer;

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D. bolted flange with rubber gasket; or

E. pitless adapter or pitless unit.

4725.3250 PUMPS AND PUMPING EQUIPMENT.

A pump or pump base installed on a well must be constructed so no unprotected openings exist into the interior of the pump or well casing.

A. A hand pump, hand pump head, stand, or similar device must have a closed and screened spout, directed downward. The pump must have a concrete slab at least four inches thick extending horizontally at least one foot in every direction from the well casing and sloped to divert water away from the casing. A watertight seal ~~which may be asphalt or a similar resilient material~~ must be provided between the casing and the slab.

B. A reciprocating pump rod must operate through a stuffing box.

C. An oil lubricated vertical turbine pump must not be installed in a well.

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 4715.2110;

B. protected with a backflow prevention device as specified in parts 4715.2000 to 4715.2170;

C. protected with a backflow prevention device as specified in parts 1505.2100 to 1505.2800 if the well is an irrigation well used for chemigation; or

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

4725.3450 FLOWING WELL OR BORING.

Subpart 1. **General construction.** A well or boring from

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which groundwater flows above the established ground surface without pumping must be constructed to prevent erosion of the aquifer and the confining layer. Casing must be installed into the flowing aquifer to prevent water flowing up the outside of the casing. The casing must be grouted with neat cement grout from the bottom of the casing to the base of the pitless adapter or to the established ground surface according to part 4725.3050.

Subp. 2. **Special construction required.** A well or boring must be constructed according to the requirements in subpart 3 when:

A. the artesian flow rate is greater than 70 gallons per minute;

B. artesian pressure at the established ground surface exceeds ten pounds per square inch; or

C. the commissioner designates 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.

Subp 3. **Special construction standards.** A well or boring requiring special construction must be constructed by:

A. drilling a bore hole a minimum of 3.25 inches larger than the outside diameter of the casing or couplings, whichever is larger, into the confining layer overlying the flowing aquifer. The bore hole must not penetrate the entire thickness of the confining layer;

B. installing steel casing into the confining layer;

C. pumping neat cement grout into the annular space surrounding the casing from the bottom of the casing to the established ground surface;

D. drilling through the confining layer into the aquifer ~~a minimum of ten feet~~;

E. installing an inner casing into the aquifer ~~which is a minimum of 3.25 inches smaller in diameter than the outer casing or open hole~~ in accordance with part 4725.2250, subpart

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8; and

F. grouting the annular space surrounding the inner casing with neat cement grout.

Grouting must be in accordance with part 4725.3050.

Subp. 4. **Flow control.** A flowing well or boring must be provided with flow control capable of stopping all flow, consisting of a valved pipe connection, watertight pump connection, specially designed pitless unit, or a receiving tank set at an altitude corresponding to that of the artesian head.

4725.3550 WELL LABEL.

Subpart 1. **Label required.** A person who has constructed a well must attach a well identification label provided by the commissioner to the well before placing the well into service unless the well is sealed within 90 days of construction.

Subp. 2. **Attachment.** The well identification label must be attached to the well casing in a visible location using a stainless steel clamp, metal band, or strap. Alternatively, the label may be attached to a concrete pump base or pedestal using screws or fasteners.

Subp. 3. **Maintenance.** The property owner must maintain the well identification label in a readable condition.

Subp. 4. **Removal; reattachment.** The well identification label must not be removed except to work on the well. On completing work, the label must be reattached.

4725.3650 REQUIREMENTS FOR DESIGNATED SPECIAL WELL CONSTRUCTION AREAS.

Subpart 1. **Plan review.** When the commissioner designates an area where contamination is detected as a special well construction area, a well must not be constructed, repaired, or sealed until the commissioner has reviewed and approved a proposed plan for well sealing, repair, construction, and location. In addition to the information on the permit or notification, the plan must include the:

A. depth;

B. location;

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C. casing type, diameter, and depth;

D. method of construction, including grout materials and grout method;

E. pumping rate; and

F. well use.

Subp. 2. **Water quality monitoring.** The commissioner may require water quality monitoring by the property owner or other person in a designated special well construction area if the commissioner finds monitoring is needed to determine the degree of contamination of a water supply.

Subp. 3. **Additional requirements.** The commissioner may specify well location and construction requirements more stringent than those specified in this chapter if the commissioner determines, based on an assessment of hydrogeologic conditions and contaminant characteristics, that additional requirements are needed to protect the public health or prevent degradation of the groundwater.

4725.3750 REPAIR OF WELLS AND BORINGS.

Subpart 1. **Repair or seal.** The property owner must have a defective part of a well or boring repaired, including broken, punctured, or otherwise defective or unserviceable casing, screen, fixture, seal, or well cap. A well or boring not repaired must be permanently sealed.

Subp. 2. **Materials.** Materials used in maintenance, replacement, or repair must meet the requirements of this chapter for new installation.

Subp. 3. **Casing removal.** When all casing is removed from a well or boring, the installation of new casing or the reinstallation of casing is considered new construction and must meet the requirements of this chapter for new construction.

