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5A NCAC 02C .0201 PURPOSE

The rules in this Section establish classes of injection wells and set forth requirements and procedures for permitting, constructing, operating, monitoring, reporting, and abandoning approved types of injection wells and abandoning, monitoring, and reporting non-permitted wells used for the injection of wastes or any substance of a composition and concentration such that, if it were discharged to the land or waters of the state, would create a threat to human health or would otherwise render those waters unsuitable for their best intended ~~best usage.~~ usage as defined in Rule .0201 of Subchapter 02L. Except as provided for in General Statute (G.S.)~~G.S.~~ 143-215.1A, the discharge of any wastes to the subsurface or groundwaters of the state by means of wells is prohibited by G.S. 143-214.2(b).

History Note: *Authority G.S. 87-84; 87-87; 87-88; 87-94; 87-95; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c);*
Eff. August 1, 1982;
Amended Eff. September 1, 1996.

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15A NCAC 02C .0202 SCOPE

The rules in this Section apply to all construction, operation, use, modification, alteration, repair, and abandonment activities of all injection wells as defined herein. ~~persons proposing to construct, alter, repair, or abandon any injection well, or owning, using or operating, or proposing to use or operate any well for injection~~. These rules do not apply to subsurface distribution systems associated with sewage treatment and disposal permits issued in accordance with G.S. 130A.

History Note: *Authority G.S. 87-86; 87-87; 143-211; 143-215.1A; 143-215.3(a)(1); 143-215.3(c);*
Eff. August 1, 1982;
Amended Eff. September 1, 1996.

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15A NCAC 02C .0203 CONFLICT WITH OTHER LAWS, RULES, AND REGULATIONS

The provisions of any federal, state, county, or municipal laws, rules, or regulations establishing injection well standards affording greater protection to the public welfare, safety, and health and to the groundwater resources shall prevail, within the jurisdiction of such agency or municipality, over standards established by the rules in this Section.

History Note: *Authority G.S. 87-87; 87-96; 143-211; 143-215.1A; 143-215.3(a)(1); 143-215.3(c);*
Eff. August 1, 1982;
Amended Eff. September 1, 1996.

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15A NCAC 02C .0204 DEFINITIONS

The definition of any word or phrase used in the rules in this Section shall be the same as given in ~~G.S. 87-85 and~~G.S. 87-85, G.S. 143-213, or any referenced rule ~~G.S. 143-213, except~~ and that the following words and phrases shall have the following meanings:

(1) "Abandonment or Plugging Record" means a systematic listing of permanent or temporary abandonment of a well and may contain a well log or description of amounts and types of abandonment material used, the method employed for abandonment, a description of formation location, formation thickness, and location of abandonment structures.

~~(2) "Air Injection Well or Air Sparging Well" means a well that is used to inject uncontaminated air to the subsurface to promote volatilization and enhance bioremediation of contaminants in the groundwater and soil.~~

~~(3) "Aquifer Test Well" means a well into which uncontaminated fluid is injected in order to facilitate the assessment of local aquifer characteristics such as permeability, hydraulic conductivity, storage coefficient, or transmissivity. This includes slug tests which assess aquifer characteristics by the addition of a known volume of water to cause an instantaneous change in the water level of the well.~~

~~(4) "Area Permit" means a permit that regulates all injection activities within the associated Area of Review.~~

(2) "Area of Review" means the area around an injection well as specified by each applicable rule type.

(3) "Best intended usage" is as defined in Rule .0201 of Subchapter 02L for each groundwater classification.

~~(5)~~(4) "Catastrophic Collapse" means the ~~sudden and utter~~ failure of ~~overlaying~~ overlying strata caused by removal of underlying materials.

~~(6)~~(5) "Closed-Loop Geothermal ~~Injection~~ Well System" means a system of continuous piping, part of which is installed in the ~~subsurface,~~ subsurface via vertical or angled borings, through which moves a fluid that does not exit the piping, ~~and~~ but ~~which~~ is used to transfer heat energy ~~to and from the fluid.~~between the subsurface and the fluid in association with a heating and cooling system.

~~(7)~~(6) "Closed-Loop Groundwater Remediation System" means a system as defined in G.S. 143-215.1A. ~~and attendant processes used for improving the quality of contaminated groundwater by collecting or pumping groundwater, treating the groundwater to reduce the concentration of or remove contaminants, and reintroducing the treated water beneath the surface in such a manner that the treated groundwater will be recaptured by the collecting or pumping portion of the system.~~

(7) "Cluster" means two or more geothermal injection wells connected to the same manifold or header of a geothermal heating and cooling system.

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~~(8) "Compliance Boundary" means a boundary as specified by 15A NCAC 2L (Classifications and Water Quality Standards Applicable To The Groundwaters of North Carolina), at and beyond which groundwater quality standards may not be exceeded.~~

~~(9)~~(8) "Confined or Enclosed Space" means any space, having a ~~limited~~ restricted means of ~~ingress or egress,~~entry and exit ~~which~~ and is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere.

~~(10)~~(9) "Confining Zone" means a geological formation, group of formations, or part of a formation that is capable of limiting fluid movement.

~~(11)~~(10) "Contaminant" ~~means any physical, chemical, biological or radiological substance or matter which, if injected, may cause a violation of any water quality standard under 15A NCAC 2L, may adversely affect the health of humans, or may degrade the quality of the groundwater.~~ is as defined in Rule .0102 of Subchapter 02L.

~~(12)~~(11) ~~"Contamination"~~ "Contaminate" or "Contamination" ~~means foreign materials of such nature, quality, and quantity as to cause degradation of the quality of the water.~~ is as defined in Rule .0102 of this Subchapter.

~~(13)~~(12) "Director" means the Director of the Division of Water ~~Quality.~~ Quality or the Director's delegate.

~~(14)~~(13) "Division" means the Division of Water Quality.

~~(15)~~(14) "Facility, Operation, or Activity" means any injection well or system.

~~(16)~~(15) "Flow Rate" means the volume per unit time of a fluid moving past a fixed reference point. ~~fluid which emerges from an orifice, pump, or turbine or passes along a conduit or channel.~~

~~(17)~~(16) "Fluid" means a material or substance which ~~flows or moves;~~ is capable of flowing whether in a semisolid, liquid, sludge, gas, or ~~any~~ other form or state.

~~(18)~~(17) "Formation Fluid" means fluid present in a formation under natural conditions. This does not include introduced fluids, such as drilling mud and grout, used to facilitate the construction or development of a well.

~~(19)~~(18) "Generator" means any person, by site location, whose act or process produces hazardous waste.

~~(20)~~(19) "Groundwaters" mean those waters occurring in the subsurface under saturated conditions.

~~(21)~~(20) "Grout" ~~means well construction material grout as specified~~ is as defined in ~~15A NCAC 2C .0100 (Criteria and Standards Applicable to Water Supply and Certain Other Wells).~~ Rule .0102 of this Subchapter.

~~(22)~~(21) "Hazardous Waste" means any solid, semisolid, liquid, or contained gaseous waste or combination thereof, which because of its quantity, concentration, or physical, chemical or infectious characteristic may:

(a) cause or ~~significantly~~ contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or

(b) pose a ~~substantial~~ present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

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~~(23)~~(22) "Hazardous Waste Management Facility" means all contiguous land and structures, and other appurtenances and improvements on the land used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units (for example, one or more landfills, surface impoundments, or combination of them).

~~(24)~~(23) "Hose Bibb or Tap" means a fluid sampling port located on or appurtenant to a well.

~~(25)~~(24) "Hydraulic Conductivity" means the rate at which a unit volume of fluid of a specific density, viscosity and temperature can flow through a permeable medium of unit cross section and under unit hydraulic gradient.

