

R655. Natural Resources, Water Rights.

R655-4. Water Wells.

R655-4-1. Purpose, Scope, and Exclusions.

1.1 Purpose.

Under Subsection 73-2-1(4)(b), the state engineer, as the Director of the Utah Division of Water Rights, shall make rules regarding well construction and related regulated activities and the licensing of water well drillers and pump installers.

These rules are promulgated pursuant to Section 73-3-25. The purpose of these rules is to assist in the orderly development of underground water; insure that minimum construction standards are followed in the drilling, construction, deepening, repairing, renovating, cleaning, development, testing, disinfection, pump installation and repair, and abandonment of water wells and other regulated wells; prevent pollution of aquifers within the state; prevent wasting of water from flowing wells; obtain accurate records of well construction operations; and insure compliance with the state engineer's authority for appropriating water.

These rules also establish administrative procedures for applications, approvals, hearings, notices, revocations, orders and their judicial review, and other administrative procedures required or allowed by these rules. These rules shall be liberally construed to permit the Division to carry out the purposes of Utah law.

1.2 Scope.

The drilling, construction, deepening, repair, renovation, replacement, or abandonment of the following types of wells are regulated by these administrative rules and the work must be permitted by the Utah Division of Water Rights and completed by a licensed well driller. The cleaning, development, testing, and disinfection in the following types of wells are regulated by these administrative rules and the work must be completed by a licensed well driller or a licensed pump installer; however a permit is not required. Moreover, the installation and repair of pumps in the following types of wells are regulated by these administrative rules and the work must be completed by a licensed pump installer; however a permit is not required. Pursuant to Subsection 73-3-25(2)(a), a person conducting pump installation and repair work on their own well on their own property for their own use is exempt from these rules and is not required to have a pump installer's license. These rules apply to both vertical, angle and horizontal wells if they fall within the scope of this section. These rules pertain only to work on or within the well itself. These rules do not regulate the incidental work beyond the well such as plumbing, electrical, and excavation work up to the well; and the building of well enclosures unless these activities directly impact or change the construction of the well itself. The process for an applicant to obtain approval to drill, construct, deepen, repair, renovate, clean, develop, abandon, or replace the non-production wells listed in Subsection R655-4-1(1.2.2) is outlined in Section R655-4-9 of these rules.

1.2.1 Water production wells at any depth including domestic wells, irrigation wells, stockwater wells, public supply wells, commercial wells, industrial wells, open-loop heat exchange wells, open-loop heat exchange injection wells, and recharge-recovery wells drilled under Title 73, Chapter 3b, Groundwater Recharge and Recovery Act. Diversion and beneficial use of groundwater from water production wells at any depth shall require approval through the appropriation procedures and policies of the state engineer and Title 73, Chapter 3.

1.2.2 Non-production wells completed to a depth greater than 30 feet including:

1.2.2.1 Cathodic protection wells.

1.2.2.2 Closed-loop Heat exchange wells that encounter formations containing groundwater.

1.2.2.3 Monitor, piezometer, and test wells designed to test and monitor water level, pressure, quality or quantity.

1.2.2.4 Other wells that can potentially interfere with established aquifers such as wells to monitor mass movement like inclinometers, facilitate horizontal utility placement, monitor man-made structures, house instrumentation to monitor structural performance, or dissipate hydraulic pressures like dewatering wells.

1.3 Exclusions.

The drilling, construction, deepening, repair, renovation, replacement, cleaning, development, pump installation and repair, or abandonment of the following types of wells or boreholes are excluded from regulation under this rule:

1.3.1 Any non-production wells described in Subsection R655-4-1(1.2.2) that are constructed to a final depth of 30 feet or less.

1.3.2 Geothermal wells with geothermal fluid temperatures greater than or equal to 120 degrees Celsius or 248 degrees Fahrenheit. Although not regulated under this rule, geothermal wells are subject to Section 73-22-1 "Utah Geothermal Resource Conservation Act" Utah Code Annotated and the rules promulgated by the state engineer including Rule R655-1, Wells Used for the Discovery and Production of Geothermal Energy in the State of Utah. Moreover, those drilling and constructing geothermal wells must hold a current well driller's license in accordance with Sections R655-4-3 and R655-4-8.

1.3.2 Temporary exploratory wells drilled to obtain information on the subsurface strata on which an embankment or foundation is to be placed or an area proposed to be used as a potential source of material for construction.

1.3.3 Wells or boreholes drilled or constructed into non-water bearing zones or which are 30 feet or less in depth for utilizing heat from the surrounding earth.

1.3.4 Geotechnical borings drilled to obtain lithologic data which are not installed for utilizing or monitoring groundwater, and which are properly sealed immediately after drilling and testing.

1.3.5 Oil, gas, and mineral exploration or production wells. These wells are subject to rules promulgated under the Division of Oil, Gas, and Mining of the Utah Department of Natural Resources.

1.3.6 Well setback or separation and water quality testing requirements are generally regulated at the local health department level or by another state agency.

R655-4-2. Definitions.

ABANDONED WELL - any well which is not in use and has been sealed or plugged with approved sealing materials so that it is made unproductive and shall prevent contamination of groundwater. A properly abandoned well will not produce water nor serve as a channel for movement of water from the well or between water bearing zones.

ADDRESS - the current residential or business address of a well driller as recorded in the Division's files.

ADJUDICATIVE PROCEEDING - means, for the purposes of this rule, an administrative action or proceeding initiated by the Division in conjunction with an Infraction Notice; or an administrative action or proceeding initiated in response to a well driller's appeal or a Cease and Desist Order or an appeal of a restriction or denial of a license renewal application.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) - a nationally recognized testing laboratory that certifies building products and adopts standards including those for steel and plastic (PVC) casing utilized in the well drilling industry. ANSI standards are often adopted for use by ASTM and AWWA. Current information on standards can be obtained from: ANSI, 1430 Broadway, New York, NY 10018 (ANSI.org).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) - an independent organization concerned with the development of standards on characteristics and performance of materials, products and systems including those utilized in the well drilling industry. Information may be obtained from: ASTM, 1916 Race Street, Philadelphia, PA 19013 (ASTM.org).

AMERICAN WATER WORKS ASSOCIATION (AWWA) - an international association which publishes standards intended to represent a consensus of the water supply industry that the product or procedure described in the standard shall provide satisfactory service or results. Information may be obtained from: AWWA, 6666 West Quincy Avenue, Denver CO 80235 (AWWA.org).

ANNULAR SPACE - the space between the outer well casing and the borehole or the space between two sets of casing.

AQUIFER - a porous underground formation yielding withdrawable water suitable for beneficial use.

ARTESIAN AQUIFER - a water bearing formation that contains underground water under sufficient pressure to rise above the zone of saturation.

ARTESIAN WELL - a well where the water level rises appreciably above the zone of saturation.

BACKFLOW PREVENTER - means a safety device, assembly, or construction practice used to prevent water pollution or contamination by preventing flow of a mixture of water or chemicals from the distribution piping into a water well or in the opposite direction of that intended. This includes check valves, foot valves, curb stops, or air gaps

BENTONITE - a highly plastic, highly absorbent, colloidal swelling clay composed largely of mineral sodium montmorillonite. Bentonite is commercially available in powdered, granular, tablet, pellet, or chip form which is hydrated with potable water and used for a variety of purposes including the stabilization of borehole walls during drilling, the control of potential or existing high fluid pressures encountered during drilling below a water table, well abandonment, and to provide a seal in the annular space between the well casing and borehole wall.

BENTONITE GROUT - a mixture of bentonite and potable water specifically designed to seal and plug wells and boreholes mixed at manufacturer's specifications to a grout consistency which can be pumped through a pipe directly into the annular space of a well or used for abandonment. Its primary purpose is to seal the borehole or well to prevent the subsurface migration or communication of fluids.

CASH BOND - A type of well driller bond in the form of a certificate of deposit (CD) submitted and assigned to the state engineer by a licensed driller to satisfy the required bonding requirements.

CASING - a tubular retaining and sealing structure that is installed in the borehole to maintain the well opening.

CATHODIC PROTECTION WELL - a well constructed for installing deep anodes to minimize or prevent electrolytic corrosive action of metallic structures installed below ground surface, such as pipelines, transmission lines, well casings, storage tanks, or pilings.

CEASE AND DESIST ORDER - means an order issued by the state engineer comprised of a red tag placed on a well rig at the well drilling location and a letter to the driller requiring that all well drilling activity at the well drilling location cease until the order is lifted.

CLOSED-LOOP HEATING-COOLING EXCHANGE WELL - means the subsystem of a geothermal heat pump system that consists of the drilled vertical borehole into the earth that is equipped with a heat exchange media conveyance loop tube, and is grouted from the bottom of the vertical borehole to the earth's surface at the drilling site. Construction of a geothermal heat pump loop well includes, in continuous order, drilling of the vertical borehole, placement of the loop tube to the bottom of the vertical borehole with the grout tremie, and grouting of the vertical borehole from the bottom of the vertical borehole to the earth's surface at the drill site. Closed-loop systems circulate a heat transfer fluid, such as water or a mixture of water and food grade, non-toxic anti-freeze, to exchange heat with the subsurface geological environment.

CONDUCTOR CASING - means the temporary or permanent casing used in the upper portion of the well bore to prevent collapse of the formation during the construction of the well or to conduct the gravel pack to the perforated or screened areas in the casing.

CONFINING UNIT - a geological layer either of unconsolidated material, usually clay or hardpan, or bedrock, usually shale, through which virtually no water moves.

CONSOLIDATED FORMATION - bedrock consisting of sedimentary, igneous, or metamorphic rock such as shale, sandstone, limestone, quartzite, conglomerate, basalt, granite, or tuff.

DEFAULT ORDER - means an order issued by the Presiding Officer after a well driller fails to attend a hearing in a well driller adjudicative proceeding. A Default Order constitutes a Final Judgment and Order.

DEWATERING WELL - a water extraction well constructed for lowering the water table elevation, either temporarily or permanently, around a man-made structure or construction activity.

DISINFECTION - or disinfecting is the use of chlorine or other disinfecting agent or process approved by the state engineer, in sufficient concentration and contact time adequate to inactivate or eradicate bacteria such as coliform or other organisms.

DIVISION - means the Division of Water Rights. The terms Division and state engineer may be used interchangeably in this rule.

DRAWDOWN - the difference in elevation between the static water level and the pumping water level in a well.

DRILL RIG - any power-driven percussion, rotary, boring, coring, digging, jetting, or augering machine used in the construction of a well or borehole.

EMERGENCY SITUATION - any situation where immediate action is needed to protect life or property. Emergency status would also extend to any situation where life is not immediately threatened but action is needed immediately and it is not possible to contact the state engineer for approval. For example, it would be considered an emergency if a domestic well needed immediate repair over a weekend when the state engineer's offices are closed.

FILES - means information maintained in the Division's public records, which may include both paper and electronic information.

FINAL JUDGMENT AND ORDER - means a final decision issued by the Presiding Officer on the whole or a part of a well driller adjudicative proceeding. This definition includes "Default Orders."

GRAVEL PACKED WELL - a well in which filter material such as sand or gravel is placed in the annular space between the well intakes, such as screen or perforated casing, and the borehole wall to increase the effective diameter of the well and to prevent fine-grained sediments from entering the well.

GROUNDWATER - subsurface water in a zone of saturation.

GROUT - a fluid mixture of Portland cement or bentonite with water of a consistency that can be forced through a pipe and placed as required. Upon approval, various additives such as sand, bentonite, and hydrated lime may be included in the mixture to meet different requirements.

HEATING-COOLING EXCHANGE SYSTEM - also known as GeoExchange, ground source heat pump, geothermal heat pump, and ground-coupled heat pump; a heat pump that uses the earth itself as a heat source, for heating, and heat sink, for cooling. It is coupled to the ground by a closed-loop heat exchanger installed vertically underground or by physically pumping water from a well with an open-loop systems and utilizing the thermal properties of the water to heat or cool.

HYDRAULIC FRACTURING - the process whereby water or other fluid is pumped with sand under high pressure into a well to fracture and clean-out the rock surrounding the well bore thus increasing the flow to the well.

INFRACTION NOTICE - means a notice issued by the Division to the licensee informing the licensee of an alleged act or acts violating this rule and the infraction points that have been assessed against the licensee.

ISSUED - means a document executed by an authorized delegate of the state engineer or by the Presiding Officer, in the case of a Hearing Notice, Final Judgment and Order or other order related to a well driller adjudicative proceeding, and deposited in the mail.

LICENSE - means the express grant of permission or authority by the state engineer to carry on the activity of well drilling.

LICENSED PUMP INSTALLER - means a qualified individual who has obtained a license from the Division and who is engaged in the installation, removal, alteration, or repair of pumps and pumping equipment for compensation.

LOG - means an official document or report that describes where, when, and how a regulated well was drilled, constructed, deepened, repaired, renovated, cleaned, developed, tested, equipped with pumping equipment, or abandoned. A Log shall be submitted to the Division by a licensee on forms provided by the Division including a Well Driller's Report, Well Abandonment Report, or Pump Installer's Report.

MONITOR WELL - a well, as defined under "well" in this section, that is constructed for determining water levels, monitoring chemical, bacteriological, radiological, or other physical properties of ground water or vadose zone water.

NATIONAL SANITATION FOUNDATION (NSF) - a voluntary third party consensus standards and testing entity established under agreement with the U. S. Environmental Protection Agency (EPA) to develop testing and adopt standards and certification programs for all direct and indirect drinking water additives and products. Information may be obtained from: NSF, 3475 Plymouth Road, P O Box 1468, Ann Arbor, Michigan 48106 (NSF.org).

NEAT CEMENT GROUT -- cement, including types I, II, III, V, high-alumina, or a combination conforming to the ASTM C150-07 Standard Specification for Portland Cement, as incorporated by reference into this rule, or equivalent standard, with no more than six gallons of water per 94 pound sack, one cubic foot, of cement of sufficient weight density of not less than 15 lbs per gallon. One cubic yard of neat cement grout contains about 1993 pounds of Portland cement and not more than 127 gallons of clean water. Bentonite, controlled density fill, or fly ash shall not be added to neat cement grout unless state engineer approval is received.

NOMINAL SIZE - means the manufactured commercial designation of the diameter of a casing. An example would be casing with an outside diameter of 12 3/4 inches which may be nominally 12-inch casing by manufactured commercial designation.

OPEN-LOOP HEATING-COOLING EXCHANGE WELL - means a well system in which groundwater is extracted from a typical water production well and pumped through an above ground heat exchanger inside the heat pump system. Heat is

either extracted or added by the primary refrigerant loop, which does not come into contact with the pumped water, and then the water is returned to the same aquifer by injection through the original extraction well or through a separate injection well.

OPERATOR - a drill rig operator or pump rig operator is an individual who works under the direct supervision of a licensed Utah Water Well Driller or Pump Installer and who can be left in responsible charge of regulated well drilling or pump installation or repair activity using equipment that is under the direct control of the licensee.

PARTY means the state engineer, an authorized delegate of the state engineer, the well driller, the pump installer, or the affected well owner.

PIEZOMETER - a tube or pipe, open at the bottom in groundwater, and sealed along its length, used to measure hydraulic head or water level in a geologic unit.

PITLESS ADAPTER - a commercially manufactured device designed for attachment to a well casing which allows buried pump discharge from the well and allows access to the interior of the well casing for installation or removal of the pump or pump appurtenances, while preventing contaminants from entering the well. Such devices protect the water and distribution lines from temperature extremes, permit extension of the casing above ground as required in Subsection R655-4-11(11.3.2) and allow access to the well, pump or system components within the well without exterior excavation or disruption of surrounding earth or surface seal.

PITLESS UNIT - a factory-assembled device with cap that extends the upper end of a well casing to above-grade and is constructed as to allow for buried pump discharge from the well and allows access to the interior of the well casing for installation or removal of the pump or pump appurtenances, while preventing contaminants from entering the well. Such devices protect the water and distribution lines from temperature extremes, permit extension of the casing above ground as required in Subsection R655-4-11(11.3.2) and allow access to the well, pump or system components within the well without exterior excavation or disruption of surrounding earth or surface seal.

POLLUTION - the alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any water that renders the water harmful, detrimental, or injurious to humans, animals, vegetation, or property, or to public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any or reasonable purpose.

POTABLE WATER - water supplied for human consumption, sanitary use, or for the preparation of food or pharmaceutical products which is free from biological, chemical, physical, and radiological impurities.

PRESIDING OFFICER - means an authorized delegate of the state engineer who conducts a well driller adjudicative proceeding.

PRESSURE GROUTING - a process by which grout is confined within the drillhole or casing by the use of retaining plugs or packers and by which sufficient pressure is applied to drive the grout slurry into the annular space or zone to be grouted.

PRIVATE WATER PRODUCTION WELL - a privately owned well constructed to supply water for any purpose which has been approved by the state engineer, such as irrigation, stockwater, domestic, commercial, industrial wells.

PROBATION - A disciplinary action that may be taken by the state engineer that entails greater review and regulation of well drilling activities but which does not prohibit a well driller from engaging in the well drilling business or operating well drilling equipment.

PROVISIONAL WELL - authorization granted by the state engineer to drill under a pending, unapproved water right, change or exchange application; or for determining characteristics of an aquifer, or the existence of a usable groundwater source. Water from a provisional well cannot be put to beneficial use until the application has been approved.

PUBLIC WATER SYSTEM SUPPLY WELL - a well, either publicly or privately owned, providing water for human consumption and other domestic uses which has at least 15 service connections or regularly serves an average of at least 25 individuals daily for at least 60 days out of the year. Public Water System Supply Wells are also regulated by the Division of Drinking Water in the Utah Department of Environmental Quality found in Title R309.

PUMP-PUMPING EQUIPMENT - means any equipment or materials utilized or intended for use in withdrawing or obtaining groundwater for any use.

PUMP INSTALLATION OR REPAIR - means the procedure employed in the placement and preparation for operation of pumps and pumping equipment at the water well location, including all construction or repair involved in making entrance to the water well, which involves the breaking of the well seal.

PUMPING WATER LEVEL - the water level in a well after a period of pumping at a given rate.

RECORD - means the official collection of all written and electronic materials produced in a well driller adjudicative proceeding, including Infraction Notices, pleadings, motions, exhibits, orders and testimony produced during the adjudicative proceedings, as well as the files of the Division.

RED TAG - is a component of a "CEASE AND DESIST ORDER" in the form of a red colored tag placed on a well at a well drilling location

REGISTRATION - means the express grant of permission or authority by the state engineer to carry on the activity of well drilling or pump installation under the supervision of a licensed well driller or pump installer.

REPAIRING, RENOVATING, AND DEEPENING - means the deepening, hydrofracturing, re-casing, perforating, re-perforating, installation of packers or seals, and any other material change in the design or construction of a well. Material changes include casing installation or modification including casing extensions, installation or modification of liner pipe, reaming or under reaming of the borehole, pitless unit installation or re-sealing.

REVOCAION - A disciplinary action that may be taken by the state engineer that rescinds the well driller's Utah Water Well Driller's License

SAND - a material having a prevalent grain size ranging from two millimeters to 0.06 millimeters.

SAND CEMENT GROUT - a grout consisting of equal parts by volume of cement conforming to ASTM C150-07, or equivalent standard, and clean sand or aggregate with no more than six gallons of water per 94 pound sack, one cubic foot, of cement.

SHALLOW WATER WELL - a horizontal or vertical excavation or opening into the ground at a depth of 30 feet or less made by digging, boring, excavating, drilling, jetting, augering, or driving or any other artificial method and left cased or open for pumping and utilizing adjacent shallow groundwater.

SHALLOW WATER WELL CONSTRUCTOR - any person who is licensed by the state engineer to construct and equip shallow water wells for compensation or otherwise. The licensed shallow water well constructor has total responsibility for the construction and equipping work in progress at the well drilling site.

STANDARD DIMENSION RATIO (SDR) - the ratio of average outside pipe diameter to minimum pipe wall thickness.

STATE ENGINEER - the director of the Utah Division of Water Rights or any employee of the Division of Water Rights designated by the state engineer to act in administering this rule. The terms Division and state engineer may be used interchangeably in this rule.

STATIC LEVEL - stabilized water level in a non-pumped well beyond the area of influence of any pumping well.

