Agency
Department of Consumer Protection

Subject
Description of Organization, Rules of Practice, and Regulations for the Well Drilling Industry

Inclusive Sections
§§ 25-128-1—25-128-64

CONTENTS

Description of Organization, Rules of Practice, and Regulations for the Well Drilling Industry

Sec. 25-128-1—25-128-32. Repealed

Repealed May 21, 1993.

Sec. 25-128-33. Title of regulations

The provisions of chapter 482 of the Connecticut General Statutes and sections 25-128-33 to 25-128-64, inclusive, of the Regulations of Connecticut State Agencies relating to wells, shall be collectively known as the Connecticut Well Drilling Code.

(Effective September 27, 1978; Amended July 8, 2022)

Sec. 25-128-34. Purpose of regulations

The purpose of the regulations shall be to govern the construction, repair, development, and abandonment of wells and geothermal systems in order to safeguard the public health, to provide an adequate supply of clean and uncontaminated water for all persons in the state of Connecticut, and to provide for the safe and efficient use of the heating and cooling properties of the Earth.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-35. Scope of regulations

(a) **Well drilling contractors and registered drillers.** The regulations shall apply to any person who engages in the industry, procedures, or operation, full time or part-time, for compensation or otherwise, of obtaining water from a well or wells by drilling or other methods, or of drilling geothermal bore holes. A well drilling contractor is any person regularly offering to the general public such person's own services, or the services of any such person's employees, in the industry of obtaining water from a well for any purpose or use, or in the industry of drilling geothermal bore holes.

(b) **Abandoned wells or geothermal bore holes.** The regulations shall apply to any person who abandons and permanently discontinues the use of a well or geothermal bore hole, or to any person who is responsible by law for the abandonment of a well or geothermal bore hole except as provided by section 25-134 of the Connecticut General Statutes.

(c) **Special exception for farmers.** The regulations shall not require a person who personally constructs a well on property owned or leased by such person, intended for use only for farming purposes on such person's farm, to obtain a certificate of registration or a permit, as provided by section 25-132 of the Connecticut General Statutes. A completion report shall be filed pursuant to section 25-128-62 of the Regulations of Connecticut State Agencies. A well that is constructed pursuant to this special exception shall not be converted to a public well unless such well was constructed by a registered well driller contractor, has a well drilling permit issued by the local director of health and a completion report, and

such conversion is approved by the Department of Public Health.

(d) **Well development.** The regulations shall apply to any person who performs work on a well for the purpose of increasing the yield of a well or otherwise improving the quality or quantity of water that might be obtained from a well.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-36. Definitions

(a) Unless expressly stated otherwise, the following terms shall, for the purpose of the Connecticut Well Drilling Code and any permit or completion report filed pursuant to said code, have the meanings indicated in this section.

(b) Words used in the present tense include the future; words used in the masculine gender include the feminine and neuter; the singular number includes the plural and the singular.

(c) Where the terms are not defined in this section or in section 25-126 of the Connecticut General Statutes, they shall have their ordinarily accepted meanings or such as the context may imply.

(1) Access port: A suitable opening into a well to allow measurement of the water level.

(2) Annular space: The space between two objects, one of which is surrounded by the other. This includes the space between the wall of an excavation and the wall of a pit; between the wall of an excavation and the casing or piping of a well or geothermal bore hole; or between two casings.

(3) Aquifer: A water bearing strata that can transmit water in significant quantity. It can be either consolidated rock, such as bedrock, or unconsolidated material, such as sand, gravel, or soil with boulders.

(4) Artesian well: A well in which static water level rises above the top of the aquifer. The aquifer is confined by an impermeable geologic formation overlying the aquifer.

(5) Board: The State Plumbing and Piping Work Examining Board.

(6) Casing: A pipe placed in a well or geothermal bore hole to prevent the walls from caving, or to seal off surface drainage and other contaminants, so that they cannot enter the well or bore hole.

(7) Closed-loop geothermal fluid: The heat transfer fluid circulating within the piping and associated components of a closed-loop geothermal system. Such fluid serves to transfer energy between the Earth or water surrounding the piping and the heat exchange components of the geothermal system. Fluids that have been approved for use by the department are set forth in section 25-128-39b of the Regulations of Connecticut State Agencies.

(8) Closed-loop geothermal surface water body: A surface water body, such as a pond, stream or lake, that is utilized as a heat source or heat sink for a closed-loop geothermal system. No public drinking water reservoir, lake, pond or stream tributary to a public drinking water reservoir, or water body that has direct influence to a public well, shall be utilized as a heat source or heat sink for a closed-loop geothermal system.

(9) Closed-loop geothermal surface water system: A closed-loop geothermal system that utilizes a closed-loop geothermal surface water body as a heat source or heat sink.

(10) Closed-loop geothermal system: A heat exchange system consisting of piping buried or placed in a geothermal bore hole, trench, or closed-loop geothermal surface water body. These self-contained systems are intended to transfer energy between the Earth or water surrounding the piping and the geothermal fluid circulating within the piping.

(11) Contamination: The act of introducing into water, foreign materials of such nature, quality, and quantity as to cause degradation of the quality of the groundwater, such as in a bore hole or aquifer, or a surface water body.

(12) Department: The Department of Consumer Protection.

(13) Direct exchange geothermal system: A heat exchange system that employs a refrigerant geothermal fluid that changes its physical state between liquid, vapor and gas as the fluid circulates through closed-loop geothermal piping (also known as direct expansion).

(14) Disinfection: The inactivation of harmful organisms present in water, through use of an accepted chlorine solution or other disinfection material or procedure accepted by the Commissioner of Consumer Protection.

(15) Drawdown: The extent of lowering of the water table or piezometric surface within or adjacent to the well, resulting from the discharge of water from the well. Drawdown is measured between the static water level and the pumping water level. The quantity of water available in the well from the static water level to the pump intake is known as the drawdown available storage.

(16) Dug well: Has the same meaning as provided in section 19-13-B51b of the Regulations of Connecticut State Agencies.

(17) Established grade: The permanent elevation of the surface of the ground at the site of the well after completion of grading, excavation, or other land movements.

(18) Geothermal bore hole: A bore hole that is used solely for the purpose of heat transfer and is fitted with closed-loop or open-loop heat exchange piping in accordance with section 25-128-39a of the Regulations of Connecticut State Agencies.

(19) Geothermal system: A closed-loop or open-loop heat system used for the purpose of exchanging heating or cooling by utilizing the relatively constant temperature of the Earth as a heat source or heat sink.

(20) Global Positioning System (GPS): A location-finding method whereby a user-operated receiver determines such receiver's position by communicating with satellites. The United States Department of Defense developed this system, which is officially known as the "Navigation Satellite Timing and Ranging Global Positioning System."

(21) Groundwater: Water encountered below the ground surface of the Earth within the zone of saturation that can supply wells and springs.

(22) Grout or grouting material: A low permeability material placed in the annular space between the casing and the formation or within a geothermal bore hole which is at least as impermeable as the soil formation. The purpose of the grout is to resist the migration of pollutants into the annular space.

(23) Flowing artesian well: A well in which the static water level is higher than the top of the casing and water flows from the well.