(25) "Hydraulic or Pneumatic Fracturing" means the intentional act of forming new fractures or propagating existing fractures in a geologic formation or portion thereof with the explicit intent of increasing the formation's permeability. Hydraulic fracturing can only be used in association with groundwater remediation injection activities.

(26) "Hydrostratigraphic" means a body of rock or unconsolidated sediment distinguished and characterized by observable hydraulic properties that relate to its ability to receive, store, transmit, and yield water.

~~(26)~~(27) "Injectant" means any solid or fluid that is emplaced in the subsurface by means of an injection well.

~~(27)~~(28) "Injection" means emplacement or discharge into the subsurface of a solid or fluid substance or material. This definition excludes drilling fluids, grout used in association with well construction or abandonment, and fluids used in connection with well development, rehabilitation or stimulation.

~~(28)~~(29) "Injection Well" means any ~~excavation which is cored, bored, drilled, jetted, dug, or otherwise constructed,~~well as defined in G.S. 87-85, whose depth is greater than its largest surface dimension and which is used, or intended to be used, for the injection of fluids or solids into the subsurface or groundwaters.

~~(29)~~(30) "Injection Zone" means a geological formation, group of formations, or part of a formation receiving solids or fluids through ~~a~~ an injection well.

~~(30)~~(31) "Lithology" means the description of rocks or sediments on the basis of their physical and chemical characteristics.

(32) "Lithostratigraphic" means a body of rock or unconsolidated sediment that is distinguished and characterized by observable lithologic features or its position relative to other bodies of rock or unconsolidated sediment.

~~(31)~~(33) "Major Facility" means a Class 1 or 4 well.

~~(32)~~(34) "Mechanical Integrity" means:

(a) an absence of a leak in the casing, tubing, or packer of an injection well; and

(b) an absence of ~~any significant~~ fluid movement ~~into an underground source of drinking water~~ through vertical channels adjacent to the injection well bore.

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~~(33)~~(35) "Monitoring Well" means any well ~~constructed for the primary purpose of obtaining samples of groundwater or other liquids for examination or testing, or for the observation or measurement of groundwater levels. This definition excludes lysimeters, tensiometers, and other devices used to investigate the characteristics of the unsaturated zone.~~as defined in Rule .0102 of this Subchapter.

~~(34)~~(36) "Owner" means any person ~~who holds the fee or other property rights in the well being constructed. A well is real property and its construction on land shall be deemed to vest ownership in the land owner, for purposes of this Section and statutes governing groundwater, in the absence of contrary agreement in writing.~~as defined in Rule .0102 of this Subchapter.

~~(35)~~(37) "Permit" means an authorization, license, or equivalent control document issued by the Director to implement the requirements of these Rules.

(38) "Permitted by Rule" means that the injection activity is authorized by the rules of this Section and does not require the issuance of an individual permit when injection wells are constructed in accordance with the rules in this Section.

~~(36)~~(39) "Plug" means the act or process of stopping the flow of fluids into or out of a formation through a borehole or well penetrating that formation.

~~(37)~~(40) "Potable Water" means those waters of the state which are suitable for drinking, culinary, or food processing purposes.

~~(38)~~(41) "Pressure" means the total load or force per unit area acting on a surface.

~~(39) "Site" means the land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity.~~

~~(40)~~(42) "Receptor" means any human, plant, animal, or structure which is, or has the potential to be, ~~adversely~~ affected by the release or migration of contaminants. Any well constructed for the purpose of monitoring groundwater and contaminant concentrations shall not be considered a receptor.

(43) "Secretary" means the Secretary of the Department of Environment and Natural Resources or the Secretary's delegate.

(44) "Site" means an area as defined in Rule .0102 of this Subchapter.

~~(41)~~(45) "Subsidence" means the lowering of the natural land surface in response to: earth movements; reduction of formation fluid pressure; removal of underlying supporting material by mining or solution of solids, either artificially or from natural causes; compaction due to wetting (Hydrocompaction); oxidation of organic matter in soils; or added load on the land surface.

(46) "Subsurface Distribution System" means an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids or solids below the surface of the ground.

~~(42) "Thermal Waste" means a material having a temperature which is in excess of 30 degrees Fahrenheit above or below the naturally occurring temperature of the receiving groundwater, as determined by the Director.~~

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~~(43)~~(47) "Transmissivity" means the product of the hydraulic conductivity and the total saturated thickness of a porous or fractured medium.

~~(44) "Underground Sources of Drinking Water" means an aquifer or its portion:~~

~~(a) which supplies any public water system; or~~

~~(b) which contains a sufficient quantity of groundwater to supply a public water supply system; and~~

~~(i) currently supplies drinking water for human consumption; or~~

~~(ii) contains fewer than 10,000 milligrams per liter of total dissolved solids.~~

~~(45) "Waste" means waste as defined in G.S. 143-213(18).~~

(48) "Waters" or "Waters of the State" is as defined in G.S. 143-212.

~~(46)~~(49) "Well head" ~~means the upper terminal of the well including adapters, ports, valves, seals, and other attachments.~~is as defined in Rule .0102 of this Subchapter.

~~(47)~~(50) "Well System" means two or more wells ~~serving the same facility.~~as defined in Rule .0102 of this Subchapter.

History Note: *Authority G.S. 87-85; 87-87; 143-213; 143-215.1A;*
Eff. August 1, 1982;
Amended Eff. September 1, 1996; July 1, 1988; March 1, 1984

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15A NCAC 02C .0205 AREA OF REVIEW (REPEALED)

~~(a) The area of review for an injection well or well field shall be a fixed radius around the well or well field of ¼ mile (1320 feet) or greater, as determined by the Director, for the following Class 5 well types:~~

~~(1) Type 5A7 - Heating/Cooling Water Return Well~~

~~(2) Type 5I - In-situ Groundwater Remediation Well~~

~~(3) Type 5L - Closed-Loop Groundwater Remediation Well~~

~~(4) Type 5P - Air Injection Well~~

~~(5) Type 5Q - Closed-Loop Geothermal Injection Well Systems~~

~~(6) Type 5X30 - Aquifer Test Well~~

~~(b) In determining a fixed radius greater than ¼ mile, the following factors shall be taken into consideration by the Director:~~

~~(1) physical and chemical characteristics of the injected and formation fluids;~~

~~(2) injection rate and pressure;~~

~~(3) hydrogeology;~~

~~(4) population and its groundwater use and dependence; and~~

~~(5) historical practices in the area.~~

~~(c) For all other Class 5 well types which can be approved under the rules in this Section, the area of review for an injection well or well field shall be calculated using the procedure for determining the zone of endangering influence specified in 40 CFR 146.6(a).~~

History Note: *Authority G.S. 87-87; 143-211; 143-215.1A; 143-215.3(a)(1); 143-215.3(c);*
Eff. August 1, 1982;
Amended Eff. September 1, 1996.
Repealed Eff.

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15A NCAC 02C .0206 CORRECTIVE ACTION

(a) Injection wells not constructed in compliance with the criteria and standards specified in these Rules shall be brought into compliance with the rules in this Section or abandoned by the person(s) responsible for the construction of the ~~well(s).~~ well(s) within 30 calendar days of becoming aware of any instance of noncompliance.