SURETY BOND - an indemnity agreement in a sum certain and payable to the state engineer, executed by the licensee as principal and which is supported by the guarantee of a corporation authorized to transact business as a surety in the state of Utah.

SUSPENSION - A disciplinary action that may be taken by the state engineer that prohibits the well driller from engaging in the well drilling business or operating well drilling equipment as a registered operator for a definite period or until certain conditions are met.

TEST WELL - authorization granted by the state engineer to drill under a non-production well approval for determining characteristics of an aquifer, or the existence of a usable groundwater source. Water from a test well cannot be put to beneficial use.

TREMIE PIPE - a device that carries materials such as seal material, gravel pack, or formation stabilizer to a designated depth in a drill hole or annular space.

UNCONSOLIDATED FORMATION - loose, soft, incoherent rock material composed of sedimentary, igneous, or metamorphic rock which includes sand, gravel, and mixtures of sand and gravel. These formations are widely distributed and can have good water storage and transmissivity characteristics.

UNHYDRATED BENTONITE - dry bentonite consisting primarily of granules, tablets, pellets, or chips that may be placed in a well or borehole in the dry state and hydrated in place by either formation water or by the addition of potable water into the well or borehole containing the dry bentonite. Unhydrated bentonite can be used for sealing and abandonment of wells.

VADOSE ZONE - the zone containing water under less than atmospheric pressure, including soil water, intermediate vadose water and capillary water. The zone extends from land surface to the zone of saturation or water table.

WATERTIGHT - a condition that does not allow the entrance, passage, or flow of water under normal operating conditions.

WELL - a horizontal or vertical excavation or opening into the ground made by digging, boring, drilling, jetting, augering, or driving or any other artificial method and left cased or open for utilizing or monitoring underground waters.

WELL DRILLER - any person who is licensed by the state engineer to construct water wells for compensation or otherwise. The licensed driller has total responsibility for the construction work in progress at the well drilling site.

WELL DRILLER BOND - A financial guarantee to the state engineer, in the form of a surety bond or cash bond, by which a licensee binds to pay the penal sum of \$5,000 to the state engineer in the event of significant noncompliance with this rule.

WELL DRILLING - the act of drilling, constructing, deepening, replacing, repairing, renovating, cleaning, developing, or abandoning a well.

R655-4-3. Licenses and Registrations.

3.1 General.

3.1.1 Section 73-3-25 requires every person that drills, constructs, deepens, repairs, renovates, cleans, develops, tests, disinfects, installs or repairs pumps, and abandons a regulated well in the state to obtain a license from the state engineer. Licenses and registrations are not transferable. Applicants for well driller or pump installer licensure must meet all requirements in this subsection, and applicants cannot obtain a Utah license through reciprocity or comity with a similar license from other states or organizations.

3.1.2 Any person found to be performing regulated well activity without a valid license or operator's registration will be ordered to cease and desist by the state engineer. The order may be made verbally but must also be followed by a written order. The order may be posted at an unattended well drilling site. A person found performing regulated well activities without a license will be subject to the state engineer's enforcement powers under Section 73-2-25 and Rule R655-14, and subject to criminal prosecution under Section 73-3-26 .

3.2 Well Driller's License.

A Utah Well Driller's License allows an individual to perform regulated well activity including drilling, construction, deepening, repairing, renovating, cleaning, development, testing, disinfection, pump installation or repair, and abandonment of

water wells and other regulated wells. An applicant must meet the following requirements to become licensed as a Utah Water Well Driller:

3.2.1 Applicants must be 21 years of age or older and be a citizen of the United States, or be lawfully entitled to remain and work in the United States in accordance with Section 63G-11-104. Applicants must file a Division Lawful Presence Affidavit with the license application;

3.2.2 Complete and submit the application form provided by the state engineer.

3.2.3 Pay the application fee approved by the state legislature.

3.2.4 Provide documentation of experience according to the following standards:

3.2.4.1 Water well drillers shall provide documentation of at least two years of full time water well drilling experience utilizing the applied for drilling methods with a licensed driller in good standing OR documentation of 16 applicable wells constructed by the applicant under the supervision of a licensed well driller in good standing.

3.2.4.2 Monitor well drillers shall provide documentation of at least two years of full time monitor well drilling experience utilizing the applied for drilling methods with a licensed driller in good standing OR documentation of 32 wells constructed by the applicant under the supervision of a licensed well driller in good standing.

3.2.4.3 Heating-cooling exchange and other non-production well drillers must provide documentation of at least six months of full time well drilling experience utilizing the applied for drilling methods with a licensed driller in good standing AND documentation of 16 well drilling projects constructed by the applicant under the supervision of a licensed well driller in good standing.

3.2.4.4 A copy of the well log for each well constructed must be provided. The documentation must also show the applicant's experience with each type of drilling rig to be listed on the license. Acceptable documentation will include registration with the Division of Water Rights, letters from licensed well drillers from Utah or other states, or a water well drilling license granted by another state.

3.2.4.5 Successful completion of training or education pertaining to well drilling, geology, map reading, and other related subjects may be substituted for up to, but not exceeding, 25% of the required drilling experience, and for up to, but not exceeding, 25% of the required drilled wells or well drilling projects. The state engineer will determine the number of months of drilling experience and the number of drilled wells that will be credited for the classroom study.

3.2.4.6 A limited or restricted license can be obtained in subcategories of activity including well cleaning, well renovation, well abandonment, and well development or testing. Testing requirements for these license subcategories will be reduced or limited in accordance with the level of activity.

3.2.5 File a well driller bond in the sum of \$5,000 with the Division of Water Rights payable to the state engineer. The well driller bond must be filed under the conditions and criteria described in Subsection R655-4-3(3.9).

3.2.6 Obtain a score of at least 70% on each of the written licensing examinations required and administered by the state engineer. The required examinations test the applicant's knowledge of:

a. Rule R655-4 and Utah water law as it pertains to underground water;

b. The minimum construction standards established by the state engineer for water well construction;

c. Geologic formations and proper names used in describing underground material types;

d. Reading maps and locating points from descriptions based on section, township, and range;

e. Groundwater geology and the occurrence and movement of groundwater;

f. The proper operating procedures and construction methods associated with the various types of water well drilling rigs. A separate test is required for each type of water well drilling rig to be listed on the license.

3.2.7 Demonstrate proficiency in resolving problem situations that might be encountered during the construction of a water well by passing an oral examination administered by the state engineer.

3.3 Drill Rig Operator's Registration.

A registered drill rig operator can oversee a site where regulated well activity is taking place if a licensed driller is not onsite. A registered drill rig operator must always be affiliated with a licensed driller. An applicant must meet the following requirements to become registered as a drill rig operator:

3.3.1 Applicants must be 18 years of age or older and be a citizen of the United States, or be lawfully entitled to remain and work in the United States in accordance with Section 63G-11-104. Applicants must file a Division Lawful Presence Affidavit with the operator application.

3.3.2 Complete and submit the application form provided by the state engineer.

3.3.3 Pay the application fee approved by the state legislature.

3.3.4 Provide documentation of at least six months of water well drilling experience with a licensed driller in good standing. The documentation must show the applicant's experience with each type of drilling rig to be listed on the registration. Acceptable documentation will include letters from licensed well drillers or registration as an operator in another state.

3.3.5 Obtain a score of at least 80% on a written examination of the minimum construction standards established by the state engineer for water well construction. The test will be provided to the licensed well driller by the state engineer. The licensed well driller will administer the test to the prospective operator and return it to the state engineer for scoring.

3.4 Pump Installer's License.

A Utah Pump Installer's License allows an individual to perform regulated pump activity including pump removal, installation, and repair in water wells and other regulated wells. A licensed pump installer can also clean, develop, pump test, and disinfect a regulated well. An individual, which does not include entities such as businesses, corporations, governments, water systems, and municipalities, can perform pump installation and repair work on their own well on their own property

without obtaining a pump installer's license. An applicant must meet the following requirements to become licensed as a Utah Pump Installer:

3.4.1 Applicants must be 21 years of age or older and be a citizen of the United States, or be lawfully entitled to remain and work in the United States in accordance with Section 63G-11-104. Applicants must file a Division Lawful Presence Affidavit with the license application.

3.4.2 Complete and submit the application form provided by the state engineer.

3.4.3 Pay the application fee approved by the state legislature.

3.4.4 Provide documentation of experience of at least two years of full time water well pump installation and repair experience with a driller or pump installer in good standing

3.4.4.4 The documentation must show the applicant's experience with each type of pump rig to be listed on the license. Acceptable documentation will include registration with the Division of Water Rights, reference letters from licensed well drillers or pump installers from Utah or other states, or a license granted by another state.

3.4.4.5 Successful completion of training or education in pump installation or repair and other related subjects may be substituted for up to, but not exceeding, 25% of the required pump experience. The state engineer will determine the number of months of drilling experience that will be credited for the classroom study.

3.4.5 File a pump installer bond in the sum of \$5,000 with the Division of Water Rights payable to the state engineer. The bond must be filed under the conditions and criteria described in Subsection R655-4-3(3.9).

3.4.6 Obtain a score of at least 70% on each of the written licensing examinations required and administered by the state engineer. The required examinations test the applicant's knowledge of:

- a. Rule R655-4 and Utah water law as it pertains to underground water;
- b. The minimum construction standards established by the state engineer pertaining to pump installation and repair;
- c. Groundwater protection procedures and standards applicable to pump installation and repair work on wells;
- d. The proper operating procedures and methods associated with pump installation and repair.

3.4.7 Demonstrate proficiency in resolving problem situations that might be encountered during pump installation and repair of a water well by passing an oral examination administered by the state engineer.

3.5 Pump Rig Operator's Registration.

A registered pump rig operator can oversee a site where regulated pump activity is taking place if a licensed pump installer is not onsite. A registered pump rig operator must always be affiliated with a licensed pump installer. An applicant must meet the following requirements to become registered as a pump rig operator:

3.5.1 Applicants must be 18 years of age or older and be a citizen of the United States, or be lawfully entitled to remain and work in the United States in accordance with Section 63G-11-104. Applicants must file a Division Lawful Presence Affidavit with the license application.

3.5.2 Complete and submit the application form provided by the state engineer.

3.5.3 Pay the application fee approved by the state legislature.

3.5.4 Provide documentation of at least six months of pump installation and repair experience with a licensed driller or pump installer in good standing. Acceptable documentation will include letters from licensed well drillers or registration as an operator in another state.

3.5.5 Obtain a score of at least 80% on a written examination of the minimum construction standards established by the state engineer for pump installation and repair. The test will be provided to the licensed pump installer or well driller by the state engineer. The licensed pump installer or well driller will administer the test to the prospective operator and return it to the state engineer for scoring.

3.6 Shallow Water Well Constructor's License.

A shallow water well constructor's license is a combined category of a well driller's license and pump installer's license. A shallow water well constructor's license allows an individual to perform regulated well and pump activity on water production wells that are at depths of 30 feet or less including drilling, construction, deepening, repairing, renovating, cleaning, development, testing, pump work, disinfection, and abandonment of shallow water wells. An applicant must meet the following requirements to become licensed as a shallow water well constructor:

3.6.1 Applicants must be 18 years of age or older and be a citizen of the United States, or be lawfully entitled to remain and work in the United States in accordance with Section 63G-11-104. Applicants must file a Division Lawful Presence Affidavit with the license application;

3.6.2 Complete and submit the application form provided by the state engineer.

3.6.3 Pay the application fee approved by the state legislature.

3.6.4 Provide documentation of experience constructing shallow water wells.

3.6.6 Obtain a score of at least 70% on the written licensing examination required and administered by the state engineer. The required examination tests the applicant's knowledge of:

- a. Rule R655-4 and Utah water law as it pertains to underground water;
- b. The minimum construction standards established by the state engineer for shallow water well construction;

3.7 Conditional, Restricted, or Limited Licenses.

The state engineer may issue a restricted, conditional, or limited license to an applicant based on drilling experience.

3.8 Refusal to Issue a License or Registration.

The state engineer may, upon investigation and after a hearing, refuse to issue a license or a registration to an applicant if it appears the applicant has not had sufficient training or experience to qualify as a competent well driller, pump installer, or operator.

3.9 Falsified Applications.

The state engineer may, upon investigation and after a hearing, revoke a license or a registration in accordance with Subsection R655-4-5(5.6) if it is determined that the original application contained false or misleading information.

3.10 Well Driller or Pump Installer Bond.

3.10.1 General

3.10.1.1. To become licensed and to continue licensure, well drillers and pump installers must file a bond in the form of a surety bond or cash bond, approved by the state engineer, in the sum of \$5,000 with the Division of Water Rights, on a form provided by the Division, which is conditioned upon proper compliance with the law and this rule and which is effective for the licensing period in which the license is to be issued. The bond shall stipulate the obligee as the "Office of the state engineer". The bond is penal in nature and is designed to ensure compliance by the licensed well driller or pump installer to protect the groundwater resource, the environment, and public health and safety. The bond may only be exacted by the state engineer for the purposes of investigating, repairing, or abandoning wells in accordance with this rule. No other person or entity may initiate a claim against the bond. Lack of a current and valid bond shall be deemed sufficient grounds for denial or discontinuation of a driller's or pump installer's license. The well driller or pump installer bond may consist of a surety bond or a cash bond.

3.10.1.2. Bonding is not required for a shallow water well constructor's license.

3.10.2 Surety Bonds.

3.10.2.1. The licensee and a surety company or corporation authorized to do business in the state of Utah as surety shall bind themselves and their successors and assigns jointly and severally to the state engineer for the use and benefit of the public in full penal sum of \$5,000. The surety bond shall specifically cover the licensee's compliance with Rule R655-4. Forfeiture of the surety bond shall be predicated upon a failure to drill, construct, repair, renovate, deepen, clean, develop, test, disinfect, perform pump work, or abandon a regulated well in accordance with this rule. The bond shall be made payable to the 'Utah State Engineer' upon forfeiture. The surety bond must be effective and exactable in the state of Utah.

3.10.2.2. The bond and any subsequent renewal certificate shall specifically identify the licensed individual covered by the bond. Company names may be included on the bond, but the licensed driller name must be included. The licensee shall notify the state engineer of any change in the amount or status of the bond. The licensee shall notify the state engineer of any cancellation or change at least 30 days from the effective date of such cancellation or change. From to the expiration of the 30-day notice of cancellation, the licensee shall deliver to the state engineer a replacement surety bond or transfer to a cash bond. If such a bond is not delivered, all activities covered by the license and bond shall cease at the expiration of the 30 day period. Termination shall not relieve the licensee or surety of any liability for incidences that occurred during the time the bond was in force.

3.10.2.3. Before the bond is forfeited by the licensee and exacted by the state engineer, the licensee shall have the option of resolving the noncompliance to standard either by personally doing the work or by paying to have another licensed driller do the work. If the licensee chooses not to resolve the problem that resulted in noncompliance, the entire bond amount of \$5,000 shall be forfeited by the surety and expended by the state engineer to investigate, repair or abandon the wells in accordance with Rule R655-4. Any excess there from shall be retained by the state engineer and expended for investigating, repairing, or abandoning wells in accordance with this rule. All claims initiated by the state engineer against the surety bond will be made in writing.

3.10.2.4. The bond of a surety company that has failed, refused or unduly delayed to pay, in full, on a forfeited bond is not approvable.

3.10.3 Cash Bonds.

3.10.3.1. The requirements for the well driller or pump installer bond may alternatively be satisfied by a cash bond in the form of a certificate of deposit (CD) for the amount of \$5,000 issued by a federally insured bank or credit union with an office in Utah. The cash bond must be in the form of a CD. Cash, savings accounts, checking accounts, or letters of credit, are not acceptable cash bonds. The CD shall specifically identify the licensed individual covered by that fund. The CD shall be automatically renewable and fully assignable to the state engineer. CD shall state on its face that it is automatically renewable.

3.10.3.2. The cash bond shall specifically cover the licensee's compliance with well drilling requirements found in Rule R655-4. The CD shall be made payable or assigned to the state engineer and placed in the possession of the state engineer. If assigned, the state engineer shall require the bank or credit union issuing the CD to waive all rights of setoff or liens against those CD. The CD, if a negotiable instrument, shall be placed in the state engineer's possession. If the CD is not a negotiable instrument, the CD and a withdrawal receipt, endorsed by the licensee, shall be placed in the state engineer's possession.

3.10.3.3. The licensee shall submit CDs in such a manner that will allow the state engineer to liquidate the CD prior to maturity, upon forfeiture, for the full amount without penalty to the state engineer. Any interest accruing on a CD shall be for the benefit of the licensee.

3.10.3.4. The period of liability for a cash bond is five years after the expiration, suspension, or revocation of the license. The cash bond will be held by the state engineer until the five year period is over, then it will be relinquished to the licensed driller. If a cash bond is replaced by a surety bond, the period of liability, during which time the cash bond will be held by the state engineer, shall be five years from the date the new surety bond becomes effective.

3.10.4 Exacting a Well Driller or Pump Installer Bond.

3.10.4.1. If the state engineer determines, following an investigation and a hearing in accordance with the process defined in Sections R655-4-5, R655-4-6, and R655-4-7, that the licensee has failed to comply with Rule R655-4 and refused to remedy the noncompliance, the state engineer may suspend or revoke a license and fully exact the well driller bond and deposit the money as a non-lapsing dedicated credit.

3.10.4.2. The state engineer may expend the funds derived from the bond to investigate or correct any deficiencies which could adversely affect the public interest resulting from noncompliance with this rule by any well driller or pump installer.

3.10.4.3. The state engineer shall send written notification by certified mail, return receipt requested, to the licensee and the surety on the bond, if applicable, informing them of the determination to exact the well driller bond. The state engineer's decision regarding the noncompliance will be attached to the notification which will provide facts and justification for bond exaction. In the case of a surety bond exaction, the surety company will then forfeit the total bond amount to the state engineer. In the case of a cash bond, the state engineer will cash out the CD. The exacted well driller bond funds may then be used by the state engineer to cover the costs of well investigation, repair, or abandonment.

R655-4-4. Administrative Requirements and General Procedures.

4.1 Authorization to Drill or Conduct Regulated Activity.

The well driller and shallow well constructor shall make certain that a valid authorization or approval to drill exists before engaging in regulated well drilling activity. Authorization to drill shall consist of a valid 'Start Card' based on any of the approvals listed in this subsection. Subsections R655-4-4(4.1.1) through R655-4-4(4.1.12) allow the applicant to contract with a well driller to drill, construct, deepen, replace, repair, renovate, or abandon exactly one well at each location listed on the Start Card or approval form. The drilling of multiple borings or wells at an approved location or point of diversion is not allowed without authorization from the state engineer's office. Most Start Cards list the date when the authorization to drill expires. If the expiration date has passed, the Start Card and authorization to engage in regulated drilling activity is no longer valid. If there is no expiration date on the Start Card, the driller must contact the state engineer's office to determine if the authorization to drill is still valid. When the work is completed, the permission to drill is terminated. Preauthorization or pre-approval of pump installation or repair work, well cleaning, development, testing, and disinfection is not required. A well renovation permit is required if an existing well is to be modified by activities such as deepening, casing-seal-gravel pack repair or renovation, liner installation, pitless adapter or unit installation, casing perforating, and screen installation. A well renovation permit is not required if the well is not modified by activities such as cleaning, development, testing, disinfection, and pump work.

4.1.1 An approved application to appropriate.

4.1.2 A provisional well approval letter, also known as a Rush Letter Approval.

An approved provisional well letter grants authority to drill but allows only enough water to be diverted to determine the characteristics of an aquifer or the existence of a usable groundwater source.

4.1.3 An approved permanent change application.

4.1.4 An approved exchange application.

4.1.5 An approved temporary change application.

4.1.6 An approved application to renovate or deepen an existing well.

4.1.7 An approved application to replace an existing well.

4.1.8 An approved monitor well letter.

An approved monitor well letter grants authority to drill but allows only enough water to be diverted to monitor groundwater.

4.1.9 An approved heat exchange well letter.

4.1.10 An approved cathodic protection well letter.

4.1.11 An approved non-production well construction application.

4.1.12 Any letter or document from the state engineer directing or authorizing a well to be drilled or work to be done on a well.