Subp. 4. **Acid treatment.** Before acid treating a well or boring, all confined spaces must be blown out with fresh air before entry and a supply of fresh air must be provided during occupancy. When there is a question of adequate fresh air supply, a self-contained breathing apparatus must be worn.

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4725.3850 SEALING WELL OR BORING.

Subpart 1. **Sealing with grout.** A well or boring must be sealed by filling the well or boring, including an open annular space, with grout. The grout must be pumped through a tremie pipe or the casing from the bottom of the well or boring upward to within two feet of the established ground surface or floor. The bottom of the tremie pipe must remain submerged in grout while grouting.

Subp. 2. **Removal of obstruction; debris.** Materials, debris, and obstructions that may interfere with sealing must be removed from the well or boring.

Subp. 3. **Casing.** Casing with an open annular space must be:

A. grouted in place;

B. removed; or

C. perforated ~~for its entire length with a minimum in each foot of casing of at least two one-half square inch perforations on opposite sides of the casing~~ or ripped. Casing must be either:

(1) perforated a minimum of one-half square inch of open area in each foot of casing; or

(2) ripped a minimum of five feet for every 20 feet of casing.

Casing must be perforated or ripped through the entire length of a confining layer.

If casing is to be removed from a collapsing formation, grout must be inserted so the bottom of the casing remains submerged in grout.

Subp. 4. **Additional sealing requirements for well or boring in unconsolidated materials.** The additional requirements in items A and B apply to the sealing of a well or boring in unconsolidated materials.

A. The portion of a well or boring in unconsolidated material must be filled with bentonite grout, high solids bentonite grout, or neat cement grout. Concrete grout is

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approved for grouting only in the dry portion of the hole. The grout must be pumped through a tremie pipe or the casing from the bottom of the well or boring upward to within two feet of the established ground surface. Clean sand or cuttings equal to the volume of grout may be poured into the well or boring while the grout is pumped through a tremie pipe. The sand or cuttings must be poured at a rate which prevents bridging.

B. In addition to the requirements in item A, a dug well 16 inches or greater in diameter, less than 200 feet in depth, and containing less than 20 feet of water may be sealed by pouring at a rate sufficient to completely fill the well without bridging using:

(1) uniformly mixed dry bentonite powder or granular bentonite and sand in a ratio of one part bentonite to five parts sand;

(2) clean unconsolidated materials with a permeability of 10^{-6} centimeters per second or less; or

(3) concrete grout.

Sealing materials must have bearing strength sufficient to prevent subsidence and support traffic or building loads.

Subp. 5. **Additional sealing requirements for well or boring in rock.** The requirements in items A to C apply to the sealing of a well or boring in rock.

A. The portion of a well or boring in rock must be sealed with neat cement grout.

B. The materials and methods described in item C are approved for sealing in those portions of a well or boring where the following conditions exist:

(1) a cavern more than twice the diameter of the bore hole;

(2) sandstone that is blasted and bailed; or

(3) the grout level fails to rise after insertion of more than one cubic yard of grout <u>or the quantity of grout necessary to fill ten vertical feet of hole</u>.

C. The materials and methods in this item are approved in those portions of a well or boring where the

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conditions in item B exist:

(1) pouring a mixture of gravel or stone aggregate not larger than one-half inch in diameter while simultaneously pumping neat cement grout or concrete grout in a ratio not to exceed five parts aggregate to one part grout;

(2) pumping a mixture of gravel not larger than one-half inch in diameter and concrete grout in a ratio not to exceed five parts gravel to one part Portland cement; or

(3) placing alternate, equal thickness layers of concrete or neat cement grout and gravel or stone aggregate not larger than one-half inch in diameter. Neat cement grout or concrete grout must be pumped through the casing or a tremie pipe. The aggregate must be poured into the bore hole at a rate that prevents bridging. Individual layers of aggregate must not exceed ~~20~~ ten feet in thickness except in blasted and bailed sandstone formations. Aggregate must not be emplaced in a confining layer.

Subp. 6. **Sealing well or boring not in use.** A boring not in use or a well not in use that does not have a maintenance permit as specified in part 4725.1848 must be sealed according to this part.

Subp. 7. **Sealing flowing well.** The discharge from a flowing well must be stopped and the well sealed according to this part. When a well cannot be sealed as described in this part, the licensee must notify the commissioner.

4725.3875 RESPONSIBILITY FOR SEALING.

Subpart 1. **Who may seal.** A property owner must have a contractor licensed or registered in accordance with part 4725.0475 seal a well or boring.

Subp. 2. **Corrective orders.** When a licensee or registrant is under a corrective order, the licensee or registrant must seal a well or boring that the licensee or registrant has constructed in violation of this chapter.

Subp. 3. **Report of well or boring not in use.** A licensee or registrant must report to the commissioner a well or boring

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that the licensee or registrant knows is not in use and is not sealed.

WATER SUPPLY WELLS

4725.4050 APPLICABILITY.

Parts 4725.4050 to 4725.5850 are additional standards that apply to water supply wells.