(24) Gravel well: Has the same meaning as provided in section 19-13-B51b of the Regulations of Connecticut State Agencies.

(25) Hazardous Substance: Has the same meaning as provided in 42 USC 13101, et seq., and 49 USC 101, et seq., and the regulations promulgated thereunder.

(26) High water mark: The upper limit of any land area that water may cover, either standing or flowing, at any time during the year.

(27) Hydrofracturing: A method of well development used to improve the specific capacity of a new or existing drilled well whereby certain zones within the well are pressurized in an effort to force open fractures in the bedrock.

(28) Installation of pumps and pumping equipment: The procedure employed in the placement and preparation for operation of pumps and pumping equipment, including all construction involved in making entrances to the well and to the building, establishing seals, installing pump piping, valves, wiring, electrical controls and tanks.

(29) Liner pipe: Pipe that is installed inside a completed and cased well for the purpose of sealing off undesirable water or for repairing ruptured or punctured casing or screens. The liner pipe and screens may be constructed of PVC schedule forty (40) plastic that meets or exceeds American Society for Testing and Materials standard D-1785.

(30) Non-hazardous substance: Has the same meaning as provided in 42 USC 13101, et seq., and 49 USC 101, et seq., and the regulations promulgated thereunder.

(31) Non-water-supply well: Has the same meaning as provided in section 25-126 of the Connecticut General Statutes.

(32) Open-loop geothermal well: A well within which a supply of groundwater from an aquifer is directly withdrawn and employed as the heat transfer fluid in a geothermal system. Geothermal systems employing open-loop geothermal wells include pump and discharge geothermal systems, pump and recharge geothermal systems and standing column wells depending upon the discharge or return point of the water.

(33) Owner: Any person or such person’s agent who holds the title or other rights of property where a well or geothermal system is constructed, repaired, or abandoned.

(34) Potable water: Water free from impurities in amounts sufficient to cause disease or other harmful physiological effects, with the minimum or maximum bacteriological, physical, and chemical composition as required in section 19-13-B102 of the Regulations of Connecticut State Agencies for public wells or section 19a-37 of the Connecticut General Statutes for private wells and semipublic wells .

(35) Private well: Has the same meaning as provided in section 19a-37 of the Connecticut General Statutes.

(36) Public water system: Has the same meaning as provided in section 19-13-B102 of the Regulations of Connecticut State Agencies.

(37) Public well: Has the same meaning as provided in section 19a-37 of the Connecticut General Statutes.

(38) Pump and discharge geothermal system: A type of open-loop geothermal system where groundwater from an aquifer is pumped directly from a water supply well to a building, where it transfers its heat energy to a heat pump. After leaving the building, the water is discharged to a permitted discharge point.

(39) Pump and recharge geothermal system: A type of open-loop geothermal system where groundwater from an aquifer is piped directly from a water supply well to a building, where it transfers its heat energy to a heat pump. The water is then pumped back into the same aquifer via a second discharge or diffusion well with an immediate hydraulic connection to the source water supply.

(40) Repair: Any work involved in the reaming, sealing, installing, changing of casing depth or height, perforating, screening, cleaning, acid washing, surging, hydrofracturing or other redevelopment of a well.

(41) Semipublic well: Has the same meaning as provided in section 19a-37 of the Connecticut General Statutes.

(42) Specific capacity: The yield of a well expressed in gallons per minute per foot of drawdown, as abbreviated "gpm/ft."

(43) Standing column wells: A type of open-loop geothermal system where temperate water is withdrawn from a water supply well, circulated through a heat pump exchanger and returned to the water column in the same well.

(44) Static water level: The depth to the surface of the water in a well measured from the land surface or other convenient, permanent, and specified datum, when no water is being discharged from the well and the water level has reached equilibrium.

(45) Surface water body: Water located on the surface of the Earth in bodies such as lakes, rivers, streams, ponds, and reservoirs.

(46) Water supply well: Has the same meaning as provided in section 19a-37 of the Connecticut General Statutes.

(47) Well: Any water supply well or non-water-supply well.

(48) Well abandonment: Actions taken to ensure that a well that is no longer in use shall not be a source or conduit for contamination of groundwater resources.

(49) Well contractor: A person regularly offering to the general public the personal services of such contractor or the services of such contractor's employees in the industry of obtaining water from a well for any purpose or use.

(50) Well vent: An outlet at the upper terminal of a well casing to allow equalization of air pressure in a well, but at the same time so constructed as to avoid entry of water and foreign material into the well.

(51) Yield: Has the same meaning as provided in section 19-13-B51b of the Regulations of Connecticut State Agencies.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-37. Manner of construction

(a) The construction of any well or geothermal bore hole shall be planned and carried

out in a manner to guard against waste and contamination of groundwater resources.

(b) Standing column wells shall not be configured to be used concurrently as a potable water supply and a geothermal heating or cooling source. Any dual-use wells existing on or before the effective date of this subsection may remain active and shall be properly maintained.

(Effective September 27, 1978; Amended July 8, 2022)

Sec. 25-128-38. Application of public health regulations

The regulations for the construction of water supply wells shall be construed in a manner consistent with the provisions of sections 19-13-B51a to 19-13-B51m, inclusive, of the Regulations of Connecticut State Agencies. In the event any conflict shall appear, the interpretation of sections 25-128-33 to 25-128-63, inclusive, of the Regulations of Connecticut State Agencies shall be made which affords the greater protection of the public health.

(Effective September 27, 1978; Amended July 8, 2022)

Sec. 25-128-39. Diameter, depth, and yield of water supply wells

(a) All new water supply wells shall be of adequate diameter and depth to be capable of yielding the quantity of water required by the user. For the use of an individual household, a bedrock well shall be satisfactory when it is capable of:

(1) Yielding five (5) gallons per minute and, in a six inch well, has a storage available of seventy-five (75) gallons. In wells with a diameter other than six (6) inches, an equivalent storage shall be required;

(2) Yielding three and one half (3 1/2) gallons per minute and, in a six inch well, has a storage available of one hundred fifty (150) gallons. In wells with a diameter other than six (6) inches, an equivalent storage shall be required.

(3) Yielding two (2) gallons per minute and has a storage available of two hundred twenty-five (225) gallons. In wells with a diameter other than six (6) inches, an equivalent storage shall be required;

(4) Yielding one (1) gallon per minute and has a storage available of four hundred (400) gallons. In wells with a diameter other than six (6) inches, an equivalent storage shall be required; or

(5) Yielding one half (1/2) gallon per minute and has a storage available of six hundred (600) gallons. In wells with a diameter other than six (6) inches, an equivalent storage shall be required.

(b) Storage available shall be the volume of water from the level of the pump intake to the static water level of the well plus any usable water in a storage tank. Storage tanks may be provided using any combination of hydropnuematic tanks and non-pressurized tanks with booster pumps.

(c) Water supply wells yielding less than one half (1/2) gallon per minute shall be pump tested for at least eighteen (18) hours to prove the water supply well yield. It is not

recommended that a water supply well with less than one half (1/2) gallon per minute of yield be used as the only supply for an individual household.