4.2 Start Cards.

4.2.1 Before commencing work to drill, construct, deepen, replace, repair, renovate, clean, or develop any well governed by this rule, the well driller or shallow well constructor must notify the state engineer of that intention by sending the information on the "Start Card" to the state engineer by the online Start Card submittal system, telephone, by fax, by hand delivery, or by email with completed Start Card scanned and attached. If using the telephone, leaving a voice mail is an acceptable notification. Thereafter, a completed original Start Card must be sent to the state engineer by the licensee after it has been telephoned in, including voice mail. A completed original Start Card does not need to be sent to the state engineer by the licensee after it has been submitted online, faxed or emailed. A copy of the Start Card should be kept at the drill site at all times regulated activity is being conducted.

4.2.2 A specific Start Card is printed for each well drilling approval and is furnished by the state engineer to the applicant or the well owner. The Start Card is preprinted with the water right or non-production well number, owner name and address, and the approved location of the well. The state engineer marks the approved well drilling activity on the card. If a Start Card is stamped with 'Special Conditions', the licensee shall contact the state engineer's office to determine what the special drilling conditions or limitations are; then implement them in the drilling and construction of the well. The licensee must put the following information on the card:

a. The date on which work on the well will start;

b. The projected completion date of the work;

- c. The well driller's license number;
- d. The licensed well driller's signature.

4.2.3 When a single authorization is given to drill wells at more than one point of diversion, a Start Card shall be submitted for each location to be drilled.

4.2.4 Following the submittal of a Start Card, if the actual start date of the drilling activity is postponed beyond the date identified on the Start Card, the licensed driller must notify the state engineer of the new start date.

4.2.5 A Start Card is not required to abandon a well. However, before commencing well abandonment work, the driller shall notify the state engineer by telephone, by facsimile, or by email of the proposed abandonment work. The notice must include the location of the well. The notice should also include the water right or non-production well number associated with the well and the well owner if that information is available.

4.2.6 A Start Card or pre-notification is not required to perform pump installation and repair work on a well.

4.3 General Requirements During Construction.

4.3.1 The well driller or pump installer shall have the required penal bond continually in effect during the term of the license; otherwise the license will become inactive.

4.3.2 The well driller's or pump installer's license number or company name exactly as shown on the license must be prominently displayed on each well drilling rig or pump rig operated under the license. If the company name is changed the licensee must immediately inform the state engineer of the change in writing.

4.3.3 A licensed well driller or a registered drill rig operator must be at the well site when the following aspects of well construction are in process: advancing the borehole, setting casing and screen, placing a filter pack, constructing a surface seal, or similar activities involved with well deepening, renovation, repair, cleaning, developing, testing, disinfecting, capping, pitless installation, or abandoning. All registered drill rig operators working under a well driller's license must be employees of the well driller and must use equipment either owned by or leased by the licensed well driller.

4.3.3.1 A licensed pump installer or a registered pump rig operator must be at the well site when the following aspects of pump work are in process: pump removal, pump installation, modification to the well head including capping, sealing, and pitless adapter or unit installation, or similar activities on and within the well involving pump installation or repair. Inasmuch as a licensed pump installer is allowed to clean, develop, test, and disinfect a regulated well, these activities must be performed in the presence of a licensed pump installer or registered pump rig operator. All registered pump rig operators working under a pump installer's license must be employees of the pump installer and must use equipment either owned by or leased by the licensed pump installer.

4.3.3.2 A registered drill rig operator who is left in responsible charge of advancing the borehole, setting casing and screen, placing a filter pack, constructing a surface seal, or similar activities involved with well deepening, renovation, repair, cleaning, developing, testing, disinfecting, capping, pitless installation, or abandoning must have a working knowledge of the minimum construction standards and the proper operation of the drilling rig. The licensed well driller is responsible to ensure that a registered operator is adequately trained to meet these requirements.

4.3.3.3 A registered pump rig operator who is left in responsible charge of pump installation or repair must have a working knowledge of the minimum construction standards and the proper operation of the pump rig. The licensed well driller or pump installer is responsible to ensure that a registered operator is adequately trained to meet these requirements.

4.3.4 State engineer provisions for issuing cease and desist orders, also known as Red Tags

4.3.4.1 Construction Standards: The state engineer or staff of the Division of Water Rights may order that regulated work on a well cease if a field inspection reveals that the construction does not meet the minimum construction standards to the extent that the public interest might be adversely affected.

4.3.4.2 Licensed Drilling Method: A cease work order may also be issued if the well driller is not licensed for the drilling method being used for the well construction.

4.3.4.3 Incompetent Registered Operator: If, during a field inspection by the staff of the Division of Water Rights, it is determined that a registered operator in responsible charge does not meet these requirements, a state engineer's red tag, in accordance with Subsection R655-4-3(3.4), shall be placed on the drilling rig or pump rig and the drilling or pump operation shall be ordered to shut down. The order to cease work shall remain effective until a qualified person is available to perform the work.

4.3.4.4 No licensee or registered operator on site: If, during a field inspection by the staff of the Division of Water Rights, it is determined that neither a licensee or registered operator are on site when regulated well activity is occurring, the state engineer may order regulated well work to cease.

4.3.4.5 General: The state engineer's order shall be in the form of a red tag which shall be attached to the drilling rig or pump rig. A letter from the state engineer shall be sent to the licensee to explain the sections of this rule that were violated. The letter shall also explain the requirements that must be met before the order can be lifted.

4.3.4.6 A licensee may appeal a Cease and Desist order by:

4.3.4.6.1 submitting to the Division a written statement clearly and concisely stating the specific disputed facts, the supporting facts, and the relief sought; or

4.3.4.6.2 requesting a hearing on the issue according to Section R655-4-7.

4.3.4.7 A Cease and Desist Order shall remain in force during the pendency of the appeal.

4.3.5 When required by the state engineer, the well driller or registered operator shall take lithologic samples at the specified intervals and submit them in the bags provided by the state engineer.

4.3.6 A copy of the effective Rule R655-4 should be available at each well construction site for review by the construction personnel. Licensed well drillers or pump installers and registered operators must have proof of licensure or registration with them on site during regulated well activity.

4.3.7 Before starting construction of a new well, the licensed driller shall investigate and become familiar with the drilling conditions, geology of potential aquifers and overlying materials, anticipated water quality problems, and know contaminated water bearing zones that may be encountered in the area of the proposed drilling activity.

4.4 Removing Drill Rig from Well Site.

4.4.1 A well driller shall not remove the drill rig from a well site unless the well drilling activity is properly completed or abandoned in accordance with the construction standards in Sections R655-4-9 through R655-4-12.

4.4.2 For this rule, the regulated work on a well will be considered completed when the well driller removes the drilling rig from the well site. The regulated pump work on a well will be considered completed when the pump installer removes the pump rig from the well site.

4.4.3 The well driller may request a variance from the state engineer to remove a drill rig from a well before completion or abandonment. This request must be in written form to the state engineer. The written request must provide justification for leaving the well incomplete or un-abandoned and show how the well will be temporarily abandoned as provided in Section R655-4-14 and must give the date when the well driller plans to continue work to either complete the well or permanently abandon it.

4.5 Official Well Driller's Report, also known as a well log.

4.5.1 Within 30 days of the completion of regulated work on any well, the licensee shall file an official well log with the state engineer. The blank well log form will be mailed to the licensee upon receipt of the information on the Start Card as described in Subsection R655-4-4(4.2).

4.5.2 The water right number or non-production well number, owner name and address, and the approved location of the well will be preprinted on the blank well log provided to the well driller. The driller shall verify this information and make any necessary changes on the well log before submittal. The state engineer will mark the approved activity, such as new, replace, repair, deepen, on the well log. The driller must provide the following information on the well log:

- a. The start and completion date of work on the well;
- b. The nature of use for the well such as domestic, irrigation, stock watering, commercial, municipal, provisional, monitor, cathodic protection, or heat pump;
- c. The borehole diameter, depth interval, drilling method and drilling fluids utilized to drill the well;
- d. The lithologic log of the well based on strata samples taken from the borehole as drilling progresses;
- e. Static water level information to include date of measurement, static level, measurement method, reference point, artesian flow and pressure, and water temperature;
- f. The size, type, description, joint type, and depth intervals of casing, screen, and perforations;
- g. A description of the filter pack, surface and interval seal material, and packers used in the well along with necessary related information such as the depth interval, quantity, and mix ratio;
- h. A description of the finished wellhead configuration;
- i. The date and method of well development;
- j. The date, method, yield, drawdown, and elapsed time of a well yield test;
- k. A description of pumping equipment ,if available;
- l. Other comments pertinent to the well activity completed;
- m. The well driller's statement to include the driller name, license number, signature, and date.

4.5.3 Accuracy and completeness of the submitted well log are required. Of particular importance is the lithologic section that should accurately reflect the geologic strata penetrated during the drilling process. Sample identification must be logged in the field as the borehole advances and the information transferred to the well log form for submission to the state engineer.

4.5.4 An amended well log shall be submitted by the licensee if it becomes known that the original report contained inaccurate or incorrect information, or if the original report requires supplemental data or information. Any amended well log must be accompanied by a written statement, signed and dated by the licensee, attesting to the circumstances and the reasons for submitting the amended well log.

4.6 Official Well Abandonment Reports, Also Known as Abandonment Logs.

4.6.1 When a well driller is contracted to replace an existing well under state engineer's approval, it shall be the responsibility of the well driller to inform the well owner that it is required by law to permanently abandon the old well in accordance with Section R655-4-14.

4.6.2 Within 30 days of the completion of abandonment work on any well, the driller shall file an abandonment log with the state engineer. The blank abandonment log will be mailed to the licensed well driller upon notice to the state engineer of the start of abandonment work as described in Subsection R655-4-4(4.2.5).

4.6.3 The water right number or non-production well number, owner name and address, and the well location ,if available, will be preprinted on the blank abandonment log provided to the well driller. The driller shall verify this information and make any necessary changes on the abandonment log before submitting the log. The driller must provide the following information on the abandonment log:

- a. Existing well construction information;
- b. Date of abandonment;

- c. Reason for abandonment;
- d. A description of the abandonment method;
- e. A description of the abandonment materials including depth intervals, material type, quantity, and mix ratio;
- f. Replacement well information ,if applicable,;
- g. The well driller's statement to include the driller name, license number, signature, and date.

4.6.4 When a well is replaced and the well owner will not allow the driller to abandon the existing well, the driller must briefly explain the situation on the abandonment form and submit the form to the state engineer within 30 days of completion of the replacement well.

4.7 Official Pump Installation Report, Also Known as a Pump Log.

4.7.1 Soon after the completion of regulated pump work on any well, the licensee shall file an official pump log with the state engineer. If well disinfection is the only activity on a well, a pump log need not be filed with the state engineer. Blank pump log forms will be available to the licensee at any Division office, requested by mail, or downloaded from the Division's website (www.waterrights.utah.gov).

4.7.2 Pertinent information to be included on the pump log by the licensee shall consist of:

- a. the water right number or non-production well number;
- b. the well owner name and address;
- c. the approved point of diversion or location of the well;
- d. the start and completion date of work on the well;
- e. the nature of use for the well such as domestic, irrigation, stock watering, commercial, municipal, provisional, monitor, cathodic protection, and heat pump;
- f. pertinent well details including casing diameters and depths, total well depth, well intake depth intervals, wellhead configuration including pitless adapter or unit configuration if applicable;
- g. a detailed description of pump-related work performed on or in the well including pump setting depth, pump type, pumping rate, valving, drop piping, jointing, capping, testing, sealing, disinfection, and pitless adapter or unit installation; and
- h. static water level information to include date of measurement, static level, measurement method, reference point, artesian flow and pressure, and water temperature;
- i. a description of the finished wellhead configuration;
- j. the date, method, yield, drawdown, and elapsed time of a well yield test;
- k. other comments pertinent to the well activity completed; and
- m. the pump installer's statement to include the licensee name, license number, signature, and date.

4.8 Incomplete or Incorrectly Completed Reports.

An incomplete log or a log that has not been completed correctly will be returned to the licensee to be completed or corrected. The log will not be considered filed with the state engineer until it is complete and correct.

4.8 Extensions of Time.

The well driller may request an extension of time for filing the well log if there are circumstances that prevent the driller from obtaining the necessary information before the expiration of the 30 days. The extension request must be submitted in writing before the end of the 30-day period.

4.9 Late Well Logs - Lapsed License

All outstanding well logs or abandonment logs shall be properly submitted to the state engineer before the lapsing of a license. A person with a lapsed license who has failed to submit all logs within 90 days of lapsing will be subject to the state engineer's enforcement powers under Section 73-2-25 and Rule R655-14.

R655-4-5. Administrative Rule Infractions.

5.1 List of Infractions and Points.

Licensed well drillers who commit the infractions listed in Table 1 shall have assessed against their well drilling record the number of points assigned to the infraction.

TABLE 1 Level I Infractions of Administrative Requirements	
Infraction	Points
Well log submitted late	10
Failure to submit a Pump Log	10
Well abandonment report submitted late	10
License number or company name not clearly posted on well drilling rig or pump rig	10
Failing to notify the state engineer of a change in the well licensee's company name	10
Failure to properly notify the state engineer before the proposed start date shown on the Start Card	20
Failure to properly notify the state engineer before the abandonment of a regulated well	20

Failure to notify the state engineer of a change of start date	50
Constructing a replacement well further than 150 ft from the original well without the authorization of an approved change application	50
Failure to drill at the state engineer-approved location as identified on the Start Card	50
Removing the well drilling rig from the well site before completing the well or temporarily or permanently abandoning the well	50

TABLE 2 Level II Infractions of Administrative Requirements	
Infraction	Points
Employing an operator who is not registered with the state	75
Contracting out work to an unlicensed driller, using the unlicensed driller's rig, without written approval from the state	75
Performing any well drilling activity without valid authorization, except in emergency situations	100
Intentionally making a material misstatement of fact in an official log or amended log	100

TABLE 3 Level III Infractions of Construction Standards and Conditions	
Infraction	Points
Approvals Using a method of drilling not listed on the well driller's license	30
Failing to comply with any conditions included on the well approval such as minimum or maximum depths, specified location of perforations	50
Performing any well construction activity in violation of a red tag cease work order	100
Casing Failure to extend well casing at least 18" above ground	30
Failure to install casing in accordance with this rule	50
Failure to install a protective casing around a PVC well at the surface	50
Using improper casing joints	100
Using or trying to use sub-standard well casing	100
Surface Seals Using improper products or procedures to install a surface seal	100
Failure to seal off artesian flow on the outside of casing	100
Failure to install surface seal to adequate depth based on formation type	100
Failure to install interval seals to eliminate aquifer commingling or cross contamination	100
Well Abandonment Using improper procedures to abandon a well	100
Using improper products to abandon a well	100
Construction Fluids	40

Using water of unacceptable quality in the well drilling operation	
Using an unacceptable mud pit	40
Failure to use treated or disinfected water for drilling processes	40
Using improper circulation materials or drilling chemicals	100
Filter or Gravel Packs and Formation Stabilizers	40
Failure to disinfect filter pack	
Failure to install filter pack properly	75
Failure to install formation stabilizer according to standard	75
Well Completion	30
Failure to make well accessible to water level or pressure head measurements	
Failure to install casing annular seals, cap, and valving, and to control artesian flow	30
Failure to disinfect a well upon completion of well drilling activity	40
Failure to install sanitary well capping according to standard	75
Failure to install a pitless adapter or unit according to standard	75
Failure to develop and test a well according to standard	75
Failure to hydrofracture a well according to standard	75
Failure to install packers or plugs according to standard	75
Failure to install well intakes, including screens, perforations, and open bottoms, according to standard	75
Failure to install non-production wells according to standard	100
Pump Installation and Repair	30
Failure to extend well casing at least 18" above ground	
Failure to make well accessible to water level or pressure head measurements	30
Failure to install casing annular seals, cap, and valving, and to control artesian flow	30
Failure to disinfect a well upon completion of pump activity	40
Failure to install a protective casing around a PVC well at the surface	50
Failure to maintain surface completion and security standards	75
Failure to install or maintain backflow protection	75
Failure to develop and test a well according to standard	75
Failure to install sanitary well capping according to standard	75
Failure to install a pitless adapter or unit according to standard	75
Failure to prevent contamination from entering a well through placement, products, tools, and materials	100
Failure to repair a well's surface seal	100

General Failure to securely cover an unattended well during construction	30
Failure to engage in well drilling activity in accordance with accepted industry practices	100

TABLE 4 Level IV Infractions of Application Requirements	
Infraction	Points
Submitting an initial license or registration application that contains false or misleading information	100

5.2 When Points Are Assessed.

Points will be assessed against a driller's record upon verification by the state engineer that an infraction has occurred. Points will be assessed when the state engineer becomes aware of the infraction regardless of when the infraction occurred.

5.3 Infraction Notice

When infraction points are assessed against a well driller's record, the state engineer shall issue an infraction notice to the well driller. The notice shall include an explanation of the alleged violations, the date the alleged violations were discovered and the approximate date of occurrence, the number of points assessed for each infraction, the total number of points on the well drillers record, an explanation of the adjudicative process to appeal a cease and desist order and or infraction notice, and an explanation of how to delete points from the driller record, an any other information deemed pertinent by the state engineer.

5.4 Appeal of Infractions.

5.4.1 If the infraction points do not require a hearing, a well driller may appeal an infraction within 30 days of the date the infraction notice was issued. The appeal shall be made in writing to the state engineer and shall state clearly and concisely the disputed facts, the supporting facts, and the relief sought.

5.4.2 A well driller may request reconsideration of a denied appeal by requesting a hearing before the Presiding Officer within 20 days of the denial. If the Presiding Officer does not respond within 20 days after the request is submitted, then it is deemed denied.

5.5 Deleting Points from the Driller Record.

Points assessed against a well driller's record shall remain on the record unless deleted through any of the following options:

5.5.1 Points shall be deleted three years after the date when the infraction is noted by the state engineer and the points are assessed against the driller's record.

5.5.2 One half the points on the record shall be deleted if the well driller is free of infractions for an entire year.

5.5.3 Thirty points shall be deleted for obtaining six hours of approved continuing education credits in addition to the credits required to renew the water well driller's license. A driller may exercise this option only once each year.

5.5.4 Twenty points shall be deleted for taking and passing, with a minimum score of 70%, the test covering the administrative requirements and the minimum construction standards. A driller may exercise this option only every other year.

5.6 Well Driller Hearings.

When the number of infraction points assessed against the well driller's record equals or exceeds 100, the state engineer shall submit a request to the Presiding Officer for a hearing. The requested purpose of the hearing shall be to determine if administrative penalties should be levied against the water well driller including fines and probation, suspension, or revocation of the water well driller's. In lieu of a hearing, the well driller may request a preliminary conference to resolve and agree upon the dispute, fines, and penalties. If resolution cannot be reached at the preliminary conference, a hearing shall be held.

5.7 Lack of Knowledge Not an Excuse.

Lack of knowledge of the law or the administrative requirements and minimum construction standards related to well drilling shall not constitute an excuse for committing a violation.

R655-4-6. Administrative Penalties.

Administrative penalties ordered against a licensed driller by the Presiding Officer following a hearing can include probation, administrative fines, license suspension, and license revocation. Administrative penalties are ordered based on the severity of the infraction, see Level I, II, III from Tables 1-3 of Subsection R655-4-5(5.1) as well as the recurrence of an infraction. The maximum administrative fine per infraction shall be capped at \$1000.

6.1 Level I Administrative Penalties: Level I administrative penalties shall be levied against Level I administrative infractions, see Table 1 of Subsection R655-4-5(5.1). The Level I administrative penalty structure is as follows:

6.1.1 At the first conviction of Level I infractions, the disciplinary action for the infractions shall be probation.

6.1.2 Second conviction shall result in probation and a fine at a rate of \$2.50 per infraction point.

6.1.3 Third conviction shall result in probation and an elevated fine at a rate of \$5 per infraction point.

6.1.4 Fourth conviction shall result in an elevated fine at a rate of \$10 per infraction point and possible suspension.

6.1.5 Continued and repeated convictions beyond the fourth conviction may result in an elevated fine at a rate of \$10 per infraction point and possible suspension or revocation.