(b) Where operation of any injection facility is not in compliance with the requirements of the rules in this Section, or where continued operation of the injection facility threatens any water quality standard or classification established under the authority of G.S. 143-214.1, the owner of the injection facility shall perform the following:

(1) ~~Stop~~ stop all injection activities immediately;

(2) ~~Notify~~ notify the Division orally within 24 hours (or the next business day), and in writing within five calendar days, of becoming aware of any instance of noncompliance;

(3) ~~Perform~~ perform a complete site assessment and submit to the ~~Division, as soon as practicable~~ Division within 30 calendar days of notifying the Division. The Director may approve an alternate time period based on the severity and extent of noncompliance. ~~or in accordance with a schedule established by the Director, a report which shall include but not be limited to a description of:~~ The site assessment report shall include a description of:

(A) ~~The~~ the source and cause of contamination;

(B) ~~Any~~ any imminent hazards to public health and safety and actions taken to mitigate them;

(C) ~~All~~ all receptors and significant exposure pathways;

(D) ~~The~~ the horizontal and vertical extent of soil and groundwater contamination and all significant factors affecting contaminant transport; and

(E) ~~Any~~ any geological and hydrogeological features influencing the movement or chemical or physical character of the ~~contaminants.~~contaminants; and

(4) ~~Submit~~ submit a corrective action plan and a proposed schedule for implementation of the corrective action to the Director, for approval. ~~In establishing a schedule,~~ For approving the proposed plan and schedule, the Director shall consider ~~any reasonable schedule proposed by the permittee.~~ the compliance history of the well owner, severity and extent of noncompliance, and any other criteria necessary for the protection of human health and the environment. The corrective action plan shall ~~include but not be limited to:~~include:

(A) ~~A~~ a description of the proposed corrective action and reasons for its selection;

(B) ~~Specific~~ specific plans, including engineering details where applicable for restoring the groundwater quality and for restoring the integrity of the injection facility if the injection activity is to continue;

(C) ~~A~~ a schedule for the implementation and operation of the proposed plan; and

(D) ~~A~~ a monitoring plan for evaluating the effectiveness of the proposed corrective action.

History Note: *Authority G.S. 87-87; 87-88; 143-211; 143-215.1A; 143-215.3(a)(1); 143-215.3(c);*
Eff. August 1, 1982;

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Amended Eff. September 1, 1996; March 1, 1984.

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15A NCAC 02C .0207 MECHANICAL INTEGRITY

~~(a) An injection well shall be considered to have mechanical integrity if:~~

~~(1) there is no measurable leak in the casing, tubing or packer; and~~

~~(2) there is no measurable fluid movement into an underground source of drinking water through vertical channels adjacent to the injection well bore which would result in deterioration of the water quality in zones above or below the injection zone; and~~

~~(3) injection pressure is no greater than atmospheric pressure (i.e. 14.7 pounds per square inch).~~

~~(b) If the injection pressure is to be greater than atmospheric, a demonstration of the mechanical integrity of the injection facility prior to injection shall be required unless it can be demonstrated to the Director's satisfaction that the methods and materials used in the construction of the well and injection operations shall not result in a threat to human health or a contravention of a groundwater quality standard as specified in 15A NCAC 2L. In conducting and evaluating the tests for mechanical integrity, the owner shall apply one of the following methods:~~

~~(1) monitoring of the annulus pressure; or~~

~~(2) a pressure test with liquid or gas.~~

~~(c) When the owner reports the results of mechanical integrity tests to the Director, the owner shall include a description of the test(s) and the method(s) used. In making an evaluation of the data submitted, the Director may review monitoring or other test data available.~~

(a) An injection well has internal mechanical integrity when there is no leak in the casing, tubing, or packer as demonstrated by one of the following methods:

(1) following an initial pressure test, monitoring of the tubing-casing annulus pressure with sufficient frequency to be representative, as determined by the Director. This test must be performed at the wellhead while maintaining an annulus pressure different from atmospheric pressure;

(2) pressure testing with liquid or gas; and

(3) any other method proposed by the permittee and approved by the Director.

(b) An injection well has external mechanical integrity when there is no significant fluid movement into groundwaters through vertical channels adjacent to the injection well bore as determined by one of the following methods:

(1) the results of a temperature or noise log;

(2) grouting records plus predictive calculations demonstrating that the injection pressures shall not exceed the strength of the grout; and

(3) any other equally effective method proposed by the permittee and approved by the Director.

(c) In conducting and evaluating the tests enumerated in this Section or others allowed by the Director, the owner or operator shall apply methods and standards generally accepted in the industry. When the well owner or operator reports the results of mechanical integrity tests, a description of the test(s) and the method(s) used shall be included. The Director shall review monitoring and other test data submitted since the previous evaluation.

(d) The Director may require additional or alternative tests if the results presented by the owner or operator under Paragraph (c) of this Rule are not satisfactory to demonstrate that an injection well has mechanical integrity.

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(e) An injection well that fails to demonstrate mechanical integrity shall take corrective action as specified in Rule .0206 of this Section.

History Note: *Authority G.S. 87-87; 143-211; 143-215.1A; 143-215.3(a)(1); 143-215.3(c);*
Eff. August 1, 1982;
Amended Eff. September 1, 1996; March 1, 1984.

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15A NCAC 02C .0208 FINANCIAL RESPONSIBILITY

When required by the Rules of this Section, ~~The~~ the permittee shall maintain financial responsibility and resources, in the form of performance bonds or other equivalent forms of financial assurances, as approved by the Director and as specified in the permit, to close, plug, and abandon the injection operation.

History Note: *Authority G.S. 87-87; 87-88; 143-211; 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 40 C.F.R. Part 144.52(a)(7); 40 C.F.R. Part 145.11(a)(20);*
Eff. August 1, 1982;
Amended Eff. September 1, 1996.

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15A NCAC 02C .0209 CLASSIFICATION OF INJECTION WELLS

Injection Wells are classified as follows:

~~(a) Class 1.~~

(1) Class 1. No person shall construct, use, or operate a well of this class for injection. This class applies to industrial, municipal, and nuclear disposal wells that are used to inject wastes beneath the lowermost formation containing groundwater. A description of the primary function for wells of this class is as follows:

~~(1) This class applies to industrial, municipal, and nuclear disposal wells that are used to inject wastes beneath the lowermost formation containing an underground source of drinking water.~~

~~(2) The designated type code and a description of the primary function for wells of this class shall be as follows:~~

(A) ~~Type 1H~~ Hazardous Waste Disposal Well. These wells are used by generators of hazardous wastes or owners of hazardous waste management facilities to inject hazardous waste.

(B) ~~Type 1I~~ Industrial disposal well. These wells are used to inject non-hazardous industrial waste.

(C) ~~Type 1M~~ Municipal disposal well. These wells are used to inject non-hazardous waste.

(D) ~~Type 1N~~ Nuclear disposal well. These wells are used to inject nuclear waste.

~~(E) Type 1X Other Class 1 wells.~~

~~(3) No person shall construct, use, or operate a well of this class for injection.~~

~~(b) Class 2.~~

(~~1~~2) Class 2. No person shall construct, use, or operate a well of this class for injection. This class applies to oil and gas production and storage related injection wells and includes wells which are used to inject fluids:

(A) which are brought to the surface in connection with conventional oil or natural gas production;

(B) for enhanced recovery of oil or natural gas; and

(C) for storage of hydrocarbons which are liquid at standard temperature and pressure.

~~(2) No person shall construct, use, or operate a well of this class for injection.~~

~~(c) Class 3.~~

(~~1~~3) Class 3. No person shall construct, use, or operate a well of this class for injection. This class applies to ~~special process~~ wells which are used to inject for the purpose of extraction of minerals or energy. A description of the primary function for wells of this class is as follows:

~~(2) The designated type code and a description of the primary function for wells of this class shall be as follows:~~

~~(A) Type 3G In-situ Gasification Well.~~

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(A) In Situ Production of Uranium or Other Metals. This category includes only in-situ production from ore bodies that have not been conventionally mined. Solution mining of conventional mines such as stopes leaching is included in Class 5.

(B) ~~Type 3M~~ Solution Mining Well. These wells are used in the solution mining of salts or potash.

(C) ~~Type 3S~~ Sulfur Mining Well. These wells are used in the mining of sulfur by the Frasch process.