(d) In the event that the Board determines that a special or unusual geological, hydrological, or other circumstance exists in the construction of any well, the Board may determine the minimum requirements of diameter, depth, and yield for the water supply well and shall render a final decision. The decision of the board shall be the final decision in accordance with section 4-180 of the Connecticut General Statutes for purposes of reconsideration in accordance with section 4-181a of the Connecticut General Statutes or appeal to the Superior Court in accordance with section 4-183 of the Connecticut General Statutes.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-39a. Geothermal bore holes

(a) The inside diameter of closed-loop geothermal bore holes shall be in accordance with the geothermal system manufacturer's specifications to allow for the proper installation of piping and grout. Where a single heat exchange pipe with no u-bend is in contact with the grout, as in a concentric system where an internal supply pipe is suspended and completely surrounded by an external heat exchange pipe, the size of the bore hole shall be in accordance with the manufacturer's specifications in order to provide for proper grouting via the tremie method.

(b) Open-loop geothermal bore holes shall be constructed in a manner that complies with all water supply well requirements, including the separating distances to sources of pollution set forth in section 19-13-B51d of the Regulations of Connecticut State Agencies.

(Effective July 8, 2022)

Sec. 25-128-39b. Closed-loop geothermal system fluid

(a) All chemicals used or added to fluids circulating through a closed-loop geothermal system for heat exchange, and the amount of chemicals used or added, shall be those specified by the manufacturer and shall be subject to industry approved standards for geothermal system efficiency.

(b) A well contractor shall only use the following closed-loop geothermal system fluids in closed-loop geothermal systems:

(1) The refrigerants commonly referred to as R-134A, R-407C, and R-410A;

(2) Drinking water, as defined in section 19-13-B102 of the Regulations of Connecticut State Agencies;

(3) Heat transfer fluids containing potable water combined with a maximum of twenty-five (25) per cent propylene glycol that has been approved by the federal Food and Drug Administration; and

(4) Other geothermal system fluids or additives approved by the department and the Department of Public Health.

(Effective July 8, 2022)

Sec. 25-128-39c. Closed-loop geothermal system piping

(a) The only acceptable materials for the underground portion of a closed-loop geothermal system are as follows:

(1) Copper, that has a cathodic protection system;

(2) High density, polyethylene extrusion compound having a cell classification of PE 345434c or PE 355434c with an ultraviolet stabilizer of C, D or E as specified in American Society for Testing and Materials ("ASTM") standard D-3350 with the following exception: This material shall exhibit zero (0) failures when tested for one hundred ninety-two (192) hours or more under ASTM standard D-1693, condition C, as required in ASTM standard D-3350. This material shall maintain a one hundred sixty (160) pounds per square inch ("psi") hydrostatic design basis at 73.4 degrees Fahrenheit per ASTM standard D-2837, and shall be listed in PPI TR4 as a PE 3408 piping formulation; and

(3) Those materials approved by the department in consultation with the Department of Public Health and the Department of Energy and Environmental Protection.

(b) The only acceptable methods for joining sections of buried geothermal piping are as follows:

(1) For copper piping assemblies, by the use of brazed joints;

(2) For polyethylene piping assemblies, by use of the heat fusion process in accordance with the pipe manufacturer's specifications, or by use of mechanical stab fittings approved by the International Ground Source Heat Pump Association ("IGSHPA"); and

(3) For piping made of materials approved pursuant to subsection (a)(3) of this section, by the use of those methods approved by the department in consultation with the Department of Public Health and the Department of Energy and Environmental Protection.

(c) All geothermal systems shall be pressure tested with water, air, or an inert gas to a minimum of one hundred fifty (150) per cent above the heat pump manufacturer's operating specifications for a minimum period of thirty (30) minutes before being put into service. Any system found to leak shall be repaired or replaced and then retested before being put into service.

(Effective July 8, 2022)

Sec. 25-128-39d. Fluids used in open-loop geothermal systems

Open-loop geothermal wells shall use only the natural groundwater, and no additives or other fluids are permitted.

(Effective July 8, 2022)

Sec. 25-128-40. Pumps and pumping equipment

(a) Pumps and pumping equipment shall be installed in the well to make the most efficient use of well storage.

(b) Pumps and pumping equipment shall be located to permit convenient access for inspection, maintenance and repair.

(c) In the event the base plate of a pump is placed directly over the well, the base plate

shall be of a type designed to form a watertight seal with the well casing or pump foundation, as provided by section 19-13-B51j of the Regulations of Connecticut State Agencies.

(d) The well shall be properly vented at the well head to allow for pressure changes within the well.

(e) The electrical wiring used in connection with the pump shall conform to specifications of the Connecticut State Building Code.

(f) Contaminated water shall not be used for the purpose of priming any pump.

(g) No connections shall be made between a geothermal system and a water supply well or the water distribution system connected to the water supply well.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-41. Location and protection of water supply wells

The location of any water supply well upon premises shall be subject to approval by the local health officer of the municipality in which such premises are located, and shall be as provided by section 19a-39 of the Connecticut General Statutes, and by section 19-13-B51d of the Regulations of Connecticut State Agencies.

(Effective September 27, 1978; Amended July 8, 2022)

Sec. 25-128-41a. Location of closed-loop geothermal systems

(a) The following are the separating distance specifications for all closed-loop geothermal systems. Distances cited are minimum separating distances based on horizontal measurements. Non-vertical closed-loop geothermal bore holes shall maintain the minimum separation distances when measured from any point along the borehole.

(1) Separating distances to subsurface sewage disposal systems shall be as prescribed in Section II of the Technical Standards for Subsurface Sewage Disposal Systems published by the Commissioner of Public Health pursuant to section 19-13-B103d(b) of the Regulations of Connecticut State Agencies.

(2) 25 feet from a below ground tank containing a non-hazardous substance. 50 feet from a below ground tank containing a hazardous substance.

(3) 10 feet from surface water or groundwater drainage structures or piping, water supply piping, public sewer laterals or mains, and fuel or utility piping. Stone below a foundation floor is not considered part of the groundwater drainage system relative to this separation distance.

(4) 10 feet from the high water mark of any body of water, except when the subject body of water is employed in a closed-loop geothermal surface water system.

(5) 50 feet from a private well or a semipublic well. The distance may be reduced to be no closer than 25 feet from a non-borehole system. When a closed-loop geothermal system is located on the same property as a private well or semipublic well, the distance may be reduced to be no closer than 25 feet to such private well or semipublic well.

(6) 75 feet from a public well with a withdrawal rate of less than 10 gallons per minute. Such distance shall not be reduced.

(7) 150 feet from a public well with a withdrawal rate of 10 to 50 gallons per minute. Such distance shall not be reduced.

(8) 200 feet from a public well with a withdrawal rate greater than 50 gallons per minute. Such distance shall not be reduced.

(b) Sources of pollution, for the purposes of this section, shall not include curtain drains, foundation drains, gutter drains, and similar drains that may carry water.

(Effective July 8, 2022)

Sec. 25-128-42. Drilling of water supply wells

(a) Water supply wells shall be so constructed that a pump of capacity equal to the desired yield can be installed and operated for different yields.

(b) Any water used shall be disinfected or of drinking water quality.

(c) Any chemicals or other additives used in drilling shall be cleaned out from the well.

(d) Rock cuttings shall be cleaned out of the well.