6.1.6 Fines for late well logs and abandonment logs shall be calculated separately and added to fines calculated for other infractions. For late well log infractions, the points associated with each infraction shall be multiplied by a factor based on the lateness of the well log. The infraction point multipliers are as follows in Table 5:

Tardiness of the Log	Infraction Point Multiplier
1-2 weeks	0.50
2-4 weeks	1.00
1-3 months	1.50
3-6 months	2.00
6-9 months	2.50
9-12 months	3.00
Over 12 months	4.00

6.2 Level II Administrative Penalties: Level II administrative penalties shall be levied against Level II administrative infractions, see Table 2 of Subsection R655-4-5(5.1). The Level II administrative penalty structure is as follows:

6.2.1 At the first conviction of Level II infractions, the disciplinary action shall result in probation and a fine at a rate of \$2.50 per infraction point.

6.2.2 Second conviction shall result in probation and an elevated fine at a rate of \$5 per infraction point.

6.2.3 Third conviction shall result in possible suspension and an elevated fine at a rate of \$10 per infraction point.

6.2.4 Continued and repeated convictions beyond the fourth conviction may result in an elevated fine at a rate of \$10 per infraction point and possible suspension or revocation.

6.3 Level III Administrative Penalties: Level III administrative penalties shall be levied against Level III construction infractions. See Table 3 of Subsection R655-4-5(5.1). The Level III administrative penalty structure is as follows:

6.3.1 At the first conviction of Level III infractions, the disciplinary action shall result in probation and a fine at a rate of \$5 per infraction point.

6.3.2 Second conviction shall result in possible suspension and an elevated fine at a rate of \$10 per infraction point.

6.3.3 Third conviction may result in an elevated fine at a rate of \$10 per infraction point and possible suspension or revocation.

6.3.4 Level IV Administrative Penalties: The Level IV administrative penalty shall be levied against a Level IV application requirement infraction. See Table 4 of Subsection R655-4-5(5.1). The Level IV administrative penalty is revocation of the license at first conviction.

6.4 Administrative Penalties - General

6.4.1 Penalties shall only be imposed as a result of a well driller hearing.

6.4.2 Failure to pay a fine within 30 days from the date it is assessed shall result in the suspension of the well driller license until the fine is paid.

6.4.3 Fines shall be deposited as a dedicated credit. The state engineer shall spend the money retained from fines for expenses related to well drilling activity inspection, well drilling enforcement, and well driller education.

6.5 Probation: As described in Subsections R655-4-6(6.1), R655-4-6(6.2), and R655-4-6(6.3), probation shall generally be the disciplinary action imposed in situations where the facts established through testimony and evidence describe first time infractions that are limited in number and less serious in their impact on the well owner and on the health of the aquifer. The probation period shall generally last until the number of infraction points on the well driller's record is reduced below 70 through any of the options described in Subsection R655-4-5(5.5).

6.6 Suspension: Suspension shall generally be the disciplinary action imposed in situations where the facts established through testimony and evidence describe repeated convictions of this rule, or infractions that pose a serious threat to the health of the aquifer, or a well driller's apparent disregard for this rule or the state's efforts to regulate water well drilling. Depending upon the number and severity of the rule infractions as described in Subsections R655-4-6(6.1), R655-4-6(6.2), and R655-4-6(6.3), the state engineer may elect to suspend a well driller license for a certain period or until certain conditions have been met by the well driller. In establishing the length of the suspension, the state engineer shall generally follow the guideline that three infraction points is the equivalent of one day of suspension. A well driller whose license has been suspended shall be prohibited from engaging in regulated well drilling activity. License suspension may also result in the exaction of the well driller bond as set forth in Subsection R655-4-3(3.9.4). A well driller whose license has been suspended is allowed to work as a registered operator under the direct, continuous supervision of a licensed well driller. If the suspension period extends beyond the expiration date of the water well driller license, the water well driller may not apply to renew the license until the suspension period has run and any conditions have been met. Once the suspension period has run and once all conditions have been met by the well driller, the suspension shall be lifted and the driller shall be notified that the licensee may again engage in the well drilling business. The well driller shall then be placed on probation until the number of infraction points on the well driller's record is reduced below 70 through any of the options described in Subsection R655-4-5(5.5).

6.7 Revocation: Revocation shall generally be the disciplinary action imposed in situations where the facts established through testimony and evidence describe repeated convictions of this rule for which the well driller's Utah Water Well License

has previously been suspended. Revocation shall also be the disciplinary action taken if after a hearing the facts establish that a driller knowingly provided false or misleading information on a driller license application. A well driller whose license has been revoked shall be prohibited from engaging in regulated well drilling activity. License revocation may also result in the exaction of the well driller bond as set forth in Subsection R655-4-3(3.9.4). A well driller whose license has been revoked is allowed to work as a registered operator under the direct, continuous supervision of a licensed well driller. A well driller whose water well license has been revoked may not apply for a new water well license for a period of two years from the date of revocation. After the revocation period has run, a well driller may apply for a new license as provided in Section R655-4-3. However, the well drilling experience required must be based on new experience obtained since the license was revoked.

R655-4-7. Adjudicative Proceedings.

7.1 Designation of Presiding Officers.

The following persons may be designated Presiding Officers for well driller adjudicative proceedings: assistant state engineers; deputy state engineers; or other qualified persons designated by the state engineer.

7.2 Disqualification of Presiding Officers.

7.2.1 A Presiding Officer shall be disqualified from performing the functions of the Presiding Officer regarding any matter in which a spouse, or a person within the third degree of relationship to either of them or the spouse of such person:

7.2.1.1 Is a party to the proceeding, or an officer, director, or trustee of a party;

7.2.1.2 Has acted as an attorney in the proceeding or served as an attorney for, or otherwise represented, a party concerning the matter in controversy;

7.2.1.3 Knows of a financial interest, either individually or as a fiduciary, in the subject matter in controversy or in a party to the proceeding;

7.2.1.4 Knows of any other interest that could be substantially affected by the outcome of the proceeding; or

7.2.1.5 Is likely to be a material witness in the proceeding.

7.2.2 A Presiding Officer is also subject to disqualification under principles of due process and administrative law.

7.2.3 These requirements are in addition to any requirements under the Utah Public Officers' and Employees' Ethics Act, Section 67-16-1 et seq.

7.2.4 A motion for disqualification shall be made first to the Presiding Officer. If the Presiding Officer is appointed, any determination of the Presiding Officer upon a motion for disqualification may be appealed to the state engineer.

7.3 Informal Proceedings

7.3.1 All adjudicative proceedings initiated under this rule are classified as informal adjudicative proceedings.

7.3.1 The procedures for informal adjudicative proceedings initiated under this rule are set forth in this rule.

7.4 Service of Notice and Orders.

7.4.1 Hearing Notices and Final Judgment and Orders shall be served upon the well driller at the well driller's address using certified mail or methods described in Rule 5 of the Utah Rules of Civil Procedure.

7.4.2 Infraction notices, notices of approval or denial of licensing or registration or license or registration renewal, and other routine correspondence related to the Division's Well Drilling Program shall be sent to the well driller at the well driller's address by regular U.S. Mail.

7.5 Computation of Time.

7.5.1 Computation of any time period referred to in this rule shall begin with the first day following the act that initiates the running of the time period. The last day of the time period computed is included unless it is a Saturday, Sunday, or legal holiday or any other day on which the Division is closed, in which event the period shall run until the end of the business hours of the following business day.

7.5.2 The Presiding Officer, for good cause shown, may extend any time limit contained in this rule, unless precluded by statute. All requests for extensions of time shall be made by motion.

7.6 Request for Hearing

7.6.1 A hearing before a Presiding Officer is permitted in a well drilling adjudicative proceeding if:

7.6.1.1 The proceeding was started by an infraction notice; or

7.6.1.2 The proceeding was started by a well driller request raising a genuine issue regarding

7.6.1.2.1 The denial of a license or registration renewal application; or

7.6.1.2.2 The issuance of a cease and desist order, also known as a red tag.

7.6.2 Regardless of any other provision to the contrary, all requests for a hearing shall be in writing and shall be filed with the Division to the attention of the Presiding Officer.

7.6.3 The request for a hearing shall state clearly and concisely the disputed facts, the supporting facts, the relief sought, and any additional information required by applicable statutes and rules.

7.6.4 The Presiding Officer shall, give all parties at least ten days notice of the date, time and place for the hearing. The Presiding Officer may grant requests for continuances for good cause shown.

7.6.5 Any party may, by motion, request that a hearing be held at some place other than that designated by the Presiding Officer, due to disability or infirmity of any party or witness, or where justice and equity would be best served.

7.6.6 A well driller at any time may withdraw the well driller's request for a hearing. The withdrawal shall be filed with the Division to the attention of the Presiding Officer, in writing, signed by the well driller or an authorized representative, and is deemed final upon the date filed.

7.7 Filings Generally.

7.7.1 Papers filed with the Division shall state the title of the proceeding and the name of the well driller on whose behalf the filing is made.

7.7.2 Papers filed with the Division shall be signed and dated by the well driller on whose behalf the filing is made or by the well driller's authorized representative. The signature constitutes certification that the well driller:

7.7.2.1 Read the document;

7.7.2.2 Knows the content;

7.7.2.3 To the best of the well driller's knowledge, represents that the statements are true;

7.7.2.4 Does not interpose the papers for delay; and

7.7.2.5 If the well driller's signature does not appear on the paper, authorized a representative with full power and authority to sign the paper.

7.7.3 All papers, except those submittals and documents that are kept in a larger format during the ordinary course of business, shall be submitted on an 8.5 x 11-inch paper. All papers shall be legibly hand printed or typewritten.

7.7.4 The Division may provide forms to be used by the parties.

7.7.5 The original of all papers shall be filed with the Division with such number of additional copies as the Division may reasonably require.

7.7.6 Simultaneously with the filing of any papers with the Division, the party filing such papers shall send a copy to all other parties, or their authorized representative to the proceedings, by hand delivery, or U.S. Mail, postage prepaid, properly addressed.

7.8 Motions.

7.8.1 A party may submit a request to the Presiding Officer for any order or action not inconsistent with Utah law or this rule. Such a request shall be called a motion. The types of motions made shall be those that are allowed under this rule and the Utah Rules of Civil Procedure.

7.8.2 Motions may be made in writing at any time before or after the start of a hearing, or they may be made orally during a hearing. Each motion shall set forth the grounds for the desired order or action and, if submitted in writing, state whether oral argument is requested. A written supporting memorandum, specifying the legal basis and support of the party's position shall accompany all motions.

7.8.3 The Presiding Officer may, upon the Presiding Officer's own initiative or upon the motion of any party, order any party to file a response or other pleading, and further permit either party to amend its pleadings in a manner just to all parties.

7.8.4 Preliminary Conference. Parties may request to appear for a preliminary conference before a hearing or before the scheduled start of a hearing or at any time before issuing a Final Judgment and Order. All parties shall prepare and exchange the following information at the initial preliminary conference:

1. names and addresses of prospective witnesses including proposed areas of expertise for expert witnesses;

2. a brief summary of proposed testimony;

3. a time estimate of each witness' direct testimony;

4. curricula vitae or resumes of all prospective expert witnesses;

5. the scheduling of a preliminary conference shall be solely within the discretion of the Presiding Officer;

6. the Presiding Officer shall give all parties at least three days notice of the preliminary conference;

7. the notice shall include the date, time and place of the preliminary conference. The purpose of a preliminary conference is to consider any of the following:

a. The simplification or clarification of the issues;

b. The possibility of obtaining stipulations, admissions, agreements on documents, understandings on matters already of record, or similar agreements which shall avoid unnecessary proof;

c. The limitation of the number of witnesses or avoidance of similar cumulative evidence, if the case is to be heard;

d. The possibility of agreement disposing of all or any of the issues in dispute; or

e. Such other matters as may aid in the efficient and equitable disposition of the adjudicative enforcement proceeding.

7.8.5 Consent Order: If the respondent substantially agrees with or does not contest the statements of fact in the initial order, or if the parties agree to specific amendments to the statements of fact in the initial order, the parties may enter into a Consent Order after a preliminary conference by stipulating to the facts, fines, and penalties, if any. A Consent Order based on that stipulation, shall be prepared by the state engineer for execution by the parties. The executed Consent Order shall be reviewed by the Presiding Officer and, if found to be acceptable, will be signed and issued by the Presiding Officer. A Consent Order issued by the Presiding Officer is not subject to reconsideration or judicial review.

7.9 Conduct of Hearings.

7.9.1 All parties, authorized representatives, witnesses and other persons present at the hearing shall conduct themselves in a manner consistent with the standards and decorum commonly observed in Utah courts. Where such decorum is not observed, the Presiding Officer may take appropriate action including adjournment, if necessary.

7.9.2 The Presiding Officer shall conduct the hearing, make all decisions regarding admission or exclusion of evidence or any other procedural matters, and have an oath or affirmation administered to all witnesses.

7.10 Rules of Evidence in Hearings.

7.10.1 Discovery is prohibited, but the Division may issue subpoenas or other orders to compel production of necessary evidence.

7.10.2 A party may call witnesses and present oral, documentary, and other evidence.

7.10.3 A party may comment on the issues and conduct cross-examination of any witness as may be required for a full and true disclosure of all facts relevant to any issue designated for hearing, and as may affect the disposition of any interest which permits the person participating to be a party.

7.10.4 A witness' testimony shall be under oath or affirmation.

7.10.5 Any evidence may be presented by affidavit rather than by oral testimony, subject to the right of any party to call and examine or cross-examine the affiant.

7.10.6 Relevant evidence shall be admitted.

7.10.7 The Presiding Officer's decision may not be based solely on hearsay.

7.10.8 Official notice may be taken of all facts of which judicial notice may be taken in Utah courts.

7.10.9 All parties shall have access to public information contained in the Division's files and to all materials and information gathered in the investigation, to the extent permitted by law.

7.10.10 No evidence shall be admitted after completion of a hearing or after a case is submitted on the record, unless otherwise ordered by the Presiding Officer.

7.10.11 Intervention is prohibited.

7.10.12 A well driller appearing before the Presiding Officer for a hearing may be represented by a licensed attorney. The Water Well Drilling Specialist shall present evidence before a Presiding Officer supporting the state engineer's claim. At the state engineer's discretion, other Division staff or a representative from the office of the Attorney General may also present supporting evidence.

7.11 Transcript of Hearing.

7.11.1 Testimony and argument at the hearing shall be recorded electronically. The Division shall make copies of electronic recordings available to any party, upon written request. The fee charged for this service shall be equal to the actual costs of providing the copy. The Division is not responsible to supply any party with a transcript of a hearing.

7.11.2 If any party shall cause to be produced a transcript of a hearing, a copy of said transcript shall be filed with the Division and provided to all other parties. By order of the Presiding Officer and with the consent of all parties, such written transcript may be deemed an official transcript.

7.11.3 Corrections to an official transcript may be made only to conform it to the evidence presented at the hearing. Transcript corrections, agreed to by opposing parties, may be incorporated into the record, if and when approved by the Presiding Officer, at any time during the hearing, or after the close of the adjudicative proceeding. The Presiding Officer may call for the submission of proposed corrections and may determine the disposition at appropriate times during the proceeding.

7.12 Procedures and Standards for Orders

7.12.1 If the well driller attends the hearing, the Presiding Officer shall issue a Final Judgment and Order.

7.12.2 The Presiding Officer may issue a Default Order if, after proper notice, the well driller fails to attend a hearing scheduled by the Presiding Officer.

7.12.3 Within a reasonable time after the close of a well driller adjudicative proceeding, the Presiding Officer shall issue a written and signed Final Judgment and Order, including:

7.12.3.1 A statement of law and jurisdiction;

7.12.3.2 A statement of facts;

7.12.3.3 An identification of the confirmed infractions;

7.12.3.4 An order setting forth actions required of the well driller;

7.12.3.5 A notice of the option to request reconsideration and the right to petition for judicial review;

7.12.3.6 The time limits for requesting reconsideration or filing a petition for judicial review; and

7.12.3.7 Other information the Presiding Officer deems necessary or appropriate.

7.12.4 The Presiding Officer's Final Judgment and Order shall be based on the record, as defined in this rule.

7.12.5 A copy of the Presiding Officer's Final Judgment and Order shall be promptly mailed to each of the parties.

7.12.6 A well driller who fails to attend a hearing waives any right to request reconsideration of the Final Judgment and Order per Subsection R655-4-7(7.13), but may petition for judicial review per Subsection R655-4-7(7.16).

7.13 Reconsideration.

7.13.1 Within 14 days after the Presiding Officer issues a Final Judgment and Order, any party may file a written request for reconsideration stating the specific grounds upon which relief is requested.

7.13.2 Unless otherwise provided by statute, the filing of a request for reconsideration is not a prerequisite for seeking judicial review of the order.

7.13.3 The request for reconsideration shall be filed with the Division to the attention of the Presiding Officer and one copy shall be mailed to each party by the party filing the request.

7.13.4 The Presiding Officer may issue a written order granting or denying the request for reconsideration. It is not required that the written order explain the grounds for the Presiding Officer's decision.

7.13.5 If the Presiding Officer does not issue an order granting a request for reconsideration within 14 days after the date it is filed with the Division, the request shall be considered denied.

7.14 Amending Administrative Orders.

7.14.1 On the motion of any party or of the Presiding Officer, the Presiding Officer may amend a Final Judgment and Order for reasonable cause shown, including a clerical mistake made in the preparation of the order.

7.14.2 A motion by any party to amend an order shall be made in a reasonable time and, if to amend a Final Judgment and Order, not more than three months after the Final Judgment and Order was issued.

7.14.3 The Presiding Officer shall notify the parties of the receipt and consideration of a motion to amend an order by issuing a notice. The notice shall include a copy of the motion.

7.14.4 Any party opposing a motion to amend an order may submit information within the time period to be established by the Presiding Officer's notice of the motion.

7.14.5 After considering a motion to amend an order and any relevant information received from the parties, the Presiding Officer shall advise the parties of the determination. If the Presiding Officer determines that the order shall be amended, the Presiding Officer shall issue the amended order to all parties.

7.15 Setting Aside a Final Judgment and Order.

7.15.1 On the motion of any party or on a motion by the Presiding Officer, the Presiding Officer may set aside a Final Judgment and Order on any reasonable grounds, including the following:

7.15.1.1 The well driller was not properly served with an infraction notice;

7.15.1.2 A rule or policy was not followed when the Final Judgment and Order was issued;

7.15.1.3 Mistake, inadvertence, excusable neglect;

7.15.1.4 Newly discovered evidence which by due diligence could not have been discovered before the Presiding Officer issued the Final Judgment and Order; or

7.15.1.5 Fraud, misrepresentation or other misconduct of an adverse party;

7.15.2 A motion to set aside a final order shall be made in a reasonable time and not more than three months after the Final Judgment and Order was issued.

7.15.3 The Presiding Officer shall notify the parties of the receipt and consideration of a motion to set aside a final order by issuing a notice to all parties, including a copy of the motion.

7.15.4 Any party opposing a motion to set aside a final order may submit information within the time period to be established by the Presiding Officer's notice of the motion.

7.15.4 After consideration of the motion to set aside an order and any information received from the parties, the Presiding Officer shall issue an order granting or denying the motion, and provide a copy of the order to all parties.

7.16 Judicial Review.

7.16.1 Pursuant to Section 73-3-14, a Final Judgment and Order may be reviewed by trial de novo by the district court:

7.16.1.1 In Salt Lake County; or

7.16.1.2 In the county where the violation occurred.

7.16.2 A well driller shall file a petition for judicial review of a Final Judgment and Order within 20 days from the day on which the order was issued, or if a request for reconsideration has been filed and denied, within 20 days of the date of denial of the request for reconsideration.

7.16.3 The Presiding Officer may grant a stay of an order or other temporary remedy during the pendency of the judicial review on the Presiding Officer's own motion, or upon the motion of a party. The procedures for notice, for consideration of motions, and for issuing a determination shall be as set forth for a motion to set aside a Final Judgment and Order.

R655-4-8. License and Operator Registration Renewal.

8.1 Well Driller and Pump Installer Licenses. The Division will mail to each licensed well driller and pump installer a notice packet to renew the license about 30 days before the expiration of the license. Failure to receive the notice does not relieve a licensee of an obligation to file application and pay the fee for renewal in a timely manner. A well driller shall notify the Division of any change in mailing address within 30 days after the change.