~~(D) Type 3T Geothermal Well.~~

~~(E) Type 3U Uranium mining Well.~~

~~(3) No person shall construct, use, or operate a well of this class for injection.~~

~~(d) Class 4.~~

(~~1~~4) Class 4. No person shall construct, use, or operate a well of this class for injection. This class applies to injection wells that are used to inject hazardous wastes into or above a formation containing an underground source of drinking water and includes wells used by:

(A) generators of hazardous wastes or radioactive wastes; and

(B) owners of hazardous waste management facilities, or radioactive waste disposal sites.

~~(2) No person shall construct, use, or operate a well of this class for injection.~~

~~(e) Class 5.~~

(~~1~~5) Class 5. This class applies to all injection wells not included in Class 1, 2, 3, and 4.

(A) The construction, use, or operation of the following Class 5 injection well types is prohibited. A description of the primary function for these prohibited Class 5 wells is as follows:

~~(2) The construction, use, or operation of the following Class 5 injection well types are prohibited. The designated type code and a description of the primary function for these wells shall be as follows:~~

~~(A) Type 5A8 Groundwater Aquaculture Return Flow Well. These wells inject groundwater or surface water that has been used to support aquaculture.~~

~~(B) Type 5D2 Storm Water Drainage Well. These wells receive storm water runoff from paved areas, including parking lots, streets, residential subdivisions, building roofs, or highways.~~

~~(C) Type 5F1 Agricultural Drainage Well. These wells receive irrigation tailwaters, other field drainage, animal yard, feedlot, or dairy runoff.~~

~~(D) Type 5G30 Special Drainage Well. These wells are used for disposing of water from sources other than direct precipitation. Examples of this well type include: landslide control drainage wells, water tank overflow drainage wells, swimming pool drainage wells, and lake control drainage wells.~~

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~~(E) Type 5H – Gaseous Hydrocarbon Storage Well. These wells are used for the storage of hydrocarbons which are gases at standard temperature and pressure.~~

~~(F) Type 5N24 – Radioactive Waste Disposal Well. These wells are used for all radioactive waste disposal other than Class 4 wells.~~

~~(G) Type 5W – Sewage or Wastewater Disposal Well. These wells are used to inject sewage or wastewater from any source to the groundwaters of the State. This includes but is not limited to cesspools and abandoned drinking water wells.~~

~~(H) Type 5X13 – Mining, Sand, or Other Backfill Well. These wells are used to inject a mixture of fluid and sand, mill tailings, and other solids into mined out portions of subsurface mines whether, what is injected is a radioactive waste or not. This also includes special wells used to control mine fires and acid mine drainage wells.~~

~~(I) Type 5X14 – Solution Mining Well. These wells are used in solution mining in conventional mines, such as stopes leaching.~~

~~(J) Type 5X15 – In-situ Fossil Fuel Recovery Well. These wells are used for the in-situ recovery of coal, lignite, oil shale, and tar sands.~~

~~(K) Type 5X17 – Air Scrubber Waste Disposal Well. These wells are used to inject wastes from air scrubbers.~~

~~(L) Type 5X18 – Water Softener Regeneration Brine Disposal Well. These wells are used to inject regeneration wastes from water softeners.~~

~~(M) Type 5X28 – Motor Vehicle Waste Disposal Well. These wells receive wastes from motor vehicle facilities and include but are not limited to autobody repair shops, new and used car dealerships, specialty repair shops (e.g., transmission, muffler, and radiator repair shops and any facility that steam cleans or otherwise washes undercarriages or engine parts or does any vehicular repair work).~~

(i) Agricultural Drainage Well. These wells receive irrigation tailwaters, other field drainage, animal yard, feedlot, or dairy runoff.

(ii) Air Scrubber Waste Disposal Well. These wells are used to inject wastes from air scrubbers.

(iii) Gaseous Hydrocarbon Storage Well. These wells are used for the storage of hydrocarbons which are gases at standard temperature and pressure.

(iv) Groundwater Aquaculture Return Flow Well. These wells inject groundwater or surface water that has been used to support aquaculture.

(v) In-situ Fossil Fuel Recovery Well. These wells are used for the in-situ recovery of coal, lignite, oil shale, and tar sands.

(vi) Mining, Sand, or Other Backfill Well. These wells are used to inject a mixture of fluid and sand, mill tailings, and other solids into mined out portions of

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subsurface mines, whether the injectant is a radioactive waste or not. This also includes wells used to control mine fires and acid mine drainage wells.

(vii) Motor Vehicle Waste Disposal Well. These wells receive wastes from motor vehicle facilities and include autobody repair shops, new and used car dealerships, specialty repair shops (e.g., transmission, muffler, and radiator repair shops and any facility that steam cleans or otherwise washes undercarriages or engine parts or does any vehicular repair work).

(viii) Sewage or Wastewater Disposal Well. These wells are used to inject sewage or wastewater from any source to the groundwaters of the State. This includes cesspools and abandoned drinking water wells.

(ix) Solution Mining Well. These wells are used in solution mining in conventional mines, such as stopes leaching.

(x) Special Drainage Well. These wells are used for disposing of water from sources other than direct precipitation. Examples of this well type include: landslide control drainage wells, water tank overflow drainage wells, swimming pool drainage wells, and lake control drainage wells.

(xi) Water Softener Regeneration Brine Disposal Well. These wells are used to inject regeneration wastes from water softeners.

(~~3~~B) The construction, use, or operation of the following Class 5 injection well types may be approved by the Director provided that the injected material does not contain any waste or any substance of a composition and concentration such that, if it were discharged to the land or waters of the state, would create a threat to human health or would otherwise render those waters unsuitable for their best intended ~~best~~ usage. ~~The designated type code and a description of the primary function for these wells shall be as follows:~~

~~(A) Type 5A7 – Heating/Cooling Water Return Well. These wells reinject groundwater used to provide heating or cooling for structures. These wells may be approved by the Director only if the temperature of the injection fluid is not in excess of 30 degrees Fahrenheit above or below the naturally occurring temperature of the receiving groundwater. This includes wells using a geothermal fluid source.~~

~~(B) Type 5B22 – Salinity Barrier Well. These wells inject uncontaminated water into an aquifer to prevent the intrusion of salt water into the fresh water.~~

~~(C) Type 5I – In-situ Groundwater Remediation Well. These wells are used to inject additives for the in-situ treatment of contaminated soil or groundwater, when such additives are determined by the Division of Epidemiology to be protective of human health and permitted by the Division.~~

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~~(D) Type 5L – Closed Loop Groundwater Remediation Well. These wells are used to inject treated groundwater as part of a closed loop remediation system for the prevention, control, or remediation of aquifer pollution.~~

~~(E) Type 5P – Air Injection Well. These wells are used to inject air to enhance in situ treatment of groundwater.~~

~~(F) Type 5QM – Closed Loop Geothermal Mixed Fluid Injection Well System. These wells are used to house a subsurface system of pipe that re-circulates fluid other than potable water for heating and cooling purposes and where the fluid is isolated from the environment.~~

~~(G) Type 5QW – Closed Loop Geothermal Water Only Injection Well System. These wells are used to house a subsurface system of pipe that re-circulates potable water for heating and cooling purposes and where the fluid is isolated from the environment.~~

~~(H) Type 5R21 – Aquifer Recharge Well. These wells are used to recharge depleted aquifers and may inject uncontaminated water of equal or better quality than the aquifer being recharged.~~

~~(I) Type 5S23 – Subsidence Control Well. These wells are used to inject fluids into a non-oil or gas producing zone to reduce or eliminate subsidence associated with overdraft of fresh water and not used for the purpose of oil or natural gas production.~~

~~(J) Type 5T – Tracer Well. These wells are used to inject substances determined by the Division of Epidemiology to be protective of human health and permitted by the Division.~~

~~(K) Type 5X25 – Experimental Technology Well. These wells are used in experimental or unproven technologies where operation is in compliance with all appropriate rules and Statutes.~~

~~(L) Type 5X30 – Aquifer Test Well. These wells are used to inject uncontaminated fluid into an aquifer to determine aquifer characteristics.~~

~~(M) Type 5Z – Other Wells.~~

(i) Aquifer Recharge Wells specified in Rule .0218 of this Section.