4725.4350 DISTANCE FROM WATER BODIES; PROTECTIONS IN FLOOD AREAS.

Subpart 1. **Distance from water bodies.** A water supply well must be at least 50 feet horizontally from the ordinary high water level as defined in Minnesota Statutes, section 103G.005, subdivision 14, of a stream, river, pond~~,~~ or lake~~, or wetland~~.

Subp. 2. **Casing in flood areas.** The casing must extend at least five feet above the regional flood level. If the regional flood level is more than five feet above the established ground surface, a watertight seal may be installed in lieu of extending the casing beyond ten feet above the established ground surface.

4725.4450 DISTANCES FROM CONTAMINATION SOURCE.

Subpart 1. **Isolation distances.** A water supply well must be located where there is optimum surface drainage and at the highest practical elevation. A water supply well must be as far as practical from a contamination source, but no less than 150 feet upgrade from a sanitary landfill, dump, or waste stabilization pond.

A water supply well must be no less than:

A. 150 feet from an area used to prepare or store more than 25 gallons or 100 pounds dry weight of:

(1) an agricultural chemical as defined in Minnesota Statutes, section 18D.01;

(2) a hazardous substance as defined in Minnesota Statutes, section 115B.02; or

(3) petroleum as defined in Minnesota Statutes, section 115C.02, unless a lesser distance is specified in this subpart;

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B. 150 feet from a sanitary landfill, dump, or waste stabilization pond. The separation distance of 150 feet between a water supply well and a sanitary landfill or waste stabilization pond is the minimum separation distance required. Because ~~containment~~ contaminant movement is highly variable, water supply wells should not be located between sanitary landfills and waste stabilization ponds and points of groundwater discharge to the ground surface;

C. 100 feet from:

(1) a manure storage area as defined in part 7020.0300, subpart 14, except as provided in subpart 2;

(2) an agricultural chemical storage or preparation area protected with ~~containment~~ safeguards as defined in parts 1505.3010 to 1505.3150 for bulk pesticides, or with safeguards as specified in standards of the Department of Agriculture for fertilizers under parts 1510.0370 to 1510.0408 and Minnesota Statutes, chapter 18C;

(3) an underground storage tank for hazardous substances or petroleum if protected with safeguards as defined in chapter 7150; and

(4) an aboveground storage tank for hazardous substances or petroleum if protected with safeguards as defined in chapter 7100;

D. 75 feet from a cesspool, seepage pit, leaching pit, or dry well except as provided in subpart 2;

E. 50 feet from:

(1) an agricultural chemical storage or preparation area covered with a permanent watertight roof and protected with ~~containment~~ safeguards as defined in parts 1505.3010 to 1505.3150 ~~and covered with a permanent watertight roof~~ for bulk pesticides, or with safeguards as specified in standards of the Department of Agriculture for fertilizers under parts 1510.0370 to 1510.0408 and Minnesota Statutes, chapter 18C;

(2) an animal feedlot as defined in part 7020.3000, subpart 3, except as provided in subpart 2;

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(3) a feeding or watering area within a pasture as defined in part 7020.3000, subpart 18;

(4) an animal or poultry building except as provided in subpart 2;

(5) ~~a flammable waste~~ an interceptor as defined in part 4715.0100, subpart 66;

(6) a grave;

(7) a ~~sediment interceptor~~ subsurface disposal field or privy except as provided in subpart 2;

(8) a septic tank, ~~subsurface disposal field,~~ sewage lift station, ~~or~~ nonwatertight sewage sump, or holding tank~~, or privy except as provided in subpart 2~~;

(9) an underground petroleum storage tank of 1,100 gallons or less;

(10) an unused, unsealed well or boring;

(11) a source of a pollutant, contaminant, or hazardous substance as defined in Minnesota Statutes, section 115B.02, that may drain into the soil except as provided in this part; and

(12) a buried sewer that:

(a) serves as a collector or municipal sewer;

(b) is pressurized, except a sewer serving one single-family residence;

(c) is open-jointed; or

(d) is constructed of materials that do not meet the specifications, methods, and testing protocol in parts 4715.0530 and 4715.2820;

F. 20 feet from:

(1) a watertight sewage sump constructed according to part 4715.2440;

(2) a pit or unfilled space below the established ground surface except a basement or building crawl space;

(3) an in-ground swimming pool;

(4) an aboveground petroleum storage tank of 1,100 gallons or less;

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(5) a buried sewer or a pressurized sewer serving one single-family residence constructed of cast iron or plastic pipe according to the material specifications, methods, and testing protocol described in parts 4715.0530 and 4715.2820 other than in item E, subitem (12); and

(6) a storm water drain pipe 12 inches or greater in diameter; and

G. ten feet from a frost-proof yard hydrant.

Subp. 2. **Exceptions to isolation distances.** The distances in items A and B are exceptions to the isolation distances in subpart 1.

A. A water supply well constructed without a watertight casing penetrating at least ten feet of a confining layer, or without 50 feet of watertight casing, must be located at least:

(1) 200 feet from a manure storage area;

(2) 150 feet from a cesspool, seepage pit, leaching pit, or dry well; and

(3) 100 feet from a subsurface disposal field, animal feedlot, animal or poultry feeding or watering area, animal or poultry building, privy, or similar contamination source.