8.1.1 Well driller licenses and Pump Installer licenses shall expire and be renewed according to the following provisions:

a. The licenses of well drillers and pump installers whose last name begins with A through L shall expire at 12 midnight on June 30 of odd numbered years.

b. The licenses of well drillers and pump installers whose last name begins with M through Z shall expire at 12 midnight on June 30 of even numbered years.

c. Drillers and pump installers who meet the renewal requirements set forth in Subsection R655-4-8(8.1.2) on or before the expiration deadlines set forth in Subsection R655-4-8(8.1.1) shall be authorized to operate as a licensed well driller or pump installer until the new license is issued. If a licensee does not complete the renewal requirements by the license expiration date, the license will become inactive, and the licensee must cease and desist all regulated work until the license has been renewed.

d. Licensees must renew their licenses within 24 months of the license expiration date. Licensees failing to renew within 24 months of the license expiration date must re-apply for a license, meet all the application requirements of Subsection R655-4-3(3.2) if re-applying for a well driller's license or Subsection R655-4-3(3.4) if re-applying for a pump installer's license, and provide documentation of 12 hours of continuing education according to the requirements of Subsection R655-4-8(8.2) obtained within the previous 24 months.

8.1.2 Applications to renew a license must include the following items:

a. payment of the license renewal fee determined and approved by the legislature;

b. written application to the state engineer;

c. documentation of continuing well driller bond coverage in the amount of \$5,000 penal bond for the next licensing period. The form and conditions of the well driller bond shall be as set forth in Subsection R655-4-3(3.9). Allowable documentation can include bond continuation certificates and CD statements;

d. as applicable to the type of license, proper submission of all Start Cards, official well driller reports, also known as well logs, pump installer reports, also known as pump logs, and well abandonment reports for the current licensing period;

e. documentation of compliance with the continuing education requirements described in Subsection R655-4-8(8.2). Acceptable documentation of attendance at approved courses must include the following information: the name of the course, the date it was conducted, the number of approved credits, the name and signature of the instructor and the licensee's name; for example, certificates of completion, transcripts, attendance rosters, or diplomas. Licensees are advised that the state engineer will not keep track of the continuing education courses each licensee attends during the year. Licensees are responsible to acquire and then submit documentation with the renewal application.

8.1.3 License renewal applications that do not meet the requirements of Subsection R655-4-8(8.1.2) by June 30 of the expiration year or which are received after June 30 of the expiration year, will be assessed an additional administrative late fee determined and approved by the legislature.

8.1.4 Restricted, conditioned, limited, or denied renewal applications

8.1.4.1 The state engineer may renew a license on a restricted, conditional, or limited basis if the licensee's performance and compliance with established rules and construction standards show the scope of the licensee's permitted activities should be reduced or that the licensee requires strict supervision during a probationary period.

8.1.4.2 The restricted, conditional, or limited license shall state the restrictions, conditions, or limitations placed on the licensee's regulated activity; whether the restrictions, conditions, or limitations are permanent or time-limited; and the requirements, if any, which must be met for the license to be re-issued without restrictions, conditions, or limitations.

8.1.4.3 The state engineer may deny an application to renew a license if there has been a violation of this rule or Section 73-3-25 that casts doubt on the competency of the licensee or the licensee's willingness to comply with the well drilling administrative requirements or construction standards.

8.1.4.4 Within 30 days of a license renewal application being denied or a license being renewed on a restricted, conditioned, or limited basis, a licensee may appeal the action by requesting a hearing according to Section R655-4-7.

8.1.4.5 The restrictions, conditions, or limitations on a license or the denial of a license shall remain effective during the pendency of the well driller or pump installer adjudicative proceeding.

8.2 Continuing Education.

8.2.1 During each license period, licensed well drillers and pump installers are required to earn at least 12 continuing education credits by attending training sessions approved, sponsored or sanctioned by the state engineer. Drillers and pump installers who do not renew their licenses, but who intend to renew within the following 24 month period allowed in Subsection R655-4-8(8.1.1), are also required to earn 12 continuing education credits.

8.2.2 The state engineer will develop criteria for the training courses, approve the courses that can offer continuing education credits, and assign the number of credits to each course.

8.2.3 The state engineer shall assign the number of continuing education credits to each proposed training session based on the instructor's qualifications, a written outline of the subjects to be covered, and written objectives for the session. Licensees wishing continuing education credit for other training sessions shall provide the state engineer with all information it needs to assign continuing education requirements.

8.2.4 Licensed drillers must complete a state engineer-sponsored "Administrative Rules for Well Drillers and Pump Installers" review course or other approved rules review once every four years.

8.2.5 CE credits cannot be carried over from one licensing period to another.

8.3 Operator's Registration.

8.3.1 Drill Rig and Pump Rig operator registrations shall expire at the same time as the license of the well driller or pump installer by whom they are employed. Operators who meet the renewal requirements set forth in Subsection R655-4-8(8.3.2) on or before 12 midnight June 30 of the expiration year shall be authorized to act as a registered operator until the new registration is issued. Operators must renew their registrations within 24 months of the registration expiration date. Operators failing to renew within 24 months of the registration expiration date must re-apply for an operator's registration and meet all the application requirements of Subsections R655-4-3(3.3) and R655-4-3(3.5).

8.3.2 Applications to renew an operator's registration must include the following items:

a. Payment of the registration renewal fee determined and approved by the legislature;

b. Written application to the state engineer.

8.3.3 Registration renewal applications that do not meet the requirements of Subsection R655-4-8(8.3.2) by the June 30 expiration date or that are received after the June 30 expiration date will be assessed an additional administrative late fee determined and approved by the legislature.

8.4 Shallow Water Well Constructor Licenses. The Division will mail to each licensed shallow water well constructor a notice packet to renew their license about 30 days before the expiration of the license. Failure to receive the notice does not relieve a licensee of the obligation to file application and pay the fee for renewal in a timely manner. The licensee shall notify the Division of any change in the licensee's mailing address within 30 days after the change.

8.4.1 Shallow water well constructor licenses shall expire and be renewed according to the following provisions:

a. The licenses whose last name begins with A through L shall expire at 12 midnight on June 30 of odd numbered years.

b. The licenses whose last name begins with M through Z shall expire at 12 midnight on June 30 of even numbered years.

c. Licensees who meet the renewal requirements set forth in Subsection R655-4-8(8.4.2) on or before the expiration deadlines set forth in Subsection R655-4-8(8.4.1) shall be authorized to operate as a licensed shallow well constructor until the new license is issued. If a licensee does not complete the renewal requirements by the license expiration date, the license will become inactive, and the licensee must cease and desist all regulated work until the license has been renewed.

d. Licensees must renew their licenses within 24 months of the license expiration date. Licensees failing to renew within 24 months of the license expiration date must re-apply for a license, meet all the application requirements of Subsection R655-4-3(3.6).

8.4.2 Applications to renew a license must include the following items:

a. Payment of the license renewal fee determined and approved by the legislature;

b. Written application to the state engineer;

c. As applicable to the type of license, proper submission of all Start Cards, official well driller reports, also known as well logs, pump installer reports, also known as pump logs, and well abandonment reports for the current licensing period;

8.4.3 License renewal applications that do not meet the requirements of Subsection R655-4-8(8.4) by June 30 of the expiration year or which are received after June 30 of the expiration year, will be assessed an additional administrative late fee determined and approved by the legislature.

R655-4-9. The Approval Process for Non-Production Wells.

9.1 General.

Regulated non-production wells such as cathodic protection wells, closed-loop heating-cooling exchange wells, monitor wells, piezometers, test wells, and other wells meeting the criteria in Subsection R655-4-1(1.2.2.4) drilled and constructed to a depth greater than 30 feet below natural ground surface require approval from the state engineer. The approval and permitting of regulated water production wells as outlined in Subsection R655-4-1(1.2.1) is accomplished through the water right processes in accordance with Title 73, Water and Irrigation.

9.2 Approval to Drill, Construct, Renovate, or Replace.

Approval to drill, construct, renovate, or replace non-production wells is issued by the state engineer's main office and regional offices following review of written requests from the owner-applicant or their appointed representative. The appointed representative shall not include the licensed driller designated on the application. The requests for approval shall be made on forms provided by the state engineer entitled "Request for Non-Production Well Construction". The following information must be included on the form:

a. General location or common description of the project.

b. Specific course and distance locations from established government surveyed outside section corners or quarter corners.

c. Total anticipated number of wells to be installed.

d. Diameters, approximate depths and materials used in the wells.

e. Projected start and completion dates.

f. Name and license number of the driller contracted to install the wells.

g. A detailed explanation of the purpose and technical aspects of the drilling project. This can also include reviews and approvals, such as building permits, done by local jurisdictions of the project. This additional documentation may expedite the Division's processing of the non-production well application.

h. Signature of the well owner or authorized representative attesting to the accuracy and truthfulness of the information on the application. The licensed driller cannot be the signatory on the non-production well application.

9.2.1 There is no fee required to request approval to drill, construct, renovate, or replace a non-production well. Using available information and sources, the Division will evaluate the potential for the non-production well to become a contamination source or otherwise negatively impact the groundwater resource before approval. This evaluation can take up to 14 days to conduct. The Division shall list application information on its website to allow the public and local jurisdictions to review the project before approval. The well permit application shall be returned without review to the applicant if the Division determines that the application is incomplete, contains inaccurate information, lacks sufficient information or is illegible. The Division shall deny the issuance of a well permit if the site where the well is to be drilled is designated by the Division as an area where wells may not be constructed, including contaminated or protected aquifers, areas where drilling and construction of wells can impact other water rights, and other areas where environmental remediation may be adversely affected by the construction or operation of wells. Upon written approval by the state engineer, the project will be assigned an approved non-production well number which will be referenced on all Start Cards and official well driller's reports.

R655-4-10. General Requirements.

10.1 Standards.

10.1.1 In some locations, the compliance with the following minimum standards will not result in a well being free from pollution or from being a source of subsurface leakage, waste, or contamination of the groundwater resource. Since it is impractical to try to prepare standards for every conceivable situation, the well driller or pump installer shall judge when to construct or otherwise perform work on wells under more stringent standards when such precautions are necessary to protect the groundwater supply and those using the well in question. Other state and local regulations pertaining to well drilling and construction, groundwater protection, isolation distances, also known as setbacks, from potential contamination sources or other structures or boundaries, and water quality and testing regulations may exist that are either more stringent than this rule or that

specifically apply to a given situation or area. It is the licensee's responsibility to understand and apply other federal, state, and local regulations as applicable.

10.2 Well Site Locations.

10.2.1 Well site locations are described by course and distance from outside section corners or quarter corners, based on a Section, Township, and Range Cadastral System, and by the Universal Transverse Mercator (UTM) coordinate system (NAD83 Map Datum) on all state engineer authorizations to drill, also known as Start Cards. However, the licensee should also be familiar with local zoning ordinances, or county boards of health requirements which may limit or restrict the actual well location and construction in relationship to property or structure boundaries and existing or proposed concentrated sources of pollution or contamination such as septic tanks, drain fields, sewer lines, stock corrals, or feed lots. The licensee should also be familiar with Title 54 Chapter 8a, Utah Underground Facilities Act, which requires subsurface excavators, including well drilling, to notify operators of underground utilities before to any subsurface excavation. Information on this requirement can be found by calling Blue Stakes Utility Notification Center at (800) 662-4111.

10.2.2 Regulated wells shall be drilled at the approved location as defined on the valid Start Card. The driller shall check the drilling location against the authorized location on the Start Card before the start of drilling to see if it matches the state-approved location listed on the Driller's Start Card. If the proposed well location does not match the state-approved well location, the driller shall notify the applicant and the state engineer's office. Drilling a well at an unapproved location is a violation.

10.3 Unusual Conditions.

10.3.1 If unusual conditions occur at a well site and compliance with this rule will not result in a satisfactory well or protection to the groundwater supply, a licensee shall request that special standards be prescribed for a particular well, also known as a variance request. The request for special standards shall be in writing and shall set forth the location of the well, the name of the owner, the unusual conditions existing at the well site, the reasons and justification that compliance with this rule and minimum standards will not result in a satisfactory well, and the proposed standards that the licensee believes will be more adequate for this particular well. If the state engineer finds that the proposed changes are in the best interest of the public, the state engineer will approve the proposed changes by assigning special standards for the particular well under consideration. At the Division's discretion, the licensee applying for the variance may be required to provide additional technical information justifying the variance. The variance request will be evaluated, and a response will be given within 14 days. In a public health emergency or other exceptional circumstance, verbal notification for a variance may be given. An emergency usually consists of a well failure resulting in a dry well or an unusable well. Driller convenience does not constitute an emergency.

R655-4-11. Well Drilling and Construction Requirements.

11.0 General. Standards in this section apply to wells greater than 30 feet. For shallow water well requirements, see Section R655-4-17.

11.1 Approved Products, Materials, and Procedures.

11.1.1 Any product, material or procedure designed for use in the drilling, construction, cleaning, renovation, development pump installation or repair, or abandonment of water production or non-production wells, which has received certification and approval for its intended use by the National Sanitation Foundation (NSF) under ANSI-NSF Standard 60 or 61, the American Society for Testing Materials (ASTM), the American Water Works Association (AWWA) or the American National Standards Institute (ANSI) may be utilized. Other products, materials or procedures may also be utilized for their intended purpose upon manufacturers certification that they meet or exceed the standards or certifications referred to in this section and upon state engineer approval.

11.1.2 Public supply wells are also regulated by the Division of Drinking Water, and there are additional construction requirements in Rule R309-515.

11.2 Well Casing - General

11.2.1 Drillers Responsibility. It shall be the sole responsibility of the well driller to determine the suitability of any type of well casing for the particular well being constructed, in accordance with these minimum requirements.

11.2.2 Casing Stick-up. The well casing shall extend a minimum of 18 inches above finished ground level and the natural ground surface should slope away from the casing. A secure sanitary, weatherproof mechanically secured cap, seal, or a completely welded cap shall be placed on the top of the well casing to prevent contamination of the well. If a vent is placed in the cap, it shall be properly screened to prevent access to the well by debris, insects, or other animals.

11.2.3 Steel Casing. All steel casing installed in Utah shall be in new or like-new condition, being free from pits or breaks, clean with all potentially dangerous chemicals or coatings removed, and shall meet the minimum specifications listed in Table 6 of this rule. To utilize steel well casing, or steel blank casing and screen combinations, that does not fall within the categories specified in Table 6, the driller shall receive written approval from the state engineer. All steel casing installed in Utah shall meet or exceed the minimum ASTM, ANSI, or AWWA standards for steel pipe as described in Subsection R655-4-11(11.1) unless otherwise approved by the state engineer. Applicable standards may include and are incorporated by reference into this rule:

AWWA A100-AWWA Standard for Water Wells, 2020 Edition.

ASTM A53/A53M-20 Standard Specifications for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless, 2020 Edition.

ASTM A139/A139M-16 Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and over), 2016 Edition.

AWWA C200-2017 Standard for Steel Water Pipe, 6 Inches and Larger, 2017 Edition.

ASTM A589/A589M-06 (2018) Standard Specification for Seamless and Welded Carbon Steel Water-Well Pipe, 2018 Edition.

ASTM A106/A106M-19a Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service, 2019 Edition

ASTM A778/A778M-16 (2021) Standard Specifications for Welded, Unannealed Austenitic Stainless Steel Tubular Products, 2021 Edition.

ASTM A252/A252M-19 Standard Specification for Welded and Seamless Steel Pipe Piles, 2019 Edition.

ASTM A312/A312M-21 Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes, 2021 Edition.

ASTM A409/A409M-19 Standard Specification for Welded Large Diameter Austenitic Steel Pipe for Corrosive or High Temperature Service, 2019 Edition.

ASTM A606/A606M-18 Standard Specification For Steel, Sheet And Strip, High-Strength, Low-Alloy, Hot-Rolled And Cold-Rolled, With Improved Atmospheric Corrosion Resistance, 2018 Edition.

TABLE 6								
Minimum Wall Thickness for Steel Well Casing								
Depth	0	200	300	400	600	800	1000	1500
Nominal	to	to	to	to	to	to	to	to
Casing	200	300	400	600	800	1000	1500	2000
Diameter	feet	feet	feet	feet	feet	feet	feet	feet
5	250	250	250	250	250	250	250	250
6	250	250	250	250	250	250	250	250
8	250	250	250	250	250	250	250	250
10	250	250	250	250	250	250	312	312
12	250	250	250	250	250	250	312	312
14	250	250	250	250	312	312	312	312
16	250	250	312	312	312	312	375	375
18	250	312	312	312	375	375	375	438
20	250	312	312	312	375	375	375	438
22	312	312	312	375	375	375	375	438
24	312	312	375	375	375	438		
30	312	375	375	438	438	500		

Note: Minimum wall thickness is in inches.
 For nominal casing diameters less than five inches, the minimum wall thickness must be equivalent to ASTM Schedule 40.
 For any other casing diameter not addressed Subsection R655-4-11(11.2), approval by the state engineer is required.
 0.250 = 1/4, 0.312 = 5/16, 0.375 = 3/8, 0.438 = 7/16.

11.2.4 Plastic and Other Non-metallic Casing.

11.2.4.1 Materials. PVC well casing and screen may be installed in Utah upon obtaining permission of the well owner. Other types of non-metallic casing or screen must be approved by the state engineer before installation. Plastic well casing and screen shall be manufactured and installed to conform with the American National Standards Institute (ANSI) or the American Society for Testing and Materials (ASTM) Standard F480-14, 2022 Edition, which is incorporated by reference to this rule. Casing and screen meeting this standard is normally marked "WELL CASING" and with the ANSI-ASTM designation "F480, SDR-17 or similar standard dimension ratio." All plastic casing and screen for use in potable water supplies shall be manufactured to be acceptable to the American National Standards Institute's National Sanitation Foundation (NSF) standard 61. Other types of plastic casings and screens may be installed upon manufacturers certification that such casing meets or exceeds the ASTM-SDR specification or ANSI-NSF approval and upon state engineer approval.

11.2.4.2 Minimum Wall Thickness and Depth Requirements. PVC well casing and screen for non-production wells with a nominal diameter equal to or less than four inches shall meet the minimum wall thickness required under ASTM Standard F480-95 SDR 21 or a Schedule 40 designation. PVC well casing and screen used for non-production well purposes with a nominal diameter greater than four inches shall meet the minimum wall thickness required under ASTM Standard F480-95 SDR 17 or a Schedule 80 designation. PVC well casing and screen used for water production well purposes shall meet the minimum wall thickness required under ASTM Standard F480-95 SDR 17 or a Schedule 80 designation. Additionally, caution should be

used when other than factory slots or perforations are added to PVC well casing. The installation of hand cut slots or perforations significantly reduces the collapse strength tolerances of unaltered casings. The depth at which plastic casing and screen is placed in a well shall conform to the minimum requirements and restrictions as outlined in ASTM Standard F480-14, 2022 Edition and to PVC casing manufacturer recommendations. Liner pipe does not need to meet these wall thickness requirements if it is placed inside of a casing that does meet these wall thickness requirements.

11.2.4.3 Fiberglass Casing. Fiberglass reinforced plastic well casings and screens may be installed in wells upon obtaining permission of the well owner. All fiberglass casing or screens installed in wells for use in potable water supplies shall be manufactured to be acceptable by ANSI-NSF Standard 61 and upon state engineer approval.

11.2.4.4 Driving Non-metallic Casing. Non-metallic casing shall not be driven, jacked, or dropped and may only be installed in an oversized borehole.

11.2.4.5 Protective Casing. If plastic or other non-metallic casing is utilized, the driller shall install a protective steel casing which complies with Subsection R655-4-11(11.2.3) or an equivalent protective covering approved by the state engineer over and around the well casing at ground surface to a depth of at least 2-1/2 feet. If a pitless adapter is installed on the well, the bottom of the protective cover shall be placed above the pitless adapter or well connection. If the pitless adapter is placed in the protective casing, the protective casing shall extend below the pitless entrance in the well casing and be sealed both on the outside of the protective casing and between the protective casing and well casing. The protective cover shall be sealed in the borehole in accordance with the requirements of Subsection R655-4-11(11.4). The annular space between the protective cover and non-metallic casing shall also be sealed with acceptable materials in accordance with Subsection R655-4-11(11.4). A sanitary, weather-tight seal or a completely welded cap shall be placed on top of the protective cover, thus enclosing the well itself. If the sanitary seal is vented, screens shall be placed in the vent to prevent debris insects, and other animals from entering the well. This protective casing requirement does not apply to monitor wells.