(ii) Aquifer Storage and Recovery Wells specified in Rule .0219 of this Section.

(iii) Aquifer Test Wells specified in Rule .0220 of this Section.

(iv) Experimental Technology Wells specified in Rule .0221 of this Section.

(v) Geothermal Aqueous Closed-Loop Wells specified in Rule .0222 of this Section.

(vi) Geothermal Direct Expansion Closed-Loop Wells specified in Rule .0223 of this Section.

(vii) Geothermal Heating/Cooling Water Return Wells specified in Rule .0224 of this Section.

(viii) Groundwater Remediation Wells specified in Rule .0225 of this Section.

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(ix) Salinity Barrier Wells specified in Rule .0226 of this Section.

(x) Stormwater Drainage Wells specified in Rule .0227 of this Section.

(xi) Subsidence Control Wells specified in Rule .0228 of this Section.

(xii) Tracer Wells specified in Rule .0229 of this Section.

(xiii) Other Wells specified in Rule .0230 of this Section.

History Note: *Authority G.S. 87-87; 87-94; 87-95; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 143-215.6(c);*
Eff. August 1, 1982;
Amended Eff. September 1, 1996; March 1, 1984.

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15A NCAC 02C .0210 REQUIREMENTS: WELLS USED TO INJECT WASTE OR CONTAMINANTS

The owner of any well that has been used to inject wastes or contaminants, with the exception of wells permitted in accordance with this Section, shall take corrective action as specified in Rule .0206(b) of this Section.

History Note: *Authority G.S. 87-87; 87-88; 143-214.2; 143-215.1A;*
Eff. August 1, 1982;
Amended Eff. September 1, 1996; March 1, 1984.

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15A NCAC 02C .0211 ~~PERMITS~~ GENERAL PERMITTING REQUIREMENTS APPLICABLE TO ALL INJECTION WELL TYPES

~~(a) A permit shall be obtained from the Director prior to constructing, operating, or using any well for injection unless the well is deemed permitted in accordance with Paragraph (u) of this Rule. In those instances where all individual injection wells within a well field will be essentially similar with respect to construction, operation, reporting, and abandonment, and are of the same well Type, the Director may issue an area permit for the injection operations within that same well field, facility, site, reservoir, or similar unit. No permit shall be granted for the injection of wastes or any substance of a composition and concentration such that, if it were discharged to the land or waters of the state, would create a threat to human health or would otherwise render those waters unsuitable for their intended best usage unless specifically provided for by Statute or by the Rules in this Section.~~

(a) A permit shall be obtained from the Director prior to constructing, operating, or using any well for injection unless the well is permitted by rule under this Section.

(b) No permit shall be granted for the injection of wastes or any substance of a composition and concentration such that, if it were discharged to the land or waters of the state, would create a threat to human health or would otherwise render those waters unsuitable for their intended best usage unless specifically provided for by Statute or by the Rules in this Section.

~~(b)~~(c) All permit applications shall be signed as follows:

(1) ~~for~~ For a corporation: by a responsible corporate officer. For the purposes of this Section, a responsible corporate officer means a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation. [Note: The Division does not require specific assignments or delegations of authority to responsible corporate officers. The Division will presume that these responsible corporate officers have the requisite authority to sign permit applications unless the corporation has notified the Division to the contrary. Corporate procedures governing authority to sign permit applications may provide for assignment or delegation to applicable corporate positions.]:

(2) ~~for~~ For a partnership or sole proprietorship: by a general partner or the proprietor, ~~respectively;~~respectively;

(3) ~~for~~ For a municipality, state, federal, or other public agency: by either a principal executive officer or ranking elected ~~official; or~~ official;

(4) ~~for~~ For all other persons: by the well owner; or

(5) For any other person authorized to act on behalf of the applicant: documentation shall be submitted with the permit application package that clearly indentifies the person, explicitly grants them specific signature authority, and is signed and dated by the applicant.

~~(c)~~(d) The person signing the permit application shall certify that the data furnished on the application is accurate and that the well will be operated in accordance with the approved specifications and conditions of the permit.

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~~(d) An application shall be submitted, in duplicate, to the Director on forms furnished by the Director and shall include the following:~~

~~(1) For all Class 5 Well Types:~~

~~(A) The permit well owner's and (if different from the owner) the well operator's name, address, telephone number, and status as a federal, state, private, public, or other activity;~~

~~(B) The name, mailing address, telephone number, and location of the facility for which the application is submitted and a brief description of the nature of the business;~~

~~(C) A description of the injection activities proposed by the applicant;~~

~~(D) A scaled, site-specific map showing the location(s) of the following:~~

~~(i) the proposed injection well(s);~~

~~(ii) all property boundaries;~~

~~(iii) the direction and distance from the injection well or well system to two nearby permanent reference points (such as roads, streams, and highway intersections);~~

~~(iv) all buildings within the property boundary;~~

~~(v) any other existing or abandoned wells, including water supply and monitoring wells, within the area of review of the injection well or well system;~~

~~(vi) any existing sources of potential or known groundwater contamination, including waste storage, treatment, or disposal systems within the area of review of the injection well or well system; and~~

~~(vii) all surface water bodies within the area of review of the injection well or well system.~~

~~(E) The chemical, physical, biological, and radiological characteristics of the fluid to be injected;~~

~~(F) The proposed average and maximum daily rate and quantity of fluid to be injected;~~

~~(G) Detailed plans and specifications of the surface and subsurface construction details of the system;~~

~~(H) A listing of all permits or construction approvals, received or applied for by the applicant, that are related to the site or facility covered by this application including but not limited to:~~

~~(i) Hazardous Waste Management program permits or approval under the Resource Conservation and Recovery Act (RCRA);~~

~~(ii) NC Division of Water Quality Non-Discharge permits;~~

~~(iii) Sewage Treatment and Disposal Permits issued in accordance with G.S. 130A; and~~

~~(iv) Other environmental permits required by state or federal law.~~

~~(I) Up to four Standard Industrial Codes which best reflect the principal products or services provided by the facility;~~

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~~(J) Whether or not the facility is located on Indian lands;~~

~~(K) Such other information as deemed necessary by the Director for the protection of human health and the environment.~~

~~(2) For Type 5A7 and 5QM Wells, in addition to the information required in Subparagraph (d)(1) of this Rule, the application shall include the heating/cooling system installation contractor's name, address, and telephone number;~~

~~(3) For Type 5I and 5L Wells, in addition to the information required in Subparagraph (d)(1) of this Rule, the application shall include:~~

~~(A) a brief description of the contamination incident and incident number assigned by Division staff in the Department's Regional Office;~~

~~(B) a site specific scaled map showing the following:~~

~~(i) contour intervals not exceeding two feet;~~

~~(ii) the location of all springs, lakes, ponds, or other surface drainage features within 1000 feet of the injection well or well system;~~

~~(iii) potentiometric surface showing direction of groundwater movement; and~~

~~(iv) the horizontal and vertical extent of the contaminant plume (including isoconcentration lines and plume cross sections).~~

~~(C) a tabulation of data on all wells within 1/4 mile of the injection well(s), excepting water supply wells serving a single family residence, which penetrate the proposed injection zone. Such data shall include a description of each well's type, depth, record of abandonment or completion, and any additional information the Director may require;~~

~~(D) a hydrogeologic description, soils description, and cross section of the subsurface to a depth that includes the known or projected depth of contamination. G.S. 89E-18 requires that any geologic plans, reports, or documents in which the performance is related to the public welfare or safeguarding of the environment be prepared by a licensed geologist or subordinate under his direction. G.S. 89E-13 requires that all drawings, reports, or documents involving geologic work which shall have been prepared or approved by a licensed geologist or a subordinate under his direction be signed and sealed by him or her. The number of borings shall be sufficient to determine the following:~~