B. An irrigation well protected with the safeguards specified in part 1505.2300, subpart 2, items D and E, as proposed in State Register, Volume 16, Number 50, page 2656 (June 8, 1992), and as later adopted, must be at least 20 feet from an agricultural chemical supply tank.

4725.4550 MINIMUM PROTECTIVE DEPTH.

A potable water supply well must be cased to a depth of at least 15 feet from the established ground surface. The top of a gravel pack must terminate at least 15 feet below the established ground surface.

4725.4650 OTHER WATER SUPPLY WELL CONSTRUCTION REQUIREMENTS.

The following requirements also apply to a new or reconstructed water supply well.

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A. A water supply well must be developed to remove drilling fluid, native silts and clays deposited during drilling, and the predetermined finer fraction of the natural formation or the gravel pack.

B. A water supply well must be constructed to provide for measurement of the static water level and pumping water level.

C. A water supply well may not produce more than five milligrams per liter (mg/l) of sand for potable water ~~of 15 mg/l for irrigation purposes~~ at the design capacity of the well ~~provided that geological conditions permit~~.

4725.4750 LEAD PROHIBITION IN WATER SUPPLY WELL.

Materials used in construction of a water supply well that contact water must not exceed eight percent lead except that solders and flux must not contain more than 0.2 percent lead.

4725.4850 PITLESS ADAPTER OR PITLESS UNIT.

A connection to a casing made less than 12 inches above the established ground surface must be made with a pitless adapter or pitless unit. The connection must not be submerged in water at the time of installation. Native materials must be packed tightly around the pitless adapter or pitless unit to the ground surface. The pitless adapter or pitless unit must:

A. be constructed to provide complete clearance within the internal diameter of the casing;

B. be designed to be field-welded by holding the welding rod in a vertical or horizontal position, or bench-welded before field installation with a material as corrosion-resistant as the parent material;

C. have all threaded joints watertight with no threads exposed;

D. impart no taste, odor, or toxic material to the water; and

E. connect to the casing by a threaded connection, welded connection, bolted flange with gasket, clamp and gasket, or compression gasket.

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Additionally, a pitless unit using a compression seal must provide for the well casing to extend at least 2.5 inches into the throat of the pitless unit. The compression collar must be held in place with corrosion-resistant bolts, nuts, and washers. The installer of a clamp-on or weld-on pitless adapter must use a guide or template for cutting the hole in the casing to accommodate the pitless adapter.

4725.4950 CAPPING WATER SUPPLY WELLS.

A water supply well must be covered with a weatherproof and insect proof:

A. overlapping well cap with compression gasket;

B. threaded or welded well cap;

C. base of a pump as specified in part 4725.3150; or

D. sanitary well seal with a one-piece top plate, compression gasket, and noncorrodible draw bolts. The cap or seal must be equivalent to the casing in weight and strength. If the well is in a building that meets the requirements in part 4725.2175, a two-piece top plate, compression gasket, and noncorrodible draw bolts may be used.

4725.5050 PRIMING WATER SUPPLY WELL PUMPS.

A pump that requires priming for ordinary use must not be installed on a water supply well unless the well is only used for a water irrigation system. An irrigation well pump must be primed only with water free of contamination and carrying a measurable chlorine residual. An irrigation well equipped with a centrifugal pump may be primed without chlorination when the pump is filled with water taken directly from the well.

4725.5150 WATER SUPPLY WELL SUCTION LINE.

Subpart 1. **Construction.** As specified in part 4715.0510, a suction line for a water supply well must be constructed of:

A. copper;

B. galvanized iron or steel;

C. cast iron; or

D. plastic pipe.

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For well water irrigation systems, aluminum pipe may also be used.

Subp. 2. **Extensions.** A suction line extending outside the well casing must be protected by being:

A. fully exposed in a building as specified in part 4725.2175;

B. fully exposed above the established ground surface; or

C. installed within an outer, concentric pipe with the annular space between the pipes filled with water from the system and maintained at system pressure.

Subp. 3. **Exception.** An unprotected suction line may be installed below the established ground surface for an irrigation well if the well is:

A. located in an agricultural field;

B. installed in an unconfined aquifer in unconsolidated material; and

C. used for a manifold collection system under negative pressure.

4725.5250 PUMP DISCHARGE LINES.

A buried discharge line between a water supply well casing and the pressure tank in an installation, including a deep well turbine or a submersible pump, must not be under negative pressure at any time. If a check valve is installed in a buried water line between the well casing and the pressure tank, the water line between the well casing and the check valve must meet the requirements of part 4725.5150 unless equipped with a vacuum release device. Pump discharge lines must be constructed of materials approved in part 4715.0510.

4725.5350 PRESSURE TANKS.

Subpart 1. **Venting.** A pressure relief or air release valve on a pressure tank that contains subterranean gas and is located in a building must be vented to the outside.