(e) Water supply wells shall be tested in accordance with section 19-13-B102 of the Regulations of Connecticut State Agencies for public wells and section 19-13-B101(d) of the Regulations of Connecticut State Agencies for private and semipublic wells.

(f) Well development shall be performed only by properly registered persons.

(g) Subcontracted work shall be performed only by properly registered persons.

(h) No solder containing more than 0.2 per cent lead shall be used in making joints and fittings in any public water system or private potable water supply system or any water user's pipelines and shall conform to the specifications of the Connecticut State Building Code.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-43. Casing of drilled wells

(a) The bottom end of the primary casing shall be equipped with a hardened drive shoe of the appropriate size.

(b) The casing shall extend at least six (6) inches above the land surface. Annular space shall be grout filled from the frost level to the bottom of the casing, except that, where special or unusual conditions exist, the annular space shall be filled with grout from the frost level to a distance of at least ten (10) feet below the land surface.

(c) Upon completion of the well unit and until such time as the well is equipped with a pump, the top of the casing shall be a metal cap fixed to prevent unwarranted access.

(d) The primary casing shall be new steel and shall be free of pits, breaks, or other serious imperfections. All casing pipes and couplings used shall have minimum weights and wall thicknesses per diameter, as specified in Table 1.

(e) In the event casing pipes are assembled together, they shall be joined by means of watertight welded joints, screw coupling joints, or slip joints. In the use of welded joints, the weld shall be at least as thick as the wall thickness of the well casing.

(f) In the event the diameter of a casing is reduced at any point along its length, the

annular space between the larger and smaller casings shall be made watertight.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-44. Length of casing, drilled wells

A twenty (20) foot minimum length of casing pipe shall be required in the construction of any drilled well, subject to the following exceptions for specific, geological and hydrological conditions:

(a) All unconsolidated overburden and other loose, caving zones shall be cased.

(b) The casing pipe shall extend at least five (5) feet into the bedrock, as shown by Figure 1.

(c) In the event, however, that the overburden or the upper five (5) feet of the bedrock constitute the primary potable water producing zones, the requirement of length of subsection (b) shall not apply.

(d) In the condition of the presence of caving zones, the casing pipe or other adequate protective seal shall extend as great a distance below the caving zone as the driller deems necessary to insure well stability.

(e) In the event geological conditions require telescoping of the casing pipe and the use of linear pipe, the respective lengths and diameters necessary to accomplish effective drilling shall be used, the annular spaces shall be made watertight where appropriate to prevent the travel of contaminants.

(Effective May 21, 1993)

Sec. 25-128-45. Length of casing, gravel wells

(a) The length of the casing in a gravel well shall be such that the pumping level does not drop below the top of the screen.

(b) In conditions of aquifers alternated with silt clay and other undesirable zones, the casing shall extend at least two (2) feet into the aquifer underlying the cased zones, as shown by figure 2.

(c) In conditions of aquifer overlain by layers of clay, silt, fine sand, or any other sand that cannot be developed for ground water, the casing pipe shall extend at least five (5) feet into the aquifer. But if the aquifer thickness is less than five (5) feet, the casing shall extend into the aquifer as much as feasible to serve the general purpose of casing, as shown by Figure 3.

(d) In conditions of aquifer overlain by till, the casing pipe shall extend at least five (5) feet below the bottom of the till. But if the aquifer is less than five (5) feet thick, the casing shall extend into the aquifer as much as feasible to serve the general purpose of casing, as shown by Figure 4.

(e) In conditions of aquifer overlain by clay, the casing shall extend at least five (5) feet below the bottom of the clay. But if the aquifer is less than five (5) feet thick, the casing shall extend into the aquifer as much as feasible to serve the general purpose of casing, as shown by Figure 5.

(f) In conditions of aquifer overlain by unconsolidated material without clay beds, the length of the casing shall be such that the pumping water levels do not drop below the top of the screen.

(g) In the event the aquifer consists of very coarse gravel and no screen is used, the casing pipe shall extend into the aquifer as much as feasible to develop the required quantity of water.

(Effective May 21, 1993)

Sec. 25-128-46. Well screens

(a) Any well constructed to obtain water from an unconsolidated formation may be equipped with a screen, for the purpose of preventing the entrance of formation material into the well after the well has been developed and completed.

(b) The well screen shall: (1) be of a standard design and manufacture, for the specific purpose of well construction; (2) be made of material adequate to withstand normal physical and chemical forces, applied to it during and after installation; (3) shall have openings free of rough edges, irregularities, or other defects that may contribute to corrosion or clogging; and (4) shall be provided with such fittings as are necessary to seal the top of the screen to the casing and to close the bottom.

(c) Any well constructed in very coarse gravel shall not, however, be required to have a screen; or, if a screen is used, the bottom may be left open.

(d) Any well constructed with multiple screens shall not connect aquifers or zones which have differences in water quality, classification or which maintain different piezometric surfaces.

(Effective May 21, 1993)

Sec. 25-128-47. Gravel packed wells, gravel

(a) The gravel in a gravel packed well shall be composed of material that does not react chemically with the water in the well, and will not create or enhance encrustation or corrosion.

(b) The gravel shall be clean, rounded, uniform, water-washed, and free from clay, silt, or other deleterious substance.

(c) The size of the gravel shall be as determined by a grain size analysis of the formation material.

(d) The gravel shall be disinfected by adding sufficient chlorine to the placement fluid to produce a chlorine residual of approximately one hundred parts per million (100 ppm).

(e) The gravel shall be placed in such a manner that no bridging or layering occurs.

(f) The gravel pack shall not connect aquifers or zones which have differences in water quality classification or in static water levels.

(Effective May 21, 1993)

Sec. 25-128-48. Gravel packed wells, construction

In a gravel packed well in which the top of the gravel does not extend inside the outer casing, a bentonite plug of at least five (5) feet in thickness shall be placed in the annular space directly on top of the gravel. The remaining space shall be filled with grout except that the upper ten (10) feet below the frost level shall be filled with cement grout. Centering guides shall be attached to pipe extensions about the well screen and to blank pipes separating different screened sections. The gravel filled pipes shall be properly capped.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-48a. Annular space

(a) Unless otherwise specified in section 19-13-B51f of the Regulations of Connecticut State Agencies, any annular space between the outside of the piping or casing and the natural materials penetrated by a well or geothermal bore hole shall be filled with suitable material to make this space as impervious to the movement of fluids and competent to support the piping or casing as are the natural materials surrounding the well or geothermal bore hole. The annular space for a geothermal bore hole shall be grouted in accordance with subsection (g) of this section. The driller may fill the annular space with the natural materials excavated during the drilling of a water supply well to meet the following requirements:

(1) The annular space shall be filled as completely as possible from the bottom of the casing to the land surface without any depressions, voids, holes or channels;

(2) The driller shall employ whatever techniques are effective for the existing conditions to achieve maximum density, strength and impermeability of the fill material; and

(3) The surface of the fill material shall be sloped away from the casing.

(b) In locations where potentially contaminating or corrosive fluids are encountered, or impermeable natural materials cannot be adequately placed and compacted to where geologic conditions or the isolation distance may not be adequate, the annular space shall be grouted for the full length of the casing, or the portion thereof below the frost line or pitless adaptor, so that no fluids may move in the zone needing to be grouted.