~~(i) the regional geologic setting;~~

~~(ii) significant changes in lithology;~~

~~(iii) the hydraulic conductivity of the saturated zone;~~

~~(iv) the depth to the mean seasonal high water table; and~~

~~(v) a determination of transmissivity and specific yield of the aquifer to be used for injection (showing calculations used for transmissivity and specific yield).~~

~~(E) a detailed description of the proposed injection procedure including:~~

~~(i) average and maximum daily rate and quantity of fluid to be injected;~~

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~~(ii) average and maximum injection pressure;~~

~~(iii) injection pressure relative to the overburden pressure of the soils and injection zone;~~

~~(iv) injection temperature; and~~

~~(v) demonstration of closed-loop recovery of injected and contaminated fluids;~~

~~(F) proposed concentration of any contaminant in the effluent, given any proposed pretreatment;~~

~~(G) plans for proposed location and construction details of groundwater monitoring well network including schedule for sampling and analytical methods.~~

~~(4) For Types 5B22, 5R21, 5S23, 5T, 5X25, and 5Z wells, in addition to the information required in Subparagraph (d)(1) of this Rule, the application shall include:~~

~~(A) a detailed description of all planned activities relating to the proposed injection facility including but not limited to:~~

~~(i) construction plans and materials;~~

~~(ii) operation procedures; and~~

~~(iii) planned injection schedule.~~

~~(B) a hydrogeologic description, soils description, and cross section of the subsurface to the depth of the proposed injection zone. G.S. 89E-18 requires that any geologic plans, reports, or documents in which the performance is related to the public welfare or safeguarding of the environment be prepared by a licensed geologist or subordinate under his direction. G.S. 89E-13 requires all drawings, reports, or documents involving geologic work which shall have been prepared or approved by a licensed geologist or a subordinate under his direction be signed and sealed by him or her. The number of borings shall be sufficient to determine the following:~~

~~(i) the regional geologic setting;~~

~~(ii) significant changes in lithology;~~

~~(iii) the hydraulic conductivity of the saturated zone;~~

~~(iv) the depth to the mean seasonal high water table; and~~

~~(v) a determination of transmissivity and specific yield of the aquifer to be used for injection (show calculations used for transmissivity and specific yield).~~

~~(C) plans for proposed location and construction details of groundwater monitoring well network including schedule for sampling and analytical methods.~~

(e) All applications for a new permit or renewal, modification, or transfer of an existing permit shall be filed in sufficient time prior to construction and operation or expiration, modification, or transfer to allow compliance with all legal procedures.

(f) All reports shall be signed by a person described in Paragraph ~~(b)~~ (c) of this Rule or by a duly authorized agent of that person. All records, reports, and information required to be submitted to the Director and public comment on

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these records, reports, or information shall be disclosed to the public unless the person submitting the information can show that such information, if made public, would disclose methods or processes entitled to protection as trade ~~secrets.~~ secrets as defined in G.S. 66-152. The Director shall determine which information is entitled to confidential treatment. In the event the Director determines that such information is entitled to be treated as confidential ~~treatment,~~ information as defined in G.S. 132-1.2, the Director shall take steps to protect such information from disclosure.

(g) The Director shall consider the cumulative effects of drilling and construction of multiple wells and operation of all proposed wells within a well field during evaluation of an area permit application.

~~(h) Injection may not commence until construction is complete, the permittee has submitted notice of completion of construction to the Director, and the Director has inspected or otherwise reviewed the injection well and finds it in compliance with the permit conditions. If the permittee has not received notice from the Director of intent to inspect or otherwise review the injection well within 10 days after the Director receives the notice, the permittee may commence injection. Prior to granting approval for the operation of any injection well, the Director shall consider the following information when such information is required by these Rules:~~

~~(1) all available logging and testing data on the well;~~

~~(2) a satisfactory demonstration of mechanical integrity pursuant to these Rules;~~

~~(3) the proposed operating procedures;~~

~~(4) the results of the formation testing program; and~~

~~(5) the status of corrective action on defective wells in the area of review.~~

~~(i) The Director may establish maximum injection volumes and pressures necessary to assure that:~~

~~(1) fractures are not initiated in the confining zone;~~

~~(2) injected fluids do not migrate outside the injection zone or area;~~

~~(3) injected fluids do not cause or contribute to the migration of fluids beyond the compliance boundary;~~

~~(4) formation fluids are not displaced outside the formation; and~~

~~(5) there is compliance with operating requirements.~~

~~(j)~~(h) ~~A~~ All permits ~~permit~~ shall be issued for a period not to exceed five years from the date of issuance. ~~On expiration of the permit, the permit shall become invalid unless application is made, at least 120 days prior to the expiration date, for an extension of the subject permit.~~ Permits are considered active until all permit requirements have been met and documentation has been received indicating that the wells meet one of the following conditions:

(1) The wells are temporarily or permanently abandoned in accordance with Rule .0233 of this Section;

(2) the wells have been converted to some other use; or

(3) the wells are permitted under another permit issued by the appropriate permitting authority for that activity.

~~(k)~~(i) ~~The permittee shall at all times properly operate and maintain all~~ All facilities shall, at all times, be properly operated and maintained ~~and systems of treatment and control (and related appurtenances) which are installed or~~

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~~used by the permittee~~ to achieve compliance with the rules of this Section. ~~conditions of this permit. Proper operation and maintenance includes effective performance and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.~~

~~(l)~~(j) The permit may be modified, revoked and reissued, or terminated by the Director in whole or part for actions which would adversely impact human health or the ~~environment,~~environment. ~~such~~ Such actions ~~to~~ may ~~include but not be limited to:~~ include:

(1) violation of any terms or conditions of the permit;

(2) obtaining a permit by misrepresentation or failure to disclose fully all relevant facts; or

(3) refusal of the permittee to allow authorized employees of the Division upon proper presentation of ~~credentials:~~ credentials to:

(A) ~~to~~ enter upon permittee's premises on which a system is located in which any records are required to be kept under terms and conditions of the permit;

(B) ~~to~~ have access to and copy any records required to be kept under terms and conditions of the permit;

(C) ~~to~~ inspect any monitoring equipment or method required in the permit; or

(D) ~~to sample any discharge~~ collect any sample from the injection facility.

~~(m)~~(k) The filing of an application by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, shall not stay any permit condition.

~~(n)~~(l) The permit shall not convey any property rights of any sort, or any exclusive privilege.

~~(o)~~(m) The permittee shall furnish to the Director any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. The permittee shall also furnish to the Director, upon request, copies of records required by the permit to be kept.

~~(p)~~(n) The permittee shall allow the Director, or an authorized representative, upon their presentation of credentials and other documents as may be required by law, to:

(1) enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;

(2) have access to and copy, during normal business hours, any records that must be kept under the conditions of the permit;

(3) inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under the permit; and

(4) sample or monitor, at reasonable times, and for the purposes of assuring permit compliances or as otherwise authorized, any substances or parameters.

~~(q)~~(o) The permittee shall retain copies of records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, and copies of all

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reports required by this permit, for a period of at least three years from the date of the sample, measurement, report, or application. Records of monitoring information shall ~~include:~~ include the:

(1) ~~the~~ date, exact place, and time of sampling or measurements;

(2) ~~the~~ individual(s) who performed the sampling or measurements;

(3) ~~the~~ date(s) analyses were performed;

(4) ~~the~~ individual(s) who performed the analyses;

(5) ~~the~~ analytical techniques or methods used; ~~and~~

(6) ~~the~~ results of any such sampling, measurements, and ~~analyses.~~ analyses; and

(7) description and date of any maintenance activities performed including the individual(s) performing such activities.