11.3 Casing Joints.

11.3.1 General. All well casing joints shall be made water tight. In instances in which a reduction in casing diameter is made, there shall be enough overlap of the casings to prevent misalignment and to insure the making of an adequate seal in the annular space between casings to prevent the movement of unstable sediment or formation material into the well, in addition to preventing the degradation of the water supply by the migration of inferior quality water through the annular space between the two casings.

11.3.2 Steel Casing. All steel casing shall be screw-coupled or welded. If the joints are welded, the weld shall meet American Welding Society standards and be at least as thick as the wall thickness of the casing and shall consist of at least two beads for the full circumference of the joint and be fully penetrating. Spot welding of joints is prohibited. State engineer approval must be obtained for other steel casing joint types such as splined joints or dielectric couplings.

11.3.3 Plastic Casing. All plastic well casing shall be mechanically screw-coupled, chemically welded, cam-locked or lug coupled to provide water tight joints as per ANSI-ASTM F480-95. Metal screws driven into casing joints shall not be long enough to penetrate the inside surface of the casing. Metal screws should be used only when surrounding air temperatures are below 50 degrees Fahrenheit (F) which retards the normal setting of the cement. Solvent-welded joints shall not impart taste, odors, toxic substances, or bacterial contamination to the water in the well.

11.4 Surface Seals and Interval Seals.

11.4.1 General. Before the drill rig is removed from the drill site of a well, a surface seal shall be installed. Well casings shall be sealed to prevent the possible downward movement of contaminated surface waters in the annular space around the well casing. The seal shall also prevent the upward movement of artesian waters within the annular space around the well casing. Depending upon hydrogeologic conditions around the well, interval seals may need to be installed to prevent the movement of groundwater either upward or downward around the well from zones that have been cased out of the well due to poor water quality or other reasons. The following surface and interval seal requirements apply equally to rotary drilled, cable tool drilled, bored, jetted, augered, and driven wells unless otherwise specified.

11.4.2 Seal Material.

11.4.2.1 General. The seal material shall consist of neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout as defined in Section R655-4-2. Use of sealing materials other than those listed in Section R655-4-11 must be approved by the state engineer. Bentonite drilling fluid, also known as drilling mud, dry drilling bentonite, or drill cuttings are not an acceptable sealing material. In no case shall drilling mud, drill cuttings, drill chips, or puddling clay be used, or allowed to fill, partially fill, or fall into the required sealing interval of a well during construction of the well. The annular space to be grouted must be protected from collapse and the introduction of materials other than grout. All hydrated sealing materials, such as neat cement grout, sand cement grout, and bentonite grout, shall be placed by tremie pipe, pumping, or pressure from the bottom of the seal interval upwards in one continuous operation when placed below a depth of 30 feet or when placed below static groundwater level. Neat cement and sand cement grouts must be allowed to cure a minimum of 24 hours before well drilling, construction, or testing may be resumed. Allowable setting times may be reduced or lengthened by use of accelerators or retardants specifically designed to change setting time, at the approval of the state engineer. The volume of annular space in the seal interval shall be calculated by the driller to determine the estimated volume of seal material required to seal the annular space. The driller shall place at least the volume of material equal to the volume of annular space, thus ensuring that a continuous seal is placed. The driller shall maintain the well casing centered in the borehole during seal placement using centralizers or other means to ensure that the seal is placed radially and vertically continuous. Neat cement and sand cement grout shall not be used for surface or interval seals with PVC and other approved non-metallic casing unless specific state engineer approval is obtained.

11.4.2.2 Bentonite Grout. Bentonite used to prepare grout for sealing shall have the ability to gel; not separate into water and solid materials after it gels; have a hydraulic conductivity or permeability value of $10E-7$ centimeters per second or less; contain at least 20% solids by weight of bentonite, and have a fluid weight of 9.5 pounds per gallon or greater and be specifically designed for sealing. In addition, if a bentonite grout is to be placed in the vadose zone, also known as the unsaturated interval, then clean rounded fine sand shall be added to the bentonite grout to increase the overall solids content and stabilize the grout from dehydrating and cracking in that interval. For 20% solids bentonite grout, at least 100 pounds of clean rounded fine sand shall be added per 50 pounds of bentonite. For 30% solids bentonite grout, at least 50 pounds of clean fine sand shall be added per 50 pounds of bentonite. Bentonite grout shall not be used for sealing intervals of fractured rock or sealing intervals of highly unstable material that could collapse or displace the sealing material, unless otherwise approved by the state engineer. Bentonite grout shall not be used as a sealing material where rapidly flowing groundwater might erode it. Bentonite or polymer drilling fluid, also known as drilling mud, does not meet the definition of a grout with respect to density, gel strength, and solids content and shall not be used for sealing purposes. At no time shall bentonite grout contain materials that are toxic, polluting, develop odor or color changes, or serve as a micro-bacterial nutrient. All bentonite grout shall be prepared and installed according to the manufacturer's instructions and this rule. All additives must be certified by a recognized certification authority such as NSF and approved by the state engineer. All bentonite used in any well shall be certified by NSF-ANSI approved standards for use in potable water supply wells, or equivalent standards as approved by the state engineer.

11.4.2.3 Unhydrated Bentonite. Unhydrated bentonite, such as granular, tabular, pelletized, or chip bentonite, may be used in the construction of well seals above a depth of 50 feet. Unhydrated bentonite can be placed below a depth of 50 feet when placed inside the annulus of two casings, when placed using a tremie pipe, or by using a placement method approved by the state engineer. The bentonite material shall be specifically designed for well sealing and be within industry tolerances. All unhydrated bentonite used for sealing must be free of organic polymers and other contamination. Placement of bentonite shall conform to the manufacturer's specifications and instructions and result in a seal free of voids or bridges. Granular or powdered bentonite shall not be placed under water by gravity feeding from the surface. When placing unhydrated bentonite, a sounding or tamping tool shall be run in the sealing interval during pouring to measure fill-up rate, verify a continuous seal placement, and to break up possible bridges or cake formation.

11.4.3 Seal and Unperforated Casing Placement.

11.4.3.1 General Seal Requirements. The surface seal must be placed in an annular space that has a minimum diameter of four inches larger than the nominal size of the permanent well casing. This amounts to a 2-inch annulus. The surface seal must extend from land surface to a minimum depth of 30 feet. The completed surface seal must fully surround the permanent well casing, must be evenly distributed, free of voids, and extend to undisturbed or recompacted soil. In unconsolidated formations such as gravels, sands, or other unstable conditions when the use of drilling fluid or other means of keeping the borehole open are not employed, either a temporary surface casing with a minimum depth of 30 feet and a minimum nominal diameter of four inches greater than the outermost permanent casing shall be utilized to ensure proper seal placement or the well driller shall notify the state engineer's office that the seal will be placed in a potentially unstable open borehole without a temporary surface casing by telephone or fax in conjunction with the Start Card submittal to provide an opportunity for the state engineer's office to inspect the placement of the seal. If a temporary surface casing is utilized, the surface casing shall be removed in conjunction with the placement of the seal. Alternatively, conductor casing may be sealed permanently in place to a depth of 30 feet with a minimum 2-inch annular seal between the surface casing and borehole wall. If the temporary surface casing is to be removed, the surface casing shall be withdrawn as sealing material is placed between the outermost permanent well casing and borehole wall. The sealing material shall be kept at a sufficient height above the bottom of the temporary surface casing as it is withdrawn to prevent caving of the borehole wall. If the temporary conductor casing is driven in place without a 2-inch annular seal between the surface casing and borehole wall, the surface casing shall be removed. Specific state engineer approval must be obtained on a case by case basis for any variation of these requirements. Surface seals and unperforated casing shall be installed in wells located in unconsolidated formation such as sand and gravel with minor clay or confining units; unconsolidated formation consisting of stratified layers of materials such as sand, gravel, and clay or other confining units; and consolidated formations according to the following procedures.

11.4.3.2 Unconsolidated Formation without Significant Confining Units. This includes wells that penetrate an aquifer overlain by unconsolidated formations such as sand and gravel without significant clay beds of at least six feet in thickness or other confining formations. The surface seal must be placed in a 2-inch annular space to a minimum depth of 30 feet. Permanent unperforated casing shall extend at least to a depth of 30 feet and also extend below the lowest anticipated pumping level. Additional casing placed in the open borehole below the required depths noted in Section R655-4-11 shall meet the casing requirements of Subsection R655-4-9(9.2) unless the casing is installed as a liner inside a larger diameter approved casing.

11.4.3.3 Unconsolidated Formation with Significant Confining Units. This includes wells that penetrate an aquifer overlain by clay or other confining formations that are at least six feet thick. The surface seal must be placed in a 2-inch annular space to a minimum depth of 30 feet and at least five feet into the confining unit above the water bearing formation. Unperforated casing shall extend from ground surface to at least 30 feet and to the bottom of the confining unit overlying the water bearing formation. If necessary to complete the well, a smaller diameter casing, liner, or well screen may be installed below the unperforated casing. The annular space between the two casings shall be sealed with grout, bentonite, or a mechanical packer. Additional casing placed in the open borehole below the required depths noted in Section R655-4-11 shall meet the casing requirements of Subsection R655-4-11(11.2) unless the casing is installed as a liner inside a larger diameter approved casing.

11.4.3.4 Consolidated Formation. This includes drilled wells that penetrate an aquifer, either within or overlain by a consolidated formation. The surface seal must be placed in a 2-inch annular space to a minimum depth of 30 feet and at least five feet into competent consolidated formation. Unperforated permanent casing shall be installed to extend to a depth of at least 30 feet and the lower part of the casing shall be driven and sealed at least five feet into the consolidated formation. If necessary to complete the well, a smaller diameter casing, liner, or well screen may be installed below the unperforated casing. The annular space between the two casings shall be sealed with grout, bentonite, or a mechanical packer. Additional casing placed in the open borehole below the required depths noted in Section R655-4-11 shall meet the casing requirements of Subsection R655-4-11(11.2) unless the casing is installed as a liner inside a larger diameter approved casing.

11.4.3.5 Sealing Artesian Wells. Unperforated well casing shall extend into the confining stratum overlying the artesian zone, and shall be adequately sealed into the confining stratum to prevent both surface and subsurface leakage from the artesian zone. If leaks occur around the well casing or adjacent to the well, the well shall be completed with the seals, packers, or casing necessary to eliminate the leakage. The driller shall not move the drilling rig from the well site until leakage is completely stopped, unless authority for temporary removal of the drilling rig is granted by the state engineer, or when loss of life or property is imminent. If the well flows naturally at land surface due to artesian pressure, the well shall be equipped with a control valve so that the flow can be completely stopped. The control valve must be available for inspection by the state engineer at all times. All flowing artesian water supply wells shall be tested for artesian shut-in pressure in pounds per square inch and rate of flow in cubic feet per second, or gallons per minute, under free discharge conditions. This data shall be reported on the well log.

11.4.3.6 Exceptions: With state engineer approval, exceptions to minimum seal depths can be made for shallow wells where the water to be produced is at a depth less than 30 feet. In no case shall a surface seal extend to a total depth less than 10 feet below land surface.

11.4.4 Interval Seals. Formations containing undesirable materials such as fine sand and silt that can damage pumping equipment and result in turbid water, contaminated groundwater, or poor quality groundwater must be sealed off so that the unfavorable formation cannot contribute to the performance and quality of the well. These zones, as well as zones with significantly differing pressures, must also be sealed to eliminate the potential of cross contamination or commingling between two aquifers of differing quality and pressure. Unless approved by the state engineer, construction of wells that cause the commingling or cross connection of otherwise separate aquifers is not allowed.

11.4.5 Other Sealing Methods. In wells where the methods of well sealing described in Section R655-4-11 do not apply, special sealing procedures can be approved by the state engineer upon written request by the licensed well driller.

11.5 Special Requirements for Oversized and Gravel Packed Wells. This section applies to wells in which casing is installed in an open borehole without driving or drilling in the casing and an annular space is left between the borehole wall and well casing. For example, mud rotary wells, flooded reverse circulation wells, and air rotary wells in open bedrock.

11.5.1 Oversized Borehole. The diameter of the borehole shall be at least four inches larger than the outside diameter of the well casing to be installed to allow for proper placement of the gravel pack or formation stabilizer and adequate clearance for grouting and surface seal installations. To accept a smaller diameter casing in any oversized borehole penetrating unconsolidated or stratified formations, the annular space must be sealed in accordance with Subsection R655-4-11(11.4). To minimize the risk of: 1) borehole caving or collapse; 2) casing failure or collapse; or 3) axial distortion of the casing, it is required that the entire annular space in an oversized borehole between the casing and borehole wall be filled with formation stabilizer such as approved seal material, gravel pack, filter material or other state engineer-approved materials. Well casing placed in an oversized borehole should be suspended at the ground surface until all formation stabilizer material is placed to reduce axial distortion of the casing if it is allowed to rest on the bottom of an open oversized borehole. To accept a smaller diameter casing, the annular space in an oversized borehole penetrating unconsolidated formations with no confining layer must be sealed in accordance with Subsection R655-4-11(11.4) to a depth of at least 30 feet or from static water level to ground surface, whichever is deeper. The annular space in an oversized borehole penetrating stratified or consolidated formations must be sealed in accordance with Subsection R655-4-11(11.4) to a depth of at least 30 feet or five feet into an impervious strata such as clay or competent consolidated formation overlying the water producing zones back to ground surface, whichever is deeper. Especially in the case of an oversized borehole, the requirements of Subsection R655-4-11(11.4.4) regarding interval sealing must be followed.

11.5.2 Gravel Pack or Filter Material. The gravel pack or filter material shall consist of clean, well-rounded, chemically stable grains that are smooth and uniform. The filter material should not contain more than 2% by weight of thin, flat, or elongated pieces and should not contain organic impurities or contaminants of any kind. To assure that no contamination is introduced into the well via the gravel pack, the gravel pack must be washed with a minimum 100 ppm solution of chlorinated water or dry hypochlorite mixed with the gravel pack at the surface before it is introduced into the well. See Table 7 of this rule for required amount of chlorine material.

11.5.3 Placement of Filter Material. All filter material shall be placed using a method that through common usage has been shown to minimize a) bridging of the material between the borehole and the casing, and b) excessive segregation of the material after it has been introduced into the annulus and before it settles into place. It is not acceptable to place filter material by pouring from the ground surface unless proper sounding devices are utilized to measure dynamic filter depth, evaluate pour rate, and minimize bridging and formation of voids.

11.5.4 No Surface Casing Used. If no permanent conductor casing is installed, neat cement grout, sand cement grout, bentonite grout, or unhydrated bentonite seal shall be installed in accordance with Subsection R655-4-11(11.4).

11.5.5 Permanent Conductor Casing Used. If permanent conductor casing is installed, it shall be unperforated and installed and sealed in accordance with Subsection R655-4-11(11.4). After the gravel pack has been installed between the

conductor casing and the well casing, the annular space between the two casings shall be sealed by either welding a watertight steel cap between the two casings at land surface or filling the annular space between the two casings with neat cement grout, sand cement grout, bentonite grout, or unhydrated bentonite from at least 50 feet to the surface and in accordance with Subsection R655-4-11(11.4). If a hole will be created in the permanent conductor casing to install a pitless adapter into the well casing, the annual space between the conductor casing and well casing shall be sealed to at least a depth of 30 feet with neat cement grout, sand cement grout, bentonite grout, or unhydrated bentonite. A waterproof cap or weld ring sealing the two casings at the surface by itself without the annular seal between the two casings is unacceptable when a pitless adapter is installed in this fashion. Moreover in this case, the annular space between the surface casing and well casing must be at least 2 inches to facilitate seal placement.

11.5.6 Gravel Feed Pipe. If a gravel feed pipe, used to add gravel to the gravel pack after well completion, is installed, the diameter of the borehole in the sealing interval must be at least four inches in diameter greater than the permanent casing plus the diameter of the gravel feed pipe. The gravel feed pipe must have at least 2-inches of seal between it and the borehole wall. The gravel feed pipe must extend at least 18 inches above ground and must be sealed at the top with a watertight cap or plug.

11.5.7 Other Gravel Feed Options. If a permanent surface casing or conductor casing is installed in the construction of a filter pack well, a watertight, completely welded, steel plate, also known as a weld ring, at least 3/16 of an inch in thickness shall be installed between the inner production casing and the outer surface or conductor casing at the wellhead. A watertight fill port with threaded cap may be installed for placing additional filter pack material in the well.

11.6 Protection of the Aquifer.

11.6.1 Drilling Fluids and LCMs. The well driller shall take due care to protect the producing aquifer from clogging or contamination. Organic substances or phosphate-based substances shall not be introduced into the well or borehole during drilling or construction. Every effort shall be made to remove all substances and materials introduced into the aquifer or aquifers during well construction. "Substances and materials" shall mean all bentonite- and polymer-based drilling fluids, filter cake, and any other inorganic substances added to the drilling fluid that may seal or clog the aquifer. All polymers and additives used in any well shall be certified by NSF-ANSI approval standards for use in potable water supply wells, or equivalent standards as approved by the state engineer. The introduction of lost circulation materials (LCM's) during the drilling process shall be limited to those products that will not present a potential medium for bacterial growth or contamination. Only LCM's which are non-organic, which can be safely broken down and removed from the borehole, may be utilized. Unacceptable LCM materials include paper or wood products, brans, hulls, grains, starches, hays or straws, and proteins. This is especially important in the construction of wells designed to be used as a public water system supply. All polymers and additives used in any well shall be certified by NSF-ANSI approval standards for use in potable water supply wells, or equivalent standards as approved by the Division. The product shall be clearly labeled as meeting these standards. Polymers and additives must be designed and manufactured to meet industry standards to be nondegrading and must not act as a medium which will promote growth of microorganisms.

11.6.2 Containment of Drilling Fluid. Drilling or circulating fluid introduced into the drilling process shall be contained in a manner to prevent surface or subsurface contamination and to prevent degradation of natural or man-made water courses or impoundments. Requirements regarding the discharges to waters of the state are promulgated under Section R317-8-2 and regulated by the Utah Division of Water Quality, 801-536-6146. Pollution of waters of the state is a violation of Title 19 Chapter 5, Utah Water Quality Act.

11.6.3 Mineralized, Contaminated or Polluted Water. When a water bearing stratum that contains nonpotable mineralized, contaminated or polluted water is encountered, the stratum shall be adequately sealed off so that contamination or co-mingling of the overlying or underlying groundwater zones will not occur. Water bearing zones with differing pressures must also be isolated and sealed off in the well to avoid aquifer depletion, wasting of water, and reduction of aquifer pressures.

11.6.4 Down-hole Equipment. All tools, drilling equipment, and materials used to drill, repair, renovate, clean, or install a pump in a well shall be free of contaminants before beginning well construction or other in-well activity. Contaminants include lubricants, fuel, or bacteria that will reduce the well efficiency, and any other items that will be harmful to public health or the resource or reduce the life of the water well. It is recommended that excess lubricants placed on drilling equipment be wiped clean before insertion into the borehole.

11.6.5 Well Disinfection and Chlorination of Water. No contaminated or untreated water shall be placed in a well during construction. Water should be obtained from a chlorinated municipal system. Where this is not possible, the water must be treated to give at least 100 parts per million free chlorine residual. Upon completion of a well or work on a well, the driller or pump installer shall disinfect the well using accepted disinfection procedures to give at least 100 parts per million free chlorine residual equally distributed in the well water from static level to the bottom of the well. A chlorine solution designated for potable water use prepared with either calcium hypochlorite in powdered, granular, or tablet form or sodium hypochlorite in liquid form shall be used for water well disinfection. Off-the-shelf chlorine compounds intended for home laundry use, pool or fountain use should not be used if they contain additives such as antifungal agents, silica, or scents. Products labeled with "Ultra" may contain these additives. Table 7 provides the amount of chlorine compound required per 100 gallons of water or 100 feet linear casing volume of water to mix a 100 parts per million solution. Disinfection situations not depicted in Table 7 must be approved by the state engineer. Additional recommendations and guidelines for water well system disinfection are available from the state engineer upon request.