Subp. 2. **Buried tanks.** A buried or partially buried pressure tank installed on a water supply well must:

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A. be identified with the manufacturer's name, a serial number, the allowable working pressure, and the year fabricated;

B. have an interior coating that complies with NSF Standard 61;

C. have a minimum one-fourth inch wall thickness for a steel pitless adapter tank attached directly to the well casing;

D. have all connections to the pressure tank welded or threaded; and

E. be installed above the water table.

4725.5450 VENTING WATER SUPPLY WELLS.

Subpart 1. **Venting exceptions.** A water supply well must be vented unless the well:

A. is a flowing well;

B. casing is used as a suction pipe;

C. has a packer jet assembly;

D. is used as a remedial well; or

E. is constructed with a watertight seal in lieu of a casing extension as specified in part 4725.4350, subpart 2.

Subp. 2. **Vent construction.** A well vent must:

A. be constructed of materials complying with parts 4725.2250 to 4725.2650;

B. have watertight joints and terminate at least ~~two~~ five feet above the regional flood level unless provided with a watertight seal as specified in part 4725.4350, subpart 2;

C. be a minimum of 12 inches above the established ground surface or the floor of a building as specified in part 4725.2175; and

D. be screened and pointed downward.

Subp. 3. **Screened vents.** A screened vent incorporated into the underside of a well cap may be used.

Subp. 4. **Gas.** Any toxic or flammable gas must be vented from the well to the outside atmosphere.

4725.5550 WATER SUPPLY WELL DISINFECTION.

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A water supply well must be disinfected according to this part. A disinfection procedure is presumed adequate when one or more water samples collected as specified in part 4725.5650 indicate the absence of total coliform bacteria.

A. A person installing a new well or pump must ensure that the well is pumped until three volumes of the water contained in the well are pumped or until the water is as clear as groundwater conditions allow, whichever is greater. After pumping, the person installing a new well or pumping equipment must disinfect the well and pumping equipment with chlorine at a concentration sufficient to produce 50 parts per million of chlorine in all parts of the well. The chlorine solution must contact the well surfaces above the static water level. The chlorine solution must remain in the well at least two hours before pumping all the chlorinated water from the well and flushing the solution from the distribution system.

B. A person repairing a well or pump must disinfect the well as specified in item A or disinfect at the start of the repair or reconditioning by applying chlorine at a concentration sufficient to produce 200 parts per million free chlorine in all parts of the well for the period of the well repair or reconditioning operation. Before taking water samples or returning the well to use, all chlorinated water must be pumped from the well.

C. Chlorine compounds with additives must not be used for disinfection.

4725.5650 WATER QUALITY SAMPLES FROM NEWLY CONSTRUCTED POTABLE WATER SUPPLY WELL.

Before the use of a newly constructed water supply well for drinking, the person constructing the well must assure that a water sample is collected from the well.

A. The person constructing the well must inform the well owner that until analysis of one or more water samples from the well indicates the absence of total coliform bacteria, the well must not be used for drinking.

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B. The person constructing the well must assure that the water sample is properly collected and submitted to a laboratory certified under parts 4740.2010 to 4740.2040. The laboratory must be certified to analyze total coliform bacteria and nitrate under part 4740.2040, subparts 2, item B, and 3, item B.

C. The sample must be analyzed for total coliform bacteria and nitrate. The person constructing the well must assure that the property owner and the commissioner receive a copy of the analysis results. The copy of analysis results sent to the commissioner must include the unique well number, the property owner's name and address, and the dates of sample collection and analysis.

D. If a water sample collected according to this part indicates the presence of total coliform bacteria, the person constructing the well is responsible for actions needed to eliminate possible causes of total coliform bacteria, redisinfect the well, and resample for total coliform bacteria.

4725.5675 CASING EXTENSION ON REPAIRED WELLS.

A water supply well with the upper terminus of the casing buried below the established ground surface must have the casing or casing extension extended 12 inches above the established ground surface when the well is repaired.

4725.5750 DUG OR BORED WATER SUPPLY WELL.

Subpart 1. **Construction.** A dug or bored water supply well may only be constructed in an unconsolidated formation and must be:

A. cased with concrete curbing at least 2.5 inches in thickness. The curbing must be reinforced with a maximum six-inch by six-inch steel wire mesh reinforcement. The annular space between the curbing and the bore hole must be grouted by pumping neat cement grout or concrete grout through a tremie pipe from the water table to the established ground surface or to a depth of 15 feet, whichever is greater; or

B. constructed with poured concrete at least four

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inches in thickness, poured in one operation. If an outside form is used, the annular space between the form and the bore hole must be grouted from the water table to the established ground surface or to a minimum depth of 15 feet, whichever is greater, by pumping neat cement grout or concrete grout through a tremie pipe from the water table to the established ground surface or to a minimum depth of 15 feet, whichever is greater.

Subp. 2. **Cover.** A dug or bored water supply well must be protected with a precast, overlapping, steel-reinforced, concrete cover at least four inches in thickness, or a locked, overlapping, metal cover at least 3/16 inch in thickness. The junction of cover with the well casing must be made with a watertight gasket and must be provided with a well vent according to part 4725.5450.

Subp. 3. **Watertight openings.** A pump opening and a connection below the established ground surface for a dug or bored water supply well must be made watertight with concrete or cement.