~~(r)~~(p) The permit shall not be ~~transferable~~ transferred to any ~~person.~~ person without the submission of a permit ownership or name change request to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be appropriate.

~~(s)~~(q) The permittee shall report any monitoring or other information ~~which indicates that any contaminant may cause an endangerment to an underground source of drinking water and any~~ that indicates noncompliance with ~~a~~ specific permit condition, that a contaminant may cause a violation of groundwater quality standards specified in Subchapter 02L, or that a malfunction of the injection system which may cause ~~fluid migration~~ the injected fluids to migrate outside the approved injection zone or area. The information shall be provided, to the Director, orally within 24 hours of the occurrence and as a written submission within five days of the occurrence. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue, and any steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

~~(t)~~(r) The Commission may delegate, through a Memorandum of Agreement to another state agency, the authority to permit injection wells that are an integral part of a facility requiring a permit from that agency.

~~(u) The following injection wells are deemed to be permitted pursuant to G.S. 87-87 and it shall not be necessary for the Division to issue individual permits for construction or operation of the following Class 5 Well Types:~~

~~(1) Type 5P – Air Injection Well which meets the following criteria:~~

~~(A) The air to be injected shall not exceed the ambient air quality standards set forth in 15A NCAC 2D Section .0400 and shall not contain any detectable hazardous constituents; and~~

~~(B) The operation of the air injection well shall not cause contaminated groundwater to migrate into an area not contaminated prior to initiation of injection activities or cause a contravention of a groundwater quality standard as specified in 15A NCAC 2L.~~

~~(2) Type 5QW – Closed Loop Geothermal Water Only Injection Well System which recirculates potable water only and meets the following criteria:~~

~~(A) The construction of the system shall be completed in such a manner so as to preclude surficial contaminants from entering the borehole; and~~

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~~(B) The person responsible for the construction of the injection well system shall submit notification, prior to construction, of construction to the Division on forms supplied by the Division.~~

~~(3) Type 5X30 - Aquifer Test Well which meets the following criteria:~~

~~(A) The operation of the aquifer test well shall not cause contaminated groundwater to migrate into an area not contaminated prior to initiation of injection activities or cause a contravention of a groundwater quality standard as specified in 15A NCAC 2L ; and~~

~~(B) The fluid to be injected shall be uncontaminated.~~

~~(4) In addition to the criteria specified in Subparagraph (u)(2) of this Rule, any test hole or boring shall be permanently abandoned by the driller in accordance with Rule .0214 of this Section within two days after drilling or two days after testing is complete, whichever is less restrictive, except when a test well is being converted to a permanent injection well, in which case conversion shall be completed within 30 days.~~

History Note: *Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);*
Eff. August 1, 1982;
Amended Eff. February 1, 1997; October 1, 1996; March 1, 1984.

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15A NCAC 02C .0212 ADDITIONAL CRITERIA AND STANDARDS: CLASS II: CLASS III (REPEALED)

History Note: *Authority G.S. 87-87; 87-88; 143-211; 143-214.2; 143-215.3(a)(1); 143-215.3(c);*
Eff. August 1, 1982;
Repealed Eff. March 1, 1984.

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15A NCAC 02C .0213 ADDITIONAL CRITERIA AND STANDARDS APPLICABLE TO CLASS 5 WELLS (REPEALED)

~~(a) Location.~~

~~(1) For all well types, the injection well shall not be located in an area generally subject to flooding. Areas which are generally subject to flooding include those with concave slope, alluvial or colluvial soils, gullies, depressions, and drainage ways.~~

~~(2) For Type 5I, and 5L wells where the concentration of any component of the injectant:~~

~~(A) exceeds the groundwater quality standards specified in 15A NCAC 2L .0202, the injection well shall not be located:~~

~~(i) at a point where the injectant would degrade the existing quality of the groundwater in the water-bearing unit into which the injectant is being released; or~~

~~(ii) at a point where, as a result of the injection activity, corrective action would be required under 15A NCAC 2L .0106.~~

~~(B) is less than the groundwater quality standards specified in 15A NCAC 2L .0202, the injection well shall not be located at point where the injectant would result in a contravention of any of the aforementioned groundwater quality standards in the water-bearing unit into which the injectant is being released.~~

~~(3) For all well types, the injection well shall be located in an area which does not require a person to enter confined spaces to perform sampling and inspection activities.~~

~~(4) For Type 5A7, 5R21, 5S23, 5X25, and 5Z wells, the minimum horizontal separation between a well that is designed for injection at atmospheric pressure and potential sources of groundwater contamination shall be as follows unless it can be demonstrated to the Director's satisfaction that a lesser separation distance will not result in a threat to human health or a contravention of a groundwater quality standard as specified in 15A NCAC 2L:~~

~~(A)~~	~~Septic tank and drainfield~~	~~50 ft.~~
~~(B)~~	~~Other subsurface ground absorption waste disposal system.~~	~~50 ft.~~
~~(C)~~	~~Industrial or municipal sludge spreading or wastewater irrigation sites~~	~~50 ft.~~
~~(D)~~	~~Water-tight sewage or liquid waste collection or transfer facility~~	~~25 ft.~~
~~(E)~~	~~Cesspools and privies~~	~~50 ft.~~
~~(F)~~	~~Animal feedlots or manure piles~~	~~50 ft.~~
~~(G)~~	~~Fertilizer, pesticide, herbicide, or other chemical storage areas~~	~~50 ft.~~
~~(H)~~	~~Sanitary landfills~~	~~500 ft.~~
~~(I)~~	~~Non-hazardous waste storage, treatment, or disposal lagoons~~	~~100 ft.~~
~~(J)~~	~~Other non-hazardous solid waste landfills~~	~~100 ft.~~
~~(K)~~	~~Animal barns~~	~~50 ft.~~

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~~(L) All other potential sources of groundwater contamination 50 ft.~~

~~(5) For all other well types the minimum horizontal separation between a well that is designed for injection and potential sources of groundwater contamination shall be the distance necessary to prevent migration of contaminants or a violation of groundwater standards as demonstrated by hydrogeologic computer modeling.~~

~~(b) Drilling Fluids and Additives. Drilling fluids and additives shall not contain organic materials that cause the surrounding groundwaters to become non-potable nor toxic substances, and may be comprised only of:~~

~~(1) the formational material encountered during drilling; or~~

~~(2) materials manufactured specifically for the purpose of borehole conditioning or well construction; or~~

~~(3) materials approved by the Director, based on a demonstration of not adversely affecting human health or the environment.~~

~~(c) Drilling, Casing, Screens, and Testing.~~

~~(1) In the drilling, casing, screening, and testing of injection wells the following procedures shall be utilized:~~

~~(A) unless otherwise excepted by this Rule, a casing shall be installed which extends from at least 12 inches above land surface to the top of the injection zone or to a depth of 20 feet whichever is shallower;~~

~~(B) wells with casing extending less than 12 inches above land surface and wells without casing may be approved by the Director only when the following conditions are met:~~

~~(i) Either:~~

~~(I) site specific conditions directly related to business activities, such as vehicle traffic, would endanger the physical integrity of the well; or~~

~~(II) it is not operationally feasible for the well head to be completed 12 inches above land surface due to the engineering design requirements of the system; and~~

~~(ii) for Type 5Q wells without permanent casing, the well head is completed in such a manner so as to preclude surficial contaminants from entering the well; and the vertical length of the borehole shall be grouted to a minimum depth of 20 feet below land surface with a grout, as specified in Rule .0204 of this Section, and by a method approved by the Director based on a demonstration of not adversely affecting human health or the environment; and~~

~~(iii) for all other wells, the well head is completed in such a manner so as to preclude surficial contaminants from entering the well; and well head protection shall include:~~

~~(I) an accessible external sanitary seal installed around the casing and grouting;~~