TABLE 7

Amount of Chlorine Compound for Each 100 Feet of Water Standing in the Well - 100 ppm solution				
Well Diameter inches	Ca-HyCLT* 25% HOCL ounces	Ca-HyCLT 65% HOCL ounces	Na-HyCLT** 12-trade % fluid ounces	Na-HyCLT** 100% Cl2 pounds
2	1.00	0.50	3.5	0.03
4	3.50	1.50	7.0	0.06
6	8.00	3.00	16.0	0.12
8	14.50	5.50	28.0	0.22
10	22.50	8.50	45.0	0.34
12	32.50	12.00	64.0	0.50
14	44.50	16.50	88.0	0.70
16	58.00	26.00	112	0.88
20	90.50	33.00	179	1.36
For every 100 gallons of water, add:	5.50	2.00	11.5	0.09
Note: *Calcium Hypochlorite - solid **Sodium Hypochlorite - liquid ***Liquid Chlorine				

11.7 Special Requirements.

11.7.1 Explosives. Explosives used in well construction shall not be detonated within the section of casing designed or expected to serve as the surface seal of the completed well, whether or not the surface seal has been placed. If explosives are used in the construction of a well, their use shall be reported on the official well log. In no case shall explosives, other than explosive shot perforators specifically designed to perforate steel casing, be detonated inside the well casing or liner pipe.

11.7.2 Access Port. Every well shall be equipped with a usable access port so that the position of the water level, or pressure head, in the well can be measured at all times.

11.7.3 Completion or Abandonment. A licensed driller shall not remove the drill rig from a well site unless the well is completed or abandoned. Completion of a well shall include all surface seals, gravel packs or curbs required. Dry boreholes, or otherwise unsuccessful attempts at completing a well, shall be properly abandoned in accordance with Section R655-4-14. Upon completion, all wells shall be equipped with a watertight, tamper-resistant casing cap or sanitary seal.

11.7.4 Surface Security. If it becomes necessary for the driller to temporarily discontinue the drilling operation before completion of the well or otherwise leave the well or borehole unattended, the well or borehole must be covered securely to prevent contaminants from entering the casing or borehole and rendered secure against entry by children, vandals, domestic animals, and wildlife.

11.7.5 Pitless Adapters and Units. Pitless adapters or units are acceptable to use with steel well casing as long as they are installed in accordance with manufacturers recommendations and specifications as well as meet the Water Systems Council Pitless Adapter Standard (PAS-97) which are incorporated by reference and are available from Water Systems Council, 13 Bentley Dr., Sterling, VA 20165, phone 703-430-6045, fax 703-430-6185, email watersystemscouncil.org. The pitless adaptor, including the cap or cover, casing extension, and other attachments, must be so designed and constructed to be secure, water tight, and to prevent contamination of the potable water supply from external sources. Pitless wellhead configurations shall have suitable access to the interior of the well to measure water level and for well disinfection purposes. Pitless configurations shall be of watertight construction throughout and be constructed of materials at least equivalent to and having wall thickness and strength compatible to the casing. Pitless adapters or units are not recommended to be mounted on PVC well casing. If a pitless adapter is to be used with PVC casing, it should be designed for use with PVC casing, and the driller should ensure that the weight of the pump and column do not exceed the strength of the PVC well casing. If it is known that a pitless adapter or unit will be installed on a well, a cement grout seal shall not be allowed within the pitless unit or pitless adaptor sealing interval as the well is being constructed. The pitless adapter or unit sealing interval shall be sealed with unhydrated bentonite as the well is constructed and before pitless installation. Upon pitless adapter or unit installation, the surface seal below the pitless connection shall be protected and maintained. After the pitless adapter or unit has been installed, the associated excavation around the well from the pitless connection to ground surface shall be backfilled and compacted with low permeability fill that includes clay. The pitless adapter or unit, including the cap or cover, pitless case and other attachments, shall be designed and constructed to be watertight to prevent the entrance of contaminants into the well from surface or near-surface sources.

11.7.6 Hydraulic Fracturing. The hydraulic fracturing pressure shall be transmitted through a drill string and shall not be transmitted to the well casing. Hydraulic fracturing intervals shall be at least 20 feet below the bottom of the permanent casing of a well. All hydraulic fracturing equipment shall be thoroughly disinfected with a 100 part per million chlorine solution

before insertion into the well. The driller shall include the appropriate hydraulic fracturing information on the well log including methods, materials, maximum pressures, location of packers, and initial or final yields. In no case shall hydrofracturing allow commingling of waters within the well bore. Clean sand or other material such as propping agents approved by the Division may be injected into the well to hold the fractures open when pressure is removed.

11.7.7 Static Water Level, Well Development, and Well Yield. To fulfill the requirements of Subsection R655-4-4(4.5.2), new wells designed to produce water shall be developed to remove drill cuttings, drilling mud, or other materials introduced into the well during construction and to restore the natural groundwater flow to the well to the extent possible. After a water production well is developed, a test should be performed to determine the rate at which groundwater can be reliably produced from the well. Following development and testing, the static water level in the well should also be measured. Static water level, well development information, and well yield information shall be noted on the official submittal of the well log by the well driller.

11.7.8 Packers. Packers shall be of a material that will not impart taste, odor, toxic substances or bacterial contamination to the water in the well.

11.7.9 Screens. Screens must be constructed of corrosion-resistant material and sufficiently strong to withstand stresses encountered during and after installation. Screen slot openings, screen length, and screen diameter should be sized and designed to provide sufficient open area consistent with strength requirements to transmit sand-free water from the well. Screens should be installed so that exposure above pumping level will not occur.

11.7.10 Openings in the Casing. There shall be no opening in the casing wall between the top of the casing and the bottom of the required casing seal except for pitless adapters, measurement access ports, and other approved openings installed in conformance with these standards. In no case shall holes be cut in the casing wall for lifting or lowering casing into the well bore unless such holes are properly welded closed and watertight before placement into the well bore.

11.7.11 Casing vents. If a well requires venting, it must terminate in a down-turned position at least 18-inches above ground level, at or above the top of the casing or pitless unit and be covered with a 24 mesh corrosion-resistant screen.

R655-4-12. Special Wells.

12.1 Construction Standards for Special Wells.

12.1.1 General. The construction standards outlined in Section R655-4-11 are meant to serve as minimum acceptable construction standards. Certain types of wells such as cathodic protection wells, closed-loop heating or cooling exchange wells, recharge and recovery wells, and public supply wells require special construction standards that are addressed in this section or in rules promulgated by other regulating agencies. At a minimum, when constructing special wells, the well shall be constructed by a licensed well driller, and the minimum construction standards of Section R655-4-11 shall be followed in addition to the following special standards.

12.1.2 Public Water Supply Wells. Public water supply wells are subject to the minimum construction standards outlined in Section R655-4-11 in addition to the requirements established by the Department of Environmental Quality, Division of Drinking Water under Rules R309-515 and R309-600. Requirements in Rules R309-515 and R309-600 are regulated by the Division of Drinking Water and not by the Division of Water Rights and may include a preliminary evaluation report related to drinking water source protection, well plan and specification review and approval, and mandatory grout seal inspection. The Division of Drinking Water should be contacted to determine specific and current rules and requirements.

12.1.3 Cathodic Protection Well Construction. Cathodic protection wells shall be constructed in accordance with the casing, joint, surface seal, and other applicable requirements outlined in Section R655-4-11. Any annular space existing between the base of the annular surface seal and the top of the anode and conductive fill interval shall be filled with appropriate fill or sealing material. Fill material shall consist of washed granular material such as sand, pea gravel, or sealing material. Fill material shall not be subject to decomposition or consolidation and shall be free of pollutants and contaminants. Fill material shall not be toxic or contain drill cuttings or drilling mud. Additional sealing material shall be placed below the minimum depth of the annular surface seal, as needed, to prevent the cross connection and commingling of separate aquifers and water bearing zones. Vent pipes, anode access tubing, and any other tubular materials comprising of the outmost casing that pass through the interval to be filled and sealed are considered casing for the purposes of these standards and shall meet the requirements of Subsections R655-4-11(11.2) and R655-4-11(11.3). Cathodic protection well casing shall be at least 2 inches in internal diameter to facilitate eventual well abandonment.

12.1.4 Closed-loop Heating-Cooling Exchange Wells. Wells or boreholes utilized for heat exchange or thermal heating in a closed-loop fashion, which are greater than 30 feet in depth and encounter formations containing groundwater, must be drilled by a licensed driller and the owner or applicant must have an approved application for that specific purpose as outlined in Section R655-4-9. Wells or boreholes installed for heat or thermal exchange process must comply with the minimum construction standards of Section R655-4-11. Direct exchange (DX) systems are allowed on a case by case basis as approved by the state engineer.

12.1.4.1 For open-loop systems where groundwater is removed, processed, and re-injected, a non-consumptive use water right approval must be obtained from the state engineer. Approval to re-inject water underground is also required from the Utah Division of Water Quality. Open-loop system wells shall be constructed in accordance with the requirements found in Section R655-4-11. If a separate well or borehole is required for re-injection purposes, it must also comply with these standards and the groundwater must be injected into the same water bearing zones as from which it is initially withdrawn. The quality and quantity of groundwater shall not be diminished or degraded upon re-injection.

12.1.4.2 Closed-loop heat exchange wells must also comply with the guidelines set forth in the National Ground Water Association Guidelines for Construction of Vertical Boreholes for Closed-Loop Heat Pump Systems, which are copyrighted and available from the National Ground Water Association at 601 Dempsey Rd, Westerville, OH 43081-8978, Phone 614-898-7791, Fax 614.898-7786, website www.ngwa.org, email customerservice@ngwa.org, or standards set forth in the Design and Installation Standards for Closed-Loop Geothermal Heat Pump Systems, which are copyrighted and available from the International Ground Source Heat Pump Association at 374 Cordell South, Oklahoma State University, Stillwater, OK 74078-8018, www.igshpa.okstate.edu. These guidelines and standards may be viewed during normal business hours at the Division's main office at 1594 West North Temple, SLC, UT 84116. For closed-loop systems where groundwater is not removed in the process, non-production well approval must be obtained from the state engineer. Specific requirements for closed-loop wells include:

a. The location of closed-loop heat pump wells must comply with applicable ordinances, regulations, or other enforceable instruments of local governments to ensure adequate protection of public water systems from encroachments or any impairment of the groundwater resource. During drilling and construction, provisions shall be made to reduce entry of foreign matter or surface runoff into the well or borehole.

b. Closed-loop system wells must be sealed from the bottom of the well or boring to ground surface using acceptable materials and placement methods described in Subsection R655-4-11(11.4). Sand may be added to the seal mix to enhance thermal conductivity as long as the seal mix meets permeability and gel strength standards outlined in Subsection R655-4-11(11.4).

c. Borehole Diameter: The borehole diameter of a closed-loop heat pump well must be of sufficient size to allow placement of the pipe and placement of a tremie to emplace the grout. In general, for loop piping with a nominal diameter of 3/4 to 1 inch, the borehole diameter shall be at least 4.75 inches. For loop piping with a nominal diameter of 1.25 inches, the borehole diameter shall be at least 5.25 inches. For loop piping with a nominal diameter of 1.5 to 2.0 inches, the borehole diameter shall be at least 6.0 inches.

d. Grouting of Vertical Ground Water Heat Pump Wells: Grouting the annulus of a heat pump well shall be completed within 24 hours from the time the borehole is drilled and loaded with the U-bend assembly and within at least 6 hours from the time the drill rig moves off the borehole. Full-length grout placement is required on all vertical closed-loop heat pump boreholes.

e. Placement of Grout Material: Full-length grout material must be placed by tremie from the bottom of the borehole to the top. The tremie pipe shall be continuously submerged in grout during placement. The tremie pipe must not be left in the borehole. The grout must fill the entire borehole. Grout must not be allowed to freefall. Once the grout has settled for at least 48 hours, borehole shall be topped off with additional grout as necessary to maintain seal material to ground surface.

f. Pipe: Pipe material, joining methods, and installation must meet the guidelines and standards referenced in the National Ground Water Association Guidelines for Construction of Vertical Boreholes for Closed-Loop Heat Pump Systems, which are copyrighted and available from the National Ground Water Association at 601 Dempsey Rd, Westerville, OH 43081-8978, Phone 614-898-7791, Fax 614.898-7786, email customerservice@ngwa.org, and in the Design and Installation Standards for Closed-Loop Geothermal Heat Pump Systems. Standards are copyrighted and available from the International Ground Source Heat Pump Association at 312 S. 4th Street, STE100, Springfield, IL 62701, www.igshpa.org, info@igshpa.org. Guidelines and standards may be viewed during normal business hours at the Division's main office at 1594 West North Temple, SLC, UT 84116. U-bend connections shall be factory jointed and piping shall not have any fusion joints below a depth of 30 feet.

g. Pressure Testing: Loop piping shall be filled with water and pressure tested before installation into the borehole. Loop piping failing this initial pressure testing shall not be installed. The installed system must be pressure tested at a minimum of two times the system operating pressure to ensure the integrity of the system. If a pressure loss is detected, the cause must be properly repaired or material replaced or properly plugged. The system shall be pressure tested again following any repairs. Pressure testing procedures shall follow the guidelines and standards in the National Ground Water Association Guidelines for Construction of Vertical Boreholes for Closed-Loop Heat Pump Systems, which are copyrighted and available from the National Ground Water Association at 601 Dempsey Rd, Westerville, OH 43081-8978, Phone 614-898-7791, Fax 614.898-7786, email customerservice@ngwa.org, and in the Design and Installation Standards for Closed-Loop Geothermal Heat Pump Systems. Standards are copyrighted and available from the International Ground Source Heat Pump Association at 312 S. 4th Street, STE100, Springfield, IL 62701, www.igshpa.org, info@igshpa.org. Guidelines and standards may be viewed during normal business hours at the Division's main office at 1594 West North Temple, SLC, UT 84116.

h. Heat transfer fluid, additives, and inhibitors. The heat transfer fluids, additives, and inhibitors used inside the closed-loop assembly must be non-toxic, safe to install, provide corrosion protection, not promote bacterial growth, and not produce an unacceptable risk to the environment in the event of a system leak. Potassium acetate or ethylene glycol shall not be used as a heat transfer fluid. Water used in the heat transfer fluid mix must be from a treated potable source or be disinfected in accordance with this rule. Use and placement of fluids, additives, and inhibitors shall be in accordance with the guidelines and standards in the National Ground Water Association Guidelines for Construction of Vertical Boreholes for Closed-Loop Heat Pump Systems, which are copyrighted and available from the National Ground Water Association at 601 Dempsey Rd, Westerville, OH 43081-8978, Phone 614-898-7791, Fax 614.898-7786, email customerservice@ngwa.org, and in the Design and Installation Standards for Closed-Loop Geothermal Heat Pump Systems. Standards are copyrighted and available from the International Ground Source Heat Pump Association at 312 S. 4th Street, STE100, Springfield, IL 62701, www.igshpa.org, info@igshpa.org. Guidelines and standards may be viewed during normal business hours at the Division's main office at 1594 West North Temple, SLC, UT 84116.

i. Abandonment: When closed-loop heat exchange wells are required to be permanently abandoned, the standards referenced in Subsection R655-4-12(12.1.4.2) shall be followed. The state engineer shall be notified before loop field abandonment. All heat transfer fluids shall be flushed and removed from loop piping before abandonment. Below ground loop piping to be abandoned shall be filled completely with acceptable grout and the loop piping ends properly capped or sealed.

12.1.4.3 This rule pertains only to the heating and cooling exchange well constructed to a depth greater than 30 feet and are not intended to regulate the incidental work that may occur up to the well such as plumbing, electrical, piping, trenching, and backfilling activities.

12.1.5 Recharge and Recovery Wells. Any well drilled under Title 73, Chapter 3b of the Groundwater Recharge and Recovery Act shall be constructed in a manner consistent with this rule and shall be drilled by a currently licensed driller. Special rules regarding the injection of water into the ground are also promulgated under the jurisdiction of the Utah Department of Environmental Quality, Division of Water Quality under Rule R317-7 and must be followed in conjunction with the Water Well Drilling rules.

R655-4-13. Deepening, Rehabilitation, and Renovation of Wells.

13.1 Sealing of Casing.

13.1.1 If in the repair of a drilled well, the old casing is withdrawn, the well shall be recased and resealed in accordance with the requirements provided in Subsection R655-4-11(11.4).

13.2 Inner Casing.

13.2.1 If an inner casing is installed to prevent leakage of undesirable water into a well, the space between the two well casings shall be completely sealed using packers, casing swedging, or pressure grouting, to prevent the movement of water between the casings.

13.3 Outer Casing.

13.3.1 If the "over-drive" method is used to eliminate leakage around an existing well, the casing driven over the well shall meet the minimum specifications listed in Subsection R655-4-11(11.4).

13.4 Artesian Wells.

13.4.1 If upon deepening an existing well, an artesian zone is encountered, the well shall be cased and completed as provided in Subsection R655-4-11(11.4).

13.5 Drilling in a Dug Well.

13.5.1 A drilled well may be constructed through an existing dug well provided that:

13.5.1.1 Unperforated Casing Requirements. An unperforated section of well casing extends from a depth of at least ten feet below the bottom of the dug well and at least 20 feet below land surface to above the maximum static water level in the dug well.

13.5.1.2 Seal Required. A two-foot thick seal of neat cement grout, sand cement grout, or bentonite grout is placed in the bottom of the dug well so as to prevent the direct movement of water from the dug well into the drilled well.

13.5.1.3 Test of Seal. The drilled well shall be pumped or bailed to determine whether the seal described in Subsection R655-4-13(13.5.1.2) is adequate to prevent movement of water from the dug well into the drilled well. If the seal leaks, additional sealing and testing shall be performed until a water tight seal is obtained.

13.6 Well Rehabilitation and Cleaning.

13.6.1 Tools used to rehabilitate or clean a well shall be cleaned, disinfected, and free of contamination before placement in a well.

13.6.2 The driller shall use rehabilitation and cleaning tools properly so as not to permanently damage the well or aquifer. If the surface seal is damaged or destroyed in the process of rehabilitation or cleaning, the driller shall repair the surface seal to the standards set forth in Subsection R655-4-11(11.4).

13.6.3 Debris, sediment, and other materials displaced inside the well and surrounding aquifer as a result of rehabilitation or cleaning shall be completely removed by pumping, bailing, well development, or other approved methods.

13.6.4 Detergents, chlorine, acids, or other chemicals placed in wells for increasing or restoring yield, shall be specifically designed for that purpose and used according to the manufacturer's recommendations.

13.6.5 Any renovation, rehabilitation, cleaning, or other work on a well that requires alteration of the well itself shall be conducted by a licensed well driller.

13.6.6 Following completion of deepening, renovation, rehabilitation, cleaning, or other work on a well, the well shall be properly disinfected in accordance with Subsection R655-4-11(11.6.5).

R655-4-14. Abandonment of Wells.

14.1 Temporary Abandonment.

14.1.1 When any well is temporarily removed from service, the top of the well shall be sealed with a tamper-resistant, watertight cap or seal. If a well is in the process of being drilled and is temporarily abandoned, the well shall be sealed with a tamper-resistant, watertight cap or seal and a surface seal installed in accordance with Subsection R655-4-11(11.4). The well may be temporarily abandoned during construction for a maximum of 90 days. After the 90 day period, the temporarily abandoned well shall be completed as a well that meets the standards of Section R655-4-11 or permanently abandoned in accordance with the following requirements, and an official well abandonment report, also known as an abandonment log, must be submitted in compliance with Section R655-4-4.