Subp. 4. **Location.** Unless a dug or bored water supply well is grouted from the surface to a depth of 50 feet or through a confining layer, the well must be located according to part 4725.4450, subpart 2, item A.

4725.5850 PUBLIC WATER SUPPLY WELLS.

Subpart 1. **Approval of plans and specifications.** A licensee must not construct a well for a public water supply system until plans and specifications have been approved according to part 4720.0010.

Subp. 2. **Site approval.** A licensee must not construct a well for a community public water system as defined in Code of Federal Regulations, title 40, section 141.2, until the site has been approved by the commissioner.

A. A well for a community public water system must be located according to the distances specified in part 4725.4450, but in no case less than 50 feet from a source of contamination except that the well must be at least:

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(1) 30 feet from a gravel pocket receiving clear water discharge from a floor drain within a building as specified in part 4725.2175; and

(2) ten feet from a fire or flushing hydrant.

B. The established ground surface at the well site must be at least two feet above the highest known water elevation of a lake, pond, river, stream, or other body of surface water, the waters of which at the highest level would approach to within 50 feet measured horizontally of the well.

C. The established ground surface must be sloped to drain away from the well and be graded to prevent the accumulation and retention of surface water within 50 feet of the well. Filling must be protected from erosion by riprap or other suitable means.

D. Casing vents must be a minimum of 18 inches above the established ground surface or floor of a building as specified in part 4725.2175.

E. The owner of a community public water system well must own or legally control, through a permanent easement, the property within a 50-foot radius of the well.

Subp. 3. **Radial water collectors.** Projection of radial water collectors must be in areas and at depths approved by the commissioner.

A. The exact location of caisson construction joints and porthole assemblies must be indicated on the submitted plans.

B. The caisson wall must be reinforced.

C. Procedures must be used that assure minimum vertical rise of the collectors.

D. The top of the caisson must be covered with a watertight floor.

E. The pump opening must be curbed.

F. Pump discharge piping must not be placed through the caisson walls.

G. There must be no construction joint within 15 feet of the established ground surface.

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4725.6050 REMEDIAL WELLS.

Subpart 1. **Additional requirements.** In addition to the general construction standards and standards for water supply wells, in parts 4725.2010 to 4725.5750, a remedial well must:

A. have spark arresters installed if petroleum products or other flammable or explosive materials are present;

B. be equipped with a casing vent or collect and treat gases, if toxic or flammable gases are present;

C. have connections protected with an air gap or back flow prevention device as specified in part 4715.2110, if the well discharges to a sewer or surface water;

D. be constructed according to part 4725.6850 for at-grade construction; and

E. not be constructed below grade.

Subp. 2. **Exemptions.** A remedial well is exempt from the distance from contamination source requirements in parts 4725.4350, subpart 1, and 4725.4450; and the minimum protective depth requirements in part 4725.4550.

DEWATERING WELLS

4725.6150 DEWATERING WELL.

Subpart 1. **Scope.** This part applies to a dewatering well as defined in Minnesota Statutes, section 103I.005, subject to the exemption in Minnesota Statutes, section 103I.115. A dewatering well must be constructed in accordance with the general construction standards in parts 4725.1851 to 4725.3950. A dewatering well must not be used for a purpose other than dewatering. A dewatering well is exempt from the provisions in parts 4725.4050 to 4725.5650.

Subp. 2. **General construction requirements.** A discharge from a dewatering system must not connect to a potable water system.

Subp. 3. **At-grade dewatering wells.** A dewatering well cased and completed at-grade must conform to part 4725.6850.

Subp. 4. **Loss of potable supply.** A licensee who installs a dewatering well that causes the loss of an adequate private

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potable water supply must provide the private well owner with a temporary supply of potable water during the operation of the dewatering well. The supply must be adequate for drinking, cooking, and other household uses. The commissioner may require the private well to be tested to determine if a health risk exists before the licensee discontinues an alternate water supply. The licensee must assure that the required testing is completed and reported to the commissioner.

Subp. 5. **Sealing.** A dewatering well that is not in use must be sealed according to this chapter.

Subp. 6. **Exceptions.** A dewatering well in an unconsolidated formation installed for less than 18 months and less than 50 feet in depth must meet the requirements in items A to F.

A. Casing must be water tight, free of oil or other contaminants, and withstand the forces exerted on it during installation and removal.

B. The upper termination of the casing must be covered with a tamper-resistant overlapping cover on the casing as specified in part 4725.3150 and extend at least 12 inches above the working grade. The working grade is the temporary elevation of the ground surface during a construction project.

C. The gravel pack must not extend above the static water level.

D. An open annulus around the well must be filled with cuttings from the bore hole, bentonite grout, high solids bentonite grout, concrete grout, or neat cement grout to a depth of 30 feet or to the top of the static water level, whichever is greater.

E. At 18 months after construction or sooner, the well must be sealed according to this chapter. A dewatering well installed for 18 months or less not encountering a confining layer may be sealed according to part 4725.7450, subpart 4.

F. The commissioner may require additional construction standards in special well construction areas as

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described in part 4725.3650.

MONITORING WELLS

4725.6450 APPLICABILITY AND USE.

In addition to the general construction and use requirements in parts 4725.2010 to 4725.3950, a monitoring well that is not in use must be sealed.