(c) A well driller shall only use the following grouts in the process of drilling wells or geothermal bore holes, or in the abandonment of wells or geothermal bore holes:

(1) Bentonite cement grout: A mixture of cement grout or sand cement grout with a minimum of ten (10) per cent bentonite added to reduce shrinkage.

(2) Bentonite clay grout: A mixture of mined, processed bentonite clay and potable water with not less than two (2) pounds of bentonite clay for every gallon of water.

(3) Cement grout: A mixture of portland cement, sand, and potable water. The mixture is commonly composed of one (1) bag of portland cement weighing ninety-four (94) pounds, an equal volume of dry sand, and five (5) to six (6) gallons of water.

(4) Concrete grout: A mixture of portland cement, sand, gravel and water.

(5) Natural grout: A mixture of water and natural materials excavated during drilling of a well. The materials shall be placed by whatever techniques are effective for the existing conditions to achieve maximum density, strength, and impermeability of the fill material.

(6) Neat cement grout: A mixture of not more than six (6) gallons of water to one (1) bag of portland cement weighing ninety-four (94) pounds.

(7) Sand cement grout: A mixture of not more than two (2) parts sand to one (1) part portland cement, and not more than six (6) gallons of water to each ninety-four (94) pound bag of portland cement.

(8) Sand clay grout: A mixture of bentonite clay and sand in equal proportions, and water.

(d) Notwithstanding subsection (c) of this section, a well driller shall use salt water resistant grout to seal the annular spaces in a water supply well when such water supply well is located within seventy-five (75) feet of a roadway where road salt is applied or in a coastal area in which the water supply well may be subject to brackish or salt water. Any additives to the grout other than silica sand and water shall meet NSF International/American National Standards Institute standard 60.

(e) All closed-loop geothermal bore holes, upon installation of loop piping, shall be grouted with one of the following grouting materials:

(1) Grout 111, as developed by Brookhaven National Laboratories for use with copper piping typically employed in a direct exchange geothermal system, or as directed per manufacturer recommendations;

(2) High grade bentonite or thermally enhanced bentonite compounds based upon the manufacturer's recommendation; or

(3) Other grouting materials approved by the department in consultation with the Department of Public Health.

(f) Grouts shall be mixed and installed in accordance with the manufacturer's specifications. Grouts may be used whether consolidated or unconsolidated formations are encountered. All closed-loop geothermal system bore holes shall be grouted within seven (7) days of the completion of drilling. After installation of piping, the bore hole shall be covered with a protective layer of grout at least one (1) foot thick and three (3) feet in diameter, centered over the bore hole. Detectable underground tape shall be installed above all bore hole locations.

(g) All closed-loop geothermal system bore holes shall be filled using the tremie method. The entire bore hole shall be filled with grout beginning at the bottom of the bore hole. The tremie employed shall be properly sized for the type of grout used, the ground conditions encountered, and the type of loop system installed. The minimum bore hole diameter shall be that specified by the manufacturer and subject to industry approved standards. Drilling mud and cuttings shall not be mixed into the bore hole.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-49. Well head completion and equipment

The completion of the well head and the equipment used shall be as follows:

(a) The top of the casing shall be cut off reasonably smooth and level.

(b) In the event the well head is enclosed, the enclosure shall be adequately drained. In the event a well pit is used, it shall be constructed in the manner provided by sections 19-

13-B51h and 19-13-B51i of the Regulations of Connecticut State Agencies.

(c) All water piping shall be protected against freezing.

(d) The well shall be equipped with a tightly fixed vented cap or a sanitary seal with an access port for ventilation. The access port shall have a minimum, inside diameter of one quarter (1/4) inch. It shall be installed and maintained in such a manner as to prevent the entrance of water, dust, insects, or other foreign material, and to permit ready access for the purpose of water level measurement.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-49a. Geothermal bore hole termination

Geothermal bore holes shall be terminated a minimum of four (4) feet below the proposed finished grade and shall be fed to the point of termination. If piping running between bore holes and the heated structure is shallower than four (4) feet below finished grade, measures shall be taken to prevent long term damage to the tubing from freeze-thaw cycles and accidental damage. Bore holes terminating in a structure shall be terminated flush with the finished floor. Casing, if used during bore hole drilling, shall be capped from the time of installation until the installation of the geothermal system piping. As the bore hole is being grouted, the casing may be withdrawn. Figures 6 and 7 in section 25-128-64 of the Regulations of Connecticut State Agencies set forth examples of bore hole termination for geothermal bore holes.

(Effective July 8, 2022)

Sec. 25-128-50. Plumbness and alignment of wells

All gravel packed wells, and all wells equipped with pumps having vertical shafts that require plumbed and aligned walls, shall be tested for plumbness and alignment in accordance with standards of the American Water Works Association.

(Effective September 27, 1978)

Sec. 25-128-51. Tests of yield

All new and repaired water supply wells, with the exception of repairs limited to well casing extensions, shall be tested for yield and capacity, as provided by section 19-13-B51k of the Regulations of Connecticut State Agencies, and all static and pumping water levels and well discharge shall be measured and recorded, with the pumping rate held constant. The test shall be made by one of the following methods: the pump method, the bailer-recovery method, the air rotary drill method, or the air lift method. For wells serving a single family the well may be tested for yield by removing as much water as is practicable from the well and measuring the rate of recovery. Geothermal bore holes for closed-loop geothermal systems are not required to be yield tested.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-52. Disinfection of wells

All wells shall be disinfected by chlorination as provided by section 19-13-B51k (c) of the Regulations of Connecticut State Agencies when such wells are constructed, repaired or developed.

(Effective September 27, 1978; Amended July 8, 2022)

Sec. 25-128-53. Construction of non-water-supply wells and geothermal boreholes

All non-water-supply wells and all geothermal bore holes shall be constructed, repaired, and maintained in such a manner that they are not a source or cause of groundwater contamination.

(Effective September 27, 1978; Amended July 8, 2022)

Sec. 25-128-54. Maintenance and repair of wells, geothermal systems and pumping equipment

All wells and geothermal systems shall be maintained in a proper condition to conserve and protect groundwater resources, and shall not be a source or cause of contamination or pollution of the water supply of any aquifer. All materials and construction practices used in the maintenance, repair, or replacement of any well shall be the same as those required for the construction of a new well or geothermal system. All maintenance, repair, hydrofracturing, developing, and replacement work shall be done only by a person holding the appropriate registration issued by the department pursuant to section 25-129 of the Connecticut General Statutes, or by a licensed plumber or electrician acting within the scope of the person's license, as provided by section 25-129 of the Connecticut General Statutes.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-55. Promulgation of construction standards

The regulations for the construction, maintenance, and repair of wells and geothermal systems, shall be promulgated in cooperation with the Department of Public Health and the Department of Energy and Environmental Protection.

(Effective September 27, 1978; Amended July 8, 2022)

Sec. 25-128-55a. Period of responsibility

The well drilling contractor shall be responsible for a period of one (1) year from the date of completion of work performed on the well to insure that the physical construction of the well meets the requirements of this code. The contractor shall not be responsible if work has been performed on the well by others, or if activities by others in the vicinity of the well have adversely affected the well.