14.2 Permanent Abandonment.

14.2.1 This section applies to the abandonment of the type of wells listed in Subsection R655-4-1(1.2) including private water wells, public supply wells, monitor wells, cathodic protection wells, and heating or cooling exchange wells. A licensed driller shall notify the state engineer before commencing abandonment work of an existing well and submit a complete and accurate abandonment log following abandonment work in accordance with Section R655-4-4. Before commencing abandonment work, the driller shall obtain a copy of the well log of the well proposed to be abandoned from the well owner or the state engineer, if available, to determine the proper abandonment procedure. Any well that is to be permanently abandoned shall be completely filled from bottom to top in a manner to prevent vertical movement of water within the borehole as well as preventing the annular space surrounding the well casing from becoming a conduit for possible contamination of the groundwater supply. A well driller who wishes to abandon a well in a manner that does not comply with the provisions set forth in this section must request approval from the state engineer.

14.3 License Required.

14.3.1 Well abandonment shall be accomplished under the direct supervision of a currently licensed water well driller who shall be responsible for verification of the procedures and materials used.

14.4 Acceptable Materials.

14.4.1 Neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout in accordance with Subsection R655-4-11(11.4) shall be used to abandon wells and boreholes. Other sealing materials or additives, such as fly ash, may be used in the preparation of grout upon approval of the state engineer. Drilling mud or drill cuttings shall not be used as any part of a sealing materials for well abandonment. The liquid phase of the abandonment fluid shall be water from a potable municipal system or disinfected in accordance with Subsection R655-4-11(11.6.5).

14.5 Placement of Materials.

14.5.1 Neat cement and sand cement grout shall be introduced at the bottom of the well or required sealing interval and placed progressively upward to the top of the well. The sealing material shall be placed by the use of a grout pipe, tremie line, dump bailer or equivalent to avoid freefall, bridging, or dilution of the sealing materials or separation of aggregates from sealants. Sealing material shall not be installed by freefall or gravity unless the interval to be sealed is dry and no deeper than 30 feet below ground surface. If the well to be abandoned is a flowing artesian well, the well may be pressure grouted from the surface. The well should be capped immediately after placement of seal materials to allow the seal material to set up and not flow out of the well.

14.5.2 Bentonite-based abandonment products shall be mixed and placed according to manufacturer's recommended procedures and result in a seal free of voids or bridges. Granular or powered bentonite shall not be placed under water. When placing unhydrated bentonite, a sounding or tamping tool shall be run in the sealing interval during pouring to measure fill-up rate, verify a continuous seal placement, and to break up possible bridges or cake formation.

14.5.3 If seal material settlement occurs during placement and set up, the top of the abandoned well casing or borehole shall be topped off with approved sealing material until the seal top remains at the natural ground surface.

14.5.4 Abandonment materials placed opposite any non-water bearing intervals or zones shall be at least as impervious as the formation or strata before penetration during the drilling process.

14.5.5 Before well or borehole abandonment, all pump equipment, piping, and other debris shall be removed to the extent possible. The well shall also be sounded immediately before it is plugged to make sure that no obstructions exist that will interfere with the filling and sealing. If the well contains lubricating oil that has leaked from a turbine shaft pump, it shall be removed from the well before abandonment and disposed of in accordance with applicable state and federal regulations.

14.5.6 Verification shall be made that the volume of sealing and fill material placed in a well during abandonment operations equals or exceeds the volume of the well or borehole to be filled and sealed.

14.6 Termination of Casing.

14.6.1 The casings of wells to be abandoned shall be severed to the natural ground surface or deeper if necessitated by development of the area. If the casing is severed below ground surface, compacted native material shall be placed above the abandoned well upon completion.

14.7 Abandonment of Artesian Wells.

14.7.1 A neat cement grout, sand cement grout, or concrete plug shall be placed in the confining stratum overlying the artesian zone so as to prevent subsurface leakage from the artesian zone. The rest of the well shall be filled with sand cement grout, neat cement grout, bentonite abandonment products, or bentonite grout. The uppermost ten feet of the well shall be abandoned as required in Subsection R655-4-14(14.5.3).

14.8 Abandonment of Drilled and Jetted Wells.

14.8.1 A neat cement grout or sand cement grout plug shall be placed opposite all perforations, screens or openings in the well casing. The rest of the well shall be filled with cement grout, neat cement, bentonite abandonment products, concrete, or bentonite slurry. The uppermost ten feet of the well shall be abandoned as required in Subsection R655-4-14(14.5.3).

14.9 Abandonment of Gravel Packed Wells.

14.9.1 All gravel packed wells shall be pressure grouted throughout the perforated or screened section of the well. The rest of the well shall be filled with sand cement grout, neat cement grout, bentonite abandonment products, or bentonite grout. If gravel pack extends above or below the perforated or screened interval in the annular space between the casing and borehole wall, additional perforations in that blank interval of casing shall be required. The uppermost ten feet of the well shall be abandoned as required in Subsection R655-4-14(14.5.3).

14.10 Removal of Casing.

14.10.1 Where possible, it is recommended that the well casing be removed during well abandonment, and when doing so, the abandonment materials shall be placed from the bottom of the well or borehole progressively upward as the casing is removed. The well shall be sealed with sand cement grout, neat cement grout, bentonite abandonment products, or bentonite grout. In the case of gravel packed wells, the entire gravel section shall be pressure grouted. The uppermost ten feet of the well shall be abandoned as required in Subsection R655-4-14(14.5.3).

14.11 Replacement Wells.

14.11.1 Wells which are to be removed from operation and replaced by the drilling of a new well under an approved replacement application, shall be abandoned in a manner consistent with Section R655-4-14 before the rig is removed from the site of the newly constructed replacement well, unless written authorization to remove the rig without abandonment is provided by the state engineer. Also refer to the requirements provided in Subsection R655-4-4(4.4).

14.12 Abandonment of Cathodic Protection Wells.

14.12.1 The general requirements for permanent well abandonment in accordance with Section R655-4-14 shall be followed for the abandonment of cathodic protection wells.

14.12.2 A cathodic protection well shall be investigated before it is destroyed to determine its condition, details of its construction and whether conditions exist that will interfere with filling and sealing.

14.12.3 Casing, cables, anodes, granular backfill, conductive backfill, and sealing material shall be removed as needed, by re-drilling, if necessary, to the point needed to allow proper placement of abandonment material. Casing that cannot be removed shall be adequately perforated or punctured at specific intervals to allow pressure injection of sealing materials into granular backfill and all other voids that require sealing.

R655-4-15. Monitor Well Construction Standards.

15.1 Scope.

15.1.1 Certain construction standards that apply to water wells also apply to monitor wells. Therefore, these monitoring well standards refer frequently to the water well standard sections of this rule. Standards that apply only to monitor wells, or that require emphasis, are discussed in this section.

15.1.2 These standards are not intended as a complete manual for monitoring well construction, alteration, maintenance, and abandonment. These standards serve only as minimum statewide guidelines towards ensuring that monitor wells do not constitute a significant pathway for the movement of poor quality water, pollutants, or contaminants. These standards provide no assurance that a monitor well will perform a desired function. Ultimate responsibility for the design and performance of a monitoring well rests with the well owner or the owner's contractor, or technical representatives. Most monitor well projects are the result of compliance with the Environmental Protection Agency (EPA), Federal Regulations such as the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or "Superfund"), or specific State Solid and Hazardous Waste requirements. The contracts governing their installation are tightly written containing specific requirements as to site location, materials used, sampling procedures and overall objectives. Therefore, specific construction requirements for monitor well installation shall be governed by applicable contracts and regulations providing they meet or exceed state requirements and specifications. Guidelines and recommended practices dealing with the installation of monitor wells may be obtained from the state engineer upon request. Additional recommended information may be obtained from the Environmental Protection Agency (EPA), Resource Conservation and Recovery Act (RCRA), Groundwater Monitoring Enforcement and Compliance Document available from EPA's regional office in Denver, Colorado and from the Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells, available from the National Groundwater Association in Dublin, Ohio.

15.2 Installation and Construction.

15.2.1 Materials and Equipment Contaminant-Free. All material used in the installation of monitor wells shall be contaminant-free when placed in the ground. Drilling equipment shall be clean and contaminant-free in accordance with Subsection R655-4-11(11.6.4). During construction contaminated water should not be allowed to enter contaminant-free geologic formations or water bearing zones.

15.2.2 Borehole Integrity. Some minor cross contamination may occur during the drilling process, but the integrity of the borehole and individual formations must then be safeguarded from permanent cross connection.

15.2.3 Casing and Screen. The well casing should be perforated or screened and filter packed with sand or gravel where necessary to provide adequate sample collection at depths where appropriate aquifer flow zones exist. The casing and screen selected shall not affect or interfere with the chemical, physical, radiological, or biological constituents of interest. Screens in the same well shall not be placed across separate water bearing zones to minimize interconnection, aquifer commingling, and cross contamination. Screens in a nested well can be placed in separate water bearing zones as long as the intervals between the water bearing zones are appropriately sealed and aquifer cross connection and commingling does not occur. Monitor well casing and screen shall conform to ASTM standards, or consist of at least 304 or 316 stainless steel, PTFE (Teflon), or Schedule 40 PVC casing.

15.2.4 Gravel or Filter Pack. If installed, the gravel or filter pack should generally extend two feet to ten feet above screened or perforated areas to prevent the migration of the sealing material from entering the zones being sampled. Gravel or filter pack material shall meet the requirements of Subsection R655-4-11(11.5.2). Gravel or filter pack for monitoring wells does not require disinfection. Drill cutting should not be placed into the open borehole annulus. The well driller shall ensure that a bridge or voids do not occur in the annular space during the placement of the gravel pack by a sounding device or other mechanism.

15.2.5 Annular Seal. All monitor wells constructed shall have a continuous surface seal, which seals the annular space between the borehole and the permanent casing, in accordance with the provisions in Section R655-4-11. The surface seal depth requirements of Section R655-4-11 do not apply to monitor wells. The surface seal may be more or less than 30 feet depending on the screen or perforation or gravel pack interval. Seals shall also be constructed to prevent interconnection and commingling of separate aquifers penetrated by the well, prevent migration of surface water and contaminations into the well and aquifers, and shall provide casing stability. The seal shall have a minimum diameter of four inches larger than the nominal size of the permanent casing, and shall extend from land surface to the top of the filter pack. After the permanent casing and optional filter pack has been set in final position, a layer of bentonite or fine sand such as mortar sand shall be placed on top of the filter pack to maintain separation between the seal material and the screened interval to insure that the seal placement will not interfere with the filter pack. The remaining annular space shall be filled to land surface in a continuous operation with unhydrated bentonite, neat cement grout, sand cement grout, or bentonite grout. Only potable water should be used to hydrate any grout or slurry mixture. The completed annular space shall fully surround the permanent casing, be evenly distributed, free of voids, and extend from the permanent casing to undisturbed or recompact soil. All sealing materials and placement methods shall conform to the standards in Section R655-4-2 and Subsection R655-4-11(11.4). The well driller shall ensure that a bridge or voids do not occur in the annular space during the placement of the seal.

15.2.6 Cuttings, Decon Water, Development Water, and Other IDW. Drill cuttings, decontamination (Decon) water, monitor well development water, and other investigation derived waste (IDW) shall be managed and disposed of in accordance with applicable state and federal environmental regulations. It is the responsibility of the driller to know and understand such requirements.

15.3 Minimum Surface Protection Requirements.

15.3.1 If a well is cased with metal and completed above ground surface, a locking water resistant cap shall be installed on the top of the well.

15.3.2 If the well is not cased with metal and completed above ground surface, a protective metal casing shall be installed over and around the well. The protective casing shall be cemented at least two feet into the ground around the non-metallic casing. A water tight cap shall be installed in the top of the well casing. A locking cap shall be installed on the top of the protective casing.

15.3.3 Monitor wells completed above ground and potentially accessible to vehicular damage shall be protected in the following manner. At least three metal posts, at least three inches in diameter, shall be cemented in place around the casing. Each post shall extend at least three feet above and two feet below ground surface. A concrete pad may be installed to add protection to the surface completion. If installed, the concrete pad shall be at least four inches thick and shall slope to drain away from the well casing. The base shall extend at least two feet laterally in all directions from the outside of the well boring. When a concrete pad is used, the well seal may be part of the concrete pad.

15.3.4 If the well is completed below land surface, a water tight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land surface and be equipped with a waterproof seal to prevent inflow of any water or contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The monument and cover must be designed to withstand the maximum expected load.

15.4 Abandonment.

15.4.1 Abandonment of monitor wells shall be completed in compliance with Section R655-4-14. The requirements in Section R655-4-14 are not required for the permanent abandonment of monitor wells completed at a depth of 30 feet below natural ground surface.

R655-4-16. Pump Installation and Repair.

16.1 Pump installation practices. All pump installations shall be completed in such a manner as to prevent waste and contamination of groundwater by pollution material entering the well from pumping equipment, casing connectors, fittings, piping, sanitary seals or caps.

16.2 Surface Seal. If in the process of pump installation or repair, the well's surface seal is disturbed or damaged, it shall be repaired and resealed in accordance with the standards provided in Subsection R655-4-11(11.4).

16.3 Tools, Equipment, and Materials. Down-hole tools and equipment used in performance of pump installation and repair shall be cleaned, disinfected, and free of contamination before placement in a well. All tools, drilling equipment, and materials used to drill a well shall be free of contaminants before beginning pump-related work. Contaminants include lubricants, fuel, or bacteria that will reduce the well efficiency, and any other items that will be harmful to public health or the resource or reduce the life of the water well. It is recommended that excess lubricants placed on equipment be wiped clean before insertion into the well. Thread compounds, sealants, and lubricants must not exceed the maximum contaminant levels for chemicals, taste, and odor. The licensee shall use pump-related tools and equipment properly so as not to permanently damage the well or aquifer.

16.4 Disinfection. Following completion of pump installation and repair work on a well, the well, pump, and in-well discharge piping shall be properly disinfected in accordance with Subsection R655-4-11(11.6.5).

16.5. Product, material, and Process Standards. Any product, material or procedure designed for use related to pump installation and repair of water production or non-production wells, which has received certification and approval for its intended use by the National Sanitation Foundation (NSF) under ANSI-NSF Standard 60 or 61, the American Society for Testing Materials (ASTM), the American Water Works Association (AWWA) or the American National Standards Institute (ANSI) may

be utilized. Other products, materials or procedures may also be utilized for their intended purpose upon manufacturers certification that they meet or exceed the standards or certifications referred to in this section and upon state engineer approval. Organic substances shall not be introduced into the well or borehole during pump installation and repair work.

16.6 Surface Completions. Pump installers shall leave the well surface completion upon completion of pump installation or repair work in accordance with the standards in Section R655-4-11 as it pertains to casing stick-up, steel or PVC casing extensions, sanitary capping and venting, and protective casings. Upon completion, all wells shall be equipped with a watertight, tamper-resistant casing cap or sanitary seal.

16.7 Flowing Artesian Wells. In accordance with Subsection R655-4-11(11.4.3.5), artesian wells that flow naturally at the surface, the well shall be equipped with a control valve so that the flow can be completely stopped. The control valve must be available for inspection by the state engineer at all times.

16.8 Seals Between Casings. If the well is constructed of multiple casing strings at or near the ground surface and if a pitless adapter or unit is installed, the standards of Subsection R655-4-11(11.5.5) shall be employed to ensure proper sealing between casings is maintained.

16.9 Water Level and Flow Measurement. Following pump installation and repair work, the well shall be left in such a manner to allow for access to water level measurements in accordance with Subsection R655-4-11(11.7.2). After pump installation and repair work is completed on a well, the static water level should be measured after which a test should be performed to determine the rate at which groundwater can be reliably produced from the well. Pumping water level should be measured and recorded during this test. Static water level and well testing information shall be noted on the official submittal of the Pump Log by the pump installer or well driller.

16.10 Surface Security. If it becomes necessary for the pump installer to temporarily discontinue operation on a well before completion or otherwise leave the well unattended, the well must be covered securely to prevent contaminants from entering the casing and rendered secure against entry by children, vandals, domestic animals, and wildlife.

16.11 Above-grade connections. An above-grade connection into the top or side of a well casing shall be at least 18-inches above the land surface and shall be constructed so as to exclude dirt or other foreign matter by at least one of the following methods, as may be applicable:

- (A) threaded connection;
- (B) welded connection;
- (C) expansion sealer;
- (D) bolted flanges with rubber gaskets;
- (E) overlapping well cap; or
- (F) if a water well pump is mounted or sealed on a concrete pedestal, the casing shall extend at least to the top of the pedestal and at least 18-inches above the land surface.

16.12 Pitless Connections. Pitless adapters and units shall be installed in accordance with the standards set forth in Subsection R655-4-11(11.7.5). Pitless adapters shall be installed below the frost line. A below ground connection shall not be submerged in water when installed. Holes cut in the casing through which the pitless adapters are installed must be sized and constructed to guarantee a watertight seal with the pitless adapter in place.

16.13 Backflow Protection. When a check valve or foot valve is not a part of the pump, a check valve or back-siphon prevention device shall be installed on the pump discharge line within the well or beyond the well to eliminate the opportunity for contaminated water to backflush into the well. Such device must be designed to direct or isolate the water flow to prevent water in the distribution line from running back down the well during removal or repair to the pump and pumping equipment. When a flow meter is installed on a well the meter must be located downstream from the backflow preventer and be placed in accordance with manufacturer spacing specifications.

16.14 Hand Pumps. Hand pumps shall be of the force type equipped with a packing gland around the pump rod, a delivery spout that is closed and downward directed, and a one-piece bell-type base that is part of the pump stand or is attached to the pump column in a watertight manner. The bell base of the pump shall be bolted with a gasket to a flange that is securely attached to the casing or pipe sleeve.

16.15 Pumping Water Level. In a screened or perforated well, the well pump setting and suction inlet shall be located so that the pumping level of the water cannot be drawn below the top of the screen.

16.16 Pump and Column or Drop Pipe Removal. During any repair or installation of a water well pump, the licensed installer shall make a reasonable effort to maintain the integrity of ground water and to prevent contamination by elevating the pump column and fittings, or by other means suitable under the circumstances.

R655-4-17. Shallow Water Well Construction Requirements.

17.0 General. Shallow water wells at a depth of 30 feet or less shall be constructed and equipped by a licensed well driller pump installer, or shallow water well constructor. Shallow water wells shall be constructed using methods and materials that will result in a well that is safe for the public and environment and not a source of subsurface leakage, waste, or contamination of the groundwater resource. The well drilling and construction requirements for wells deeper than 30 feet found in Section R655-4-11 do not apply to shallow water wells that are 30-feet deep or less.

17.1 Approved Products, Materials, and Procedures. Any product, material or procedure designed for use in the drilling, construction, cleaning, renovation, development, or abandonment of shallow water production wells shall be designed for that purpose and be safe for the public and environment.

17.2 Shallow Water Well Casing. It shall be the sole responsibility of the well driller or shallow water well constructor to determine the suitability of any type of well casing for the particular well being constructed.

17.2.1 Casing Stick-up. The well casing shall extend a minimum of 18 inches above finished ground level and the natural ground surface should slope away from the casing. A secure sanitary, weatherproof mechanically secured cap, seal, or a completely welded cap shall be placed on the top of the well casing to prevent contamination of the well.

17.3 Surface Seals. A surface seal shall be installed in the annular space between the well casing and borehole wall from ground surface to an appropriate depth to protect the well from surface water contamination. The seal shall also prevent the upward movement of artesian waters within the annular space around the well casing.

17.3.1 Seal Material. The seal material shall consist of neat cement grout, sand cement grout, or unhydrated bentonite such as granular, tabular, pelletized, or chip bentonite, as defined in Section R655-4-2.

17.4 Access Port. Every shallow water well shall be equipped with a usable access port so that the position of the water level, or pressure head, in the well can be measured at all times.

17.5 Static Water Level, Well Development, and Well Yield. To fulfill the requirements of Subsection R655-4-4(4.5.2), new wells designed to produce water shall be developed to remove sediment and materials introduced during construction and to restore the natural groundwater flow to the well to the extent possible. After a water production well is developed, a test should be performed to determine the rate at which groundwater can be reliably produced from the well. Following development and testing, the static water level in the well should also be measured. Static water level, well development information, and well yield information shall be noted on the official submittal of the well log by the licensee.

17.6 Pump Work. All pump installations shall be completed in such a manner as to prevent waste and contamination of groundwater by pollution material entering the well from pumping equipment, casing connectors, fittings, piping, sanitary seals or caps.

KEY: water wells, pump installers, well drillers license, shallow water well constructor

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