4725.6650 CONSTRUCTION OF MONITORING WELLS.

Subpart 1. **PVC materials.** A monitoring well must be constructed according to parts 4725.2010 to 4725.3950, except that a monitoring well may be constructed with flush threaded polyvinyl chloride (PVC) casing and screens if:

A. the screen intersects the surface of the water table at the time of installation and the well is constructed so the joint between the two deepest casing sections is above the surface of the water;

B. the total depth of the monitoring well is 50 feet or less;

C. the monitoring well is completed in unconsolidated materials; and

D. the flush threaded PVC casing used meets the standards in Schedule 40 as referenced in ASTM Standard 1785-88.

Subp. 2. **Grouting of annular space.** The annular space of a monitoring well must be grouted from ten feet or less above the screen or open bore hole to the established ground surface according to part 4725.3050, except that no cuttings from the bore hole must be added to the grout. ~~The~~ Neat cement or concrete grout may terminate six inches below the manhole or vault for an at-grade installation. One layer of bentonite pellets is allowed when the total depth of the annular space to be grouted is less than 80 feet, the depth of water in the annular space is less than 50 feet, and limestone or dolomite rock formations have not been encountered. When bentonite pellets are used, the layer of bentonite pellets must:

A. not exceed five feet in thickness;

B. not extend more than ten feet above the top of the

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screen; and

C. be poured without voids or bridging.

Subp. 3. **Exception to drilling fluids.** Drilling fluids used to construct a monitoring well must comply with part 4725.2950, except that a free chlorine residual is not required.

4725.6750 PROTECTION OF MONITORING WELLS.

Subpart 1. **Capping.** The casing of a monitoring well or a protective outer casing as specified in subpart 2, item B, must be closed with a watertight, locked cap or a wrench-tightened, threaded metal cap.

A. The metal cap must be equivalent to the casing in strength and weight.

B. The top of the well must be at least five feet above the regional flood level. If the regional flood level is more than five feet above the established ground surface, a watertight seal may be installed in lieu of extending the casing beyond ten feet above the established ground surface.

C. A monitoring well cased with plastic must be protected as specified in subpart 2, item B.

D. The inner casing must be capped.

Subp. 2. **Protection.** A monitoring well must be protected by:

A. surrounding the casing with a concrete pyramid or cone that has horizontal dimensions of at least 24 inches by 24 inches at the established ground surface, that rises 12 inches above the established ground surface at the casing, and has a base with a mass of at least three cubic feet below the established ground surface;

B. using ASTM Schedule 40 steel outer casing at least 3.25 inches in diameter greater than the inner casing, extends at least two feet above and four feet below the established ground surface, and has neat cement grout or concrete grout in the annular space between the casings from the bottom of the outer casing to the established ground surface; or

C. placing three posts at least four inches square or

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four inches in diameter around the well at equal distances from each other and two feet from the casing. The posts must extend two feet above and four feet below the established ground surface or to a depth of two feet if each post is set in concrete to a depth of two feet. The posts must be made of reinforced concrete, decay-resistant wood, or ASTM Schedule 40 steel pipe capped with an overlapping, threaded, welded steel or iron cap, or be filled with cement.

4725.6775 REPAIR; SEALING OF MONITORING WELL.

A monitoring well owner must repair or seal a damaged monitoring well within seven days after the property owner becomes aware of the damage.

4725.6850 AT-GRADE MONITORING WELL.

Subpart 1. **At-grade termination.** A monitoring well must terminate at least 12 inches above the established ground surface unless the commissioner determines that no location exists for such a well to provide monitoring information equivalent to an at-grade well.

Subp. 2. **Termination location; map.** A monitoring well casing may terminate at grade only on a roadway, sidewalk, driveway, or a parking area. The location of the well identified by unique well number must be marked on a scaled map with angles and directions from surveyed property corners, a permanent benchmark, or the corners of a permanent structure. The map must be submitted to the commissioner with the well record.

Subp. 3. **Construction.** An at-grade monitoring well must be constructed as specified in this subpart.

A. At-grade well casing must terminate no lower than the established ground surface.

B. The well must be contained in a protective manhole cover or vault. The top of the manhole cover or vault must be no less than two inches above the established ground surface.

C. The established ground surface must be sloped to divert surface water or spills away from the well and to allow

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for traffic movement and snow plowing.

D. The manhole cover or vault must be installed in a concrete pad at least four inches in thickness and four feet square or four feet in diameter and of sufficient load-bearing capacity to support vehicular traffic.

E. The manhole cover or vault must be labeled with the words "Monitoring Well" cast or stamped in letters at least one centimeter or one-half inch in height.

F. All materials used to construct the manhole cover or vault must be resistant and impervious to water, petroleum products, and chemicals likely to be present.

G. The manhole cover or vault must have a watertight, impervious compression O-ring or gasket.

H. The manhole cover or vault must meet AASHTO Standards H20-44 and M306-89.

I. The well casing must be secured with a locking cap or cover. The manhole cover or vault must be secured with a lock or tamper-resistant bolts.