(Effective May 21, 1993)

Sec. 25-128-56. Abandonment of wells, responsibility

(a) Any well that is abandoned shall not be a source or cause of contamination or

pollution of groundwater resources. Abandonment procedures shall be performed or directed only by a registered well driller contractor. The registered well driller contractor who performs the work of abandonment shall be responsible for compliance with the procedure of abandonment of the well, as provided in section 25-128-57 of the Regulations of Connecticut State Agencies.

(b) A registered well driller contractor shall, within 60 days of completion of a well abandonment, file a completion report on a form and in a manner prescribed by the Commissioner of Consumer Protection in accordance with section 25-128-62 of the Regulations of Connecticut State Agencies. Copies of such report shall be concurrently submitted to the owner, the Departments of Consumer Protection, Public Health and Energy and Environmental Protection, and the local health department or district.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-57. Procedure of abandonment

In the event of abandonment of any water supply well or other type of well the proper procedure and materials shall be used as follows:

(a) The well shall be plugged to prevent the entrance of surface water, circulation of water between or among producing zones, or any other process resulting in the contamination or pollution of groundwater resources.

(b) In the event of temporary abandonment or discontinuance of the use of any well, the well shall be sealed with a watertight cap or seal, as provided in subsection (e) of this section.

(c) The well shall be chlorinated prior to abandonment using a chlorine solution with a minimum concentration of one hundred fifty parts per million (150 ppm) of chlorine.

(d) The well shall be checked from land surface to the entire depth of the well before it is sealed, to insure against the presence of any obstruction that will interfere with sealing operations.

(e) The well bore shall be filled and sealed with any of the following materials: neat cement grout, sand cement grout, bentonite clay grout, or sand clay or bentonite cement grout. Dug wells may be abandoned with clean sand and gravel.

(f) The grout material shall be placed in such a way to prevent voids in the grout or dilution of the grout.

(g) Any well constructed in a consolidated rock formation, may be filled with fine sand in the zone or zones of consolidated rock. The top of the sand fill shall be at least ten (10) feet below the bottom of the casing, and the remaining portions of the well shall be filled with neat cement grout, sand cement grout, bentonite clay grout, or sand clay or bentonite cement grout.

(h) Any test well or bore shall be abandoned in such a manner that it does not become a channel for the vertical movement of water or other substance to the potable groundwater resources.

(i) Deep waste disposal or oil wells with casings free of any breaks, and extending below

the potable groundwater zones, may be sealed with a watertight cap or welded plate.

(j) Upon completion of abandonment of the well, the top of the casing or grout material may be terminated at least four (4) feet below the ground surface.

(Effective May 21, 1993; Amended July 8, 2022)

Sec. 25-128-57a. Abandonment of geothermal systems

When abandoning a geothermal system, closed-loop geothermal fluid shall be displaced with bentonite grout or a substance approved by the Department of Consumer Protection in consultation with the Department of Public Health and the Department of Energy and Environmental Protection, or otherwise be evacuated from the geothermal system by a process approved by the Department of Consumer Protection. After displacement or evacuation of the fluid, the bore hole and excavation shall be filled and covered with grout to provide a cap at least twelve (12) inches thick over the bore hole. All fluids or gases shall be contained and properly disposed of.

(Effective July 8, 2022)

Sec. 25-128-58. Repealed

Repealed May 21, 1993.

Sec. 25-128-58a. [Contractor-limited to well water-supply drilling W-1] (Repealed)

Repealed July 8, 2022.

(Effective May 21, 1993; Repealed July 8, 2022)

Sec. 25-128-58b. [Contractor-limited to well non water-supply drilling W-3] (Repealed)

Repealed July 8, 2022.

(Effective May 21, 1993; Repealed July 8, 2022)

Sec. 25-128-59—25-128-60. Repealed

Repealed May 21, 1993.

Sec. 25-128-60a. [Well driller - limited to well water-supply drilling (W-2)] (Repealed)

Repealed July 8, 2022.

(Effective May 21, 1993; Repealed July 8, 2022)

Sec. 25-128-60b. Well driller - limited to well non-water-supply drilling W-4.

The requirements for this registration shall be three (3) years as an apprentice driller or possess equivalent experience and training. This registration permits the registrant to construct a well, including but not limited to, the installation, repair and maintenance of

pumps, pump motors, pump piping, valves, wiring, electric controls and tanks only while the registrant is in the direct and regular employment of a contractor registered for such work. The applicant shall demonstrate his knowledge of well drilling by passing a written examination conducted pursuant to Sections 21a-7 (1) and 21a-8 (5) of the General Statutes.

(Effective May 21, 1993)

Sec. 25-128-61. [Permit requirement] (Repealed)

Repealed July 8, 2022.

(Effective May 21, 1993; Repealed July 8, 2022)

Sec. 25-128-62. Completion reports

(a) A contractor shall, within 60 days of completion of a water supply well or a geothermal system, file a completion report on a form and in a manner prescribed by the Commissioner of Consumer Protection. The completion report shall be concurrently submitted to the owner and the department. Such report shall include but not be limited to the following:

(1) Contractor information: Name of the contractor; address; registration number; and type of work completed (e.g., drill bore holes, install and grout loops, bore hole abandonment, etc.).

(2) Water supply well or system location: Town; driller map number; GPS coordinates to the nearest fifth decimal; address; zip code; nearest two cross streets; casing details (length, diameter, weight per foot, manner of connection sections of casing, information on use of a drive shoe, information on grouting of well casing and type of grout used); yield test information (bailed, pumped, compressed air, duration of yield test in hours, yield in gallons per minute); water level information (static water level, water levels during yield test); depth of completed well; well screen details; geological materials and thickness of materials penetrated in feet; date well was completed; permit number; registration number; date of report; signature of well driller; and schematic diagram showing location of completed well with measurements to at least two fixed points.

(3) Well or system owner: Name; address; town; state; zip code; and telephone number.

(4) When applicable, bore hole specifications: Date first bore hole drilled; date last bore hole drilled; total number of bore holes drilled; total number of bore holes used in system; diameter of bore holes; depth of bore holes in feet; spacing intervals of bore holes in feet; average depth to bedrock in feet; geologic materials and thickness of materials penetrated; amount and type of casing, if any; static water levels; type of grout used; and amount of grout used.

(5) When applicable, loop field installation: Installer name; registration number; piping loop material used; number of loops installed; depth of closed-loop in feet; date last loop installed; date bore hole grouted; type of grout used; average number of bags to grout each loop; pounds per bag of grout; and cubic feet of grout used for each bore hole. The type and volume of closed-loop geothermal fluid to be used in closed loops shall be denoted,

and the form shall provide for a confirmation that detectable underground tape has been installed above the bore hole location.

(b) Attached to each form shall be a diagram prepared or approved by the contractor showing geothermal bore holes, major buildings, septic systems, and water supply wells on site.

(Effective September 27, 1978; Amended July 8, 2022)

Sec. 25-128-63. Exemption from construction standards

As provided by section 25-133 of the Connecticut General Statutes, as where the Board finds that compliance with the regulations and construction standards adopted would result in undue hardship, an exemption from any one or more of the standards may be granted by the Board to the extent necessary to ameliorate such undue hardship, and to the extent such exemption can be granted without impairing the intent and purpose of the regulations. An application for a special exemption shall be made in writing on a form to be prescribed by the department. The application shall include all information regarding circumstances and conditions of construction of the well as the Board deems necessary. The decision of the Board to grant or deny the exemption requested, in whole or in part, shall be made within thirty (30) days, and the Board shall notify the applicant in writing of its decision. Exemptions may only be granted by the Board pertaining to the requirements of chapter 482 of the Connecticut General Statutes and the regulations promulgated thereunder, and without violating chapter 368a of the Connecticut General Statutes and the regulations promulgated thereunder.

(Effective September 27, 1978; Amended July 8, 2022)

Sec. 25-128-64. Figures and Drawings

Table 1

CASING PIPE WEIGHTS AND DIMENSIONS

Size In Inches	Wt. Lbs. Per Ft. Threads and Couplings	Pipe			Threads per Inch	Couplings	
		Thickness in Inches	Diameter-Inches			Length in Inches	External Diameter Inches
			External	Internal			
1--	1.68	.133	1.315	1.049	11 1/2	1 7/8	1.556
1 1/4	2.28	.140	1.660	1.380	11 1/2	2 1/8	1.907
1 1/2	2.73	.145	1.900	1.610	11 1/2	2 3/8	2.218
2	3.68	.154	2.375	2.067	11 1/2	2 5/8	2.760
2 1/2	5.82	.203	2.875	2.469	8	2 7/8	3.276
3	7.62	.216	3.500	3.068	8	3 1/8	3.948
3 1/2	9.20	.226	4.000	3.548	8	3 5/8	4.531
4	10.89	.237	4.500	4.026	8	3 5/8	5.091
4 1/2	12.64	.247	5.000	4.506	8	4 1/8	5.591
5	14.81	.258	5.563	5.047	8	4 1/8	6.296
*6	19.18	.280	6.625	6.065	8	4 1/8	7.358
7	23.769	.301	7.625	7.023	8	4 1/8	8.358
8	25.00	.277	8.625	8.071	8	4 5/8	9.420
10	35.00	.307	10.750	10.136	8	6 1/8	11.721
12	45.00	.330	12.750	12.090	8	6 1/8	13.958
14 OD	57.00	.375	14.000	13.250	8	7 1/8	15.446
15 OD	61.15	.375	15.000	14.250	8	7 1/8	16.446
16 OD	65.30	.375	16.000	15.250	8	7 1/8	17.446
17 OD	73.20	.375	17.000	16.250	8	7 1/8	18.683
18 OD	81.20	.375	18.000	17.250	8	7 1/8	19.921
20 OD	90.00	.375	20.000	19.250	8	7 5/8	21.706
*6	17.00	.250	6.625	6.375	(also acceptable)		