J. The well label must be placed on the well casing, manhole cover, or vault, or the unique well number may be stamped on the vault.

4725.7050 VERTICAL HEAT EXCHANGERS.

Subpart 1. **Construction.** The provisions in items A to G apply to vertical heat exchanger construction.

A. Piping used must be 160 psi pressure-rated high density polyethylene or polybutylene.

B. Connections to piping must use socket fusion or butt fusion joining methods.

C. Piping must be pressure tested with air or potable water for 15 minutes at a pressure of 1.5 times the system operating pressure after installation in the bore hole.

D. The annular space between the vertical heat exchanger piping and the bore hole must be grouted with neat cement grout in rock or neat cement grout or bentonite grout in unconsolidated materials according to the procedures in part

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4725.3050, subpart 2.

E. Only food-grade or USP-grade propylene glycol or calcium chloride 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.

F. A flow meter must be installed.

G. Water make-up lines to the vertical heat exchanger must be protected with a backflow prevention device approved in part 4715.2110.

Subp. 2. **Notice of loss or leak.** The owner of the vertical heat exchanger must notify the commissioner of heat loop leakage or loss of pressure within 24 hours after the owner becomes aware of the loss or leak.

4725.7250 ELEVATOR SHAFT HYDRAULIC CYLINDERS.

Subpart 1. **General.** A bore hole drilled to install an elevator shaft hydraulic cylinder must be cased, sealed, and maintained according to this chapter to prevent the vertical movement of water.

Subp. 2. **Casing.** The bore hole must be cased to the bottom of the excavation.

Subp. 3. **Exception.** The bore hole is exempt from the requirements in ~~part~~ parts 4725.2150; 4725.2175; 4725.2185; 4725.2250, subpart 8, concerning extension of the casing 12 inches above the established ground surface; and 4725.2250, subpart 11.

Subp. 4. **Hydraulic fluid leakage protection.** Hydraulic fluid must be protected from leakage by:

A. attaching a watertight cap or plate to the bottom of the casing and ~~setting~~ surrounding the casing ~~half-way into at least six inches of~~ with neat cement or concrete grout. The grout must extend at least three inches above and three inches below the bottom of the casing;

B. ~~filling~~ grouting the inside of the casing with at least two feet of concrete grout or neat cement grout; or

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C. encasing the cylinder in a schedule 30 plastic outer pipe or sleeve with the bottom of the pipe or sleeve capped and the top extending above the pit floor.

4725.7450 ENVIRONMENTAL BORE HOLE.

Subpart 1. **Construction.** An environmental bore hole that is cased must be constructed to conform to the monitoring well requirements in parts 4725.6650, 4725.6750, and 4725.6775.

Subp. 2. **At-grade bore holes.** An environmental bore hole cased and completed at-grade must conform to part 4725.6850.

Subp. 3. **Sealing.** An environmental bore hole that is not in use or that serves as a potential or actual source of contamination must be sealed according to this chapter.

Subp. 4. **Exception to sealing requirements.** An environmental bore hole less than 50 feet in an unconsolidated formation and not encountering a confining layer may be sealed by removing the casing and screen and allowing the bore hole to collapse.

A. The bore hole must not encounter pollution or contamination or have been installed to detect pollution or contaminants.

B. The collapse must not be induced other than by removal of the screen or casing.

C. The bore hole above the collapse must be sealed as specified in part 4725.3850 with bentonite grout, high solids bentonite grout, neat cement grout, or concrete grout.

RENUMBERER. Minnesota Rules, part 4725.0100, subparts 9 and 10, are renumbered as subparts 24c and 30f respectively.

REPEALER. Minnesota Rules, parts 4725.0100, subparts 4, 5, 8, 9, 10, 11, 12, 13, 14, 17, 20, 24, 26, 29, 30b, 31b, 38, 39, 49a, 50, 52, 53, and 54; 4725.0300; 4725.0450; 4725.0500; 4725.0700; 4725.1000; 4725.1050; 4725.1325; 4725.1350; 4725.1400; 4725.1500, subparts 2 and 3; 4725.1600, subparts 2 and 3; 4725.1860; 4725.1900; 4725.2000; 4725.2100; 4725.2200; 4725.2300; 4725.2400; 4725.2500; 4725.2600; 4725.2700;

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4725.2800; 4725.2900; 4725.3100; 4725.3200; 4725.3300;
4725.3400; 4725.3500; 4725.3600; 4725.3700; 4725.3800;
4725.3900; 4725.4000; 4725.4100; 4725.4200; 4725.4300;
4725.4400; 4725.4500; 4725.4600; 4725.4700; 4725.4800;
4725.4900; 4725.5000; 4725.5100; 4725.5200; 4725.5300;
4725.5400; 4725.5500; 4725.5600; 4725.5700; 4725.5800;
4725.5900; 4725.6000; 4725.6100; 4725.6200; 4725.6300;
4725.6400; 4725.6500; 4725.6600; 4725.6700; 4725.6750;
4725.6800; 4725.6900; 4725.7000; 4725.7100; 4725.7200;
4725.7400; 4725.7500; 4725.7600; and 4725.7605, are repealed.

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