FIG. 1 CONSTRUCTION OF BEDROCK WELLS

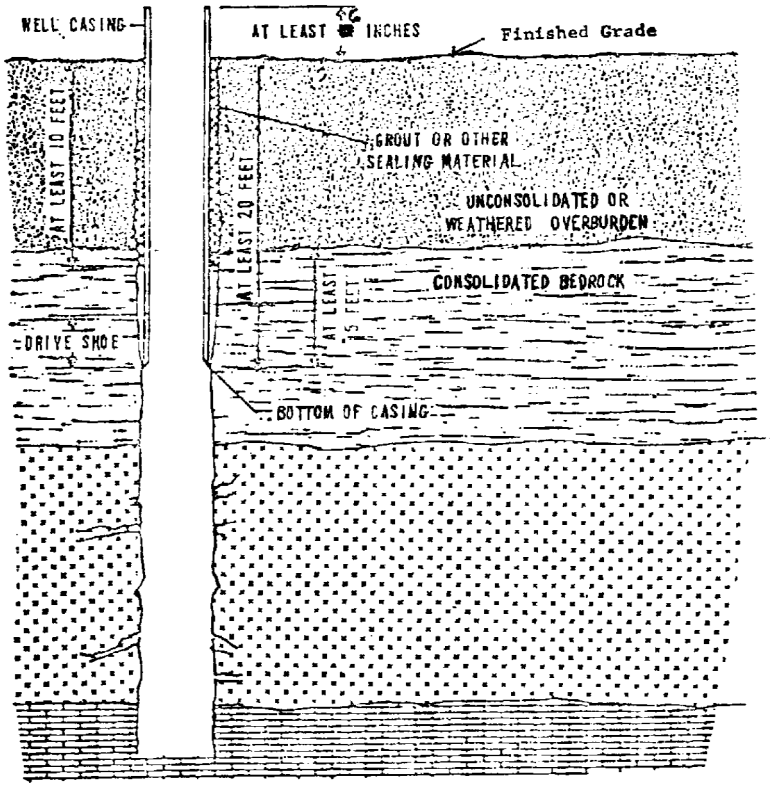


FIG. 2 CONSTRUCTION OF WELLS IN AQUIFERS WITH ALTERNATING BEDS OF SILT AND CLAY

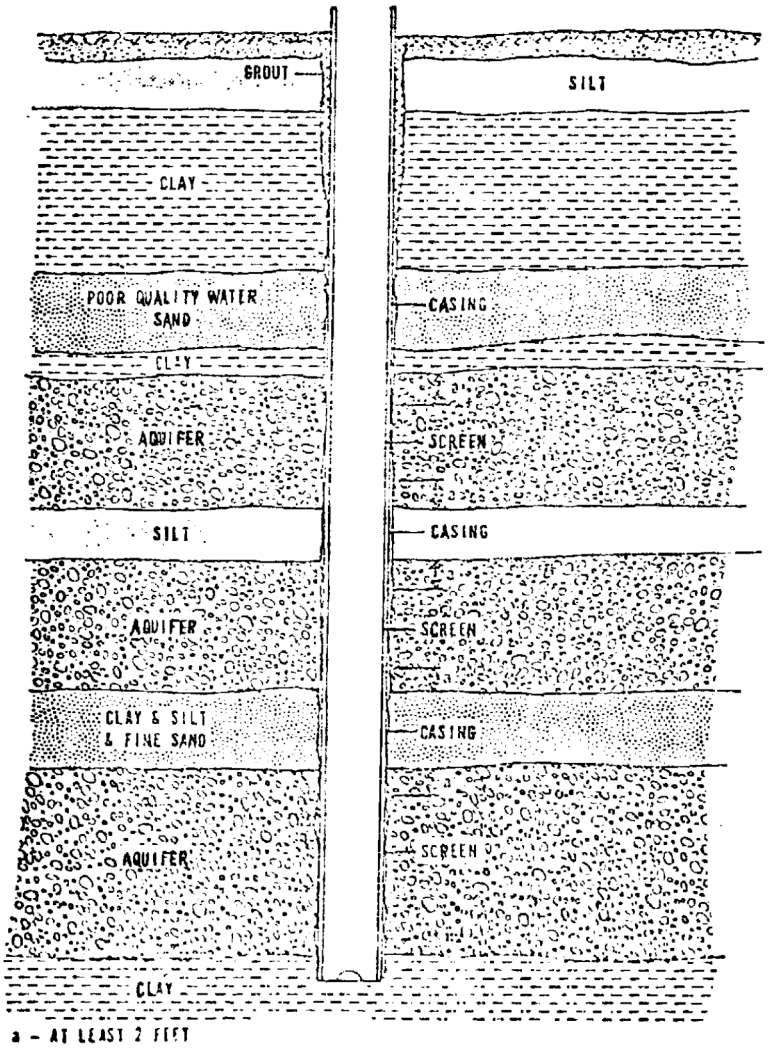


FIG. 3 CONSTRUCTION OF WELL IN AQUIFER OVERLAIN BY CLAY, SILT AND FINE SAND

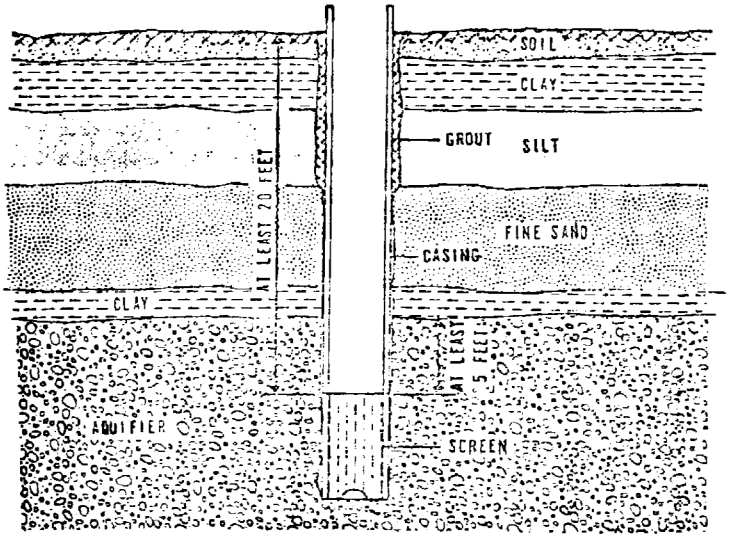


FIG. 4 CONSTRUCTION OF WELL IN AN AQUIFER OVERLAIN BY TILL

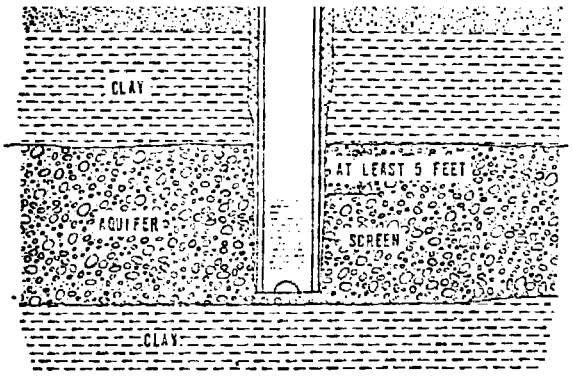


FIG. 5 CONSTRUCTION OF WELL IN AOUIFER OVERLAIN BY CLAY

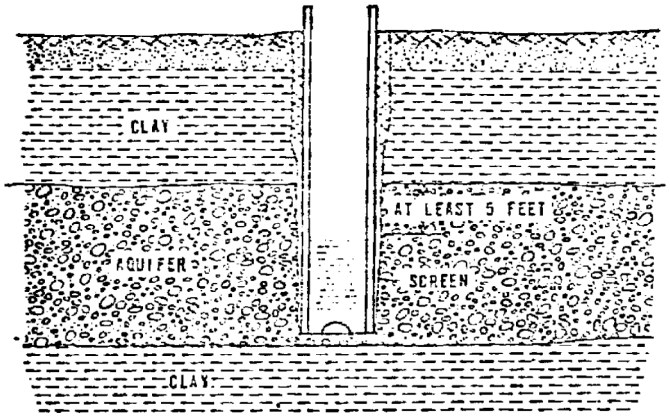


FIG. 6 TERMINATION OF EXTERIOR GEOTHERMAL BOREHOLE

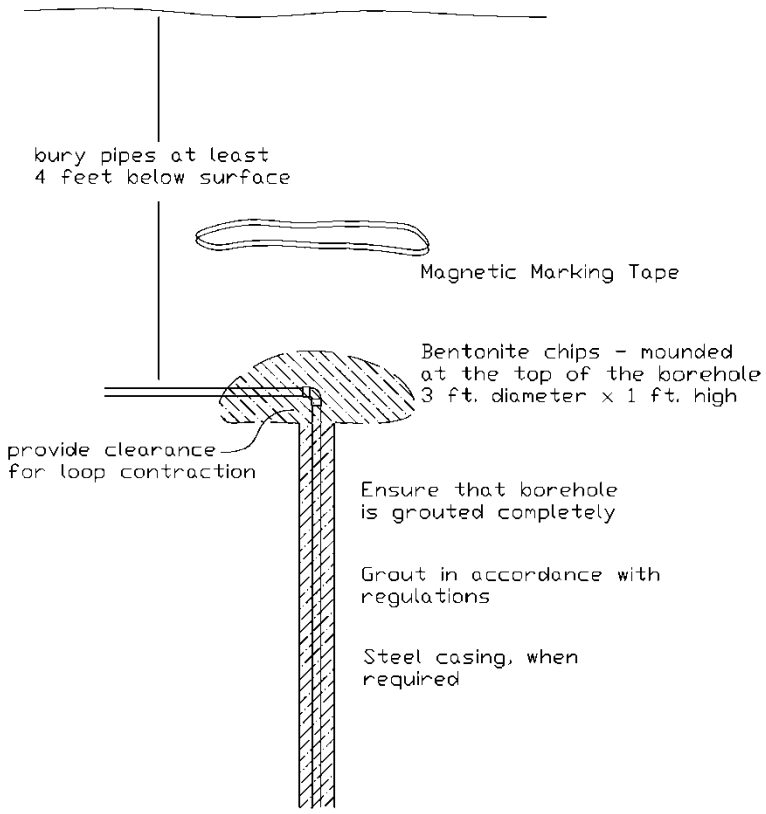
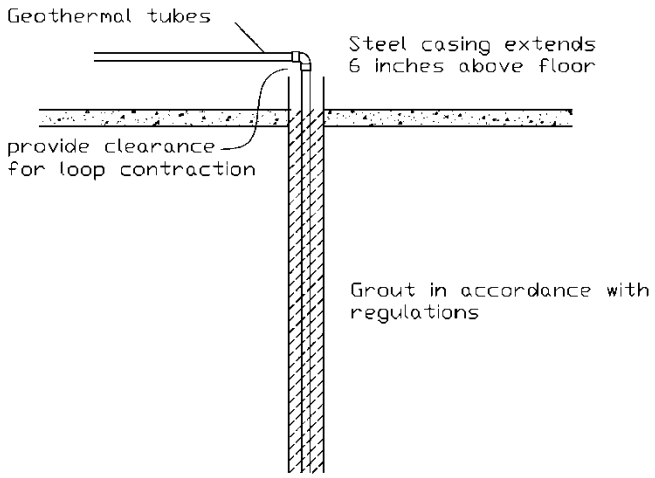


FIG. 7 TERMINATION OF INTERIOR GEOTHERMAL BOREHOLE



(Effective September 27, 1978; Amended July 8, 2022)