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~~(II) a sufficient vertical distance between the top of the grouting and the top of the casing to prevent any surficial fluids from entering the injection well casing; and~~

~~(III) a water-tight seal installed on the top of the casing;~~

~~(C) the methods and materials used in construction shall not threaten the physical and mechanical integrity of the well during its lifetime (i.e., it shall be designed and constructed to operate the projected life of the well) and shall be compatible with the proposed injection activities. In determining the suitability of the methods and materials to be used in the drilling, casing, screening, and testing, the Director shall consider the following:~~

~~(i) depth to the injection zone;~~

~~(ii) injection pressure, external pressure, internal pressure, and axial loading;~~

~~(iii) hole size;~~

~~(iv) size and grade of all casing (wall thickness, diameter, nominal weight, length, joint specification, and casing material);~~

~~(v) size and grade of all screen material (wall thickness, nominal weight, diameter, length, joint specification, and screen material);~~

~~(vi) corrosiveness of injected and formation fluids;~~

~~(vii) lithology of injection and confining zones;~~

~~(viii) type and grade of cement;~~

~~(ix) type and grade of drilling fluid and additives; and~~

~~(x) other applicable state and local well construction and environmental standards;~~

~~(D) multi-screened wells shall not connect aquifers or zones which have differences in water quality which would result in a degradation of any aquifer or zone;~~

~~(E) the migration of fluids outside the approved injection or recovery zone or area is not permitted;~~

~~(F) contaminants are not introduced into underground sources of drinking water unless specifically authorized by Statute or Rule; and~~

~~(G) the borehole shall not penetrate to a depth greater than the depth at which injection will occur unless the purpose of the borehole is the investigation of the geophysical and geochemical characteristics of an aquifer. Following completion of the investigation the borehole beneath the zone of injection shall be grouted completely to prevent the vertical migration of any contaminants downward.~~

~~(2) In addition to the requirements of Subparagraph (c)(1) of this Rule, the testing requirements for all wells other than Type 5A7, 5QW, 5P, and 5X30 shall include but not be limited to:~~

~~(A) Appropriate logs and other tests conducted during the drilling and construction of the wells shall be submitted to the Director within 30 days of completion of well construction. A descriptive report interpreting the results of such logs and tests shall be prepared by a knowledgeable log~~

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~~analyst and submitted to the Director within 30 days of completion of the tests. The logs and tests appropriate to each type of Class 5 well shall be determined by the Director based on the intended function, depth, construction, and other characteristics of the well, availability of similar data in the area of the drilling site, and the need for additional information that may arise from time to time as the construction of the well progresses. At a minimum, such logs and tests shall include deviation checks conducted on all holes where pilot holes and reaming are used, and at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drilling. In the case of area permits, the Director may authorize logs and tests of the well field as a whole, rather than of each individual well within the well field.~~

~~(B) When the injection zone is a water bearing formation, the following information concerning the injection zone as determined or calculated by the owner, shall be submitted to the Director within 30 days of completion of the determinations in an integrated form:~~

~~(i) fluid pressure;~~

~~(ii) fluid temperature;~~

~~(iii) fracture pressure;~~

~~(iv) other physical and chemical characteristics of the injection zone;~~

~~(v) physical and chemical characteristics of the formation fluids; and~~

~~(vi) compatibility of injected fluids with formation fluids.~~

~~(C) When the injection formation is not a water bearing formation, only the information required in Parts (B)(iii) and (iv) of this Subparagraph shall be determined or calculated and submitted to the Director within 30 days of completion of the determinations.~~

~~(D) Monitoring wells completed in the injection zone and any of those zones adjacent to the injection zone might be affected by the injection operations. These wells shall be located in such a fashion as to detect any movement of injection fluids, process by products, or formation fluids outside the injection area or zone. If the operation may be affected by subsidence or catastrophic collapse, the monitoring wells shall be located so that they will not be physically affected and shall be of an adequate number to detect movement of injected fluids, process by products, or formation fluids outside the injection zone or area. In determining the number, location and spacing of monitoring wells, the following criteria shall be considered by the Director:~~

~~(i) the population relying on the underground source of drinking water affected, or potentially affected, by the injection operation;~~

~~(ii) the proximity of the injection operation to points of withdrawal of drinking water;~~

~~(iii) the local geology and hydrology;~~

~~(iv) the operating pressures;~~

~~(v) the chemical characteristics and volume of the injected fluid, formation water, and process by products; and~~

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~~(vi) the density of injection wells.~~

~~(E) For any wells that inject at a pressure exceeding atmospheric, tests for mechanical integrity and injection capacity shall be conducted in accordance with Rule .0207 of this Section.~~

~~(3) All piping, wiring, and vents shall enter the well through the top of the casing unless otherwise approved by the Director based on a design demonstrated to preclude surficial contaminants from entering the well.~~

~~(4) A hose bibb, sampling tap, or other collection equipment, as approved by the Director based on a demonstration of not adversely affecting human health or the environment, shall be installed on the line entering the injection well such that a sample of the injectant can be obtained immediately prior to its entering the injection well.~~

~~(d) Grouting and Sand and Gravel Packing.~~

~~(1) The annular space between the casing and the borehole shall be grouted:~~

~~(A) with a type of cement that is non-toxic and is non-reactive with the casing or screen materials, the formation, and the injected fluids;~~

~~(B) by a method such that the physical and mechanical integrity of the well(s) is not threatened during its life expectancy;~~

~~(C) from land surface:~~

~~(i) to a minimum depth of 20 feet when the well is greater than 20 feet in depth; or~~

~~(ii) to within two feet of the top of the injection zone in those wells less than 20 feet in depth; or~~

~~(iii) in another configuration, as approved by the Director, upon demonstrations that such a configuration is necessitated by engineering design of the injection facility and will not adversely affect human health or the environment; and~~

~~(D) so that the grout shall extend outward from the casing wall to a minimum thickness equal to either one third of the diameter of the outside dimension of the casing or two inches, whichever is greater.~~

~~(2) Grout shall be placed around the casing by one of the following methods:~~

~~(A) Pressure. Grout shall be pumped or forced under pressure through the bottom of the casing until it fills the annular area around the casing and overflows at the surface.~~

~~(B) Pumping. Grout shall be pumped into place through a hose or pipe extended to the bottom of the annular space which can be raised as the grout is applied. The grout hose or pipe shall remain submerged in grout during the entire application.~~

~~(C) Other. Grout may be emplaced in the annular space by gravity flow in such a way to insure complete filling of the space.~~

~~(3) If an outer casing is installed, it shall be grouted by either the pumping or pressure method.~~

~~(4) All grout mixtures shall be prepared prior to emplacement.~~

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~~(5) The well shall be grouted within five working days after the casing is set.~~

~~(6) No additives which will accelerate the process of hydration shall be used in grout for thermoplastic well casing.~~

~~(7) In those instances where the life expectancy of the well will not exceed 90 days, the Director may consider modifications or deletion of the grouting requirements where such modifications or deletion would not have a deleterious effect upon an underground source of drinking water.~~

~~(8) Packing materials shall:~~

~~(A) be composed of quartz, granite, or similar rock material and shall be clean, of uniform size, water-washed and free from clay, silt, or other deleterious material;~~

~~(B) be disinfected prior to subsurface emplacement;~~

~~(C) be emplaced such that it shall not connect aquifers or zones which have differences in water quality that would result in the deterioration of the water qualities in any aquifer or zone; and~~

~~(D) be evenly distributed around the screen and shall extend to a depth at least one foot above the top of the screen. A one foot thick seal, comprised of bentonitic clay or other sealing material approved by the Director based on a demonstration of not adversely affecting human health or the environment, shall be emplaced directly above and in contact with the packing material.~~

~~(e) Operating.~~

~~(1) Pressure at the well head shall be limited to a maximum which will ensure that the pressure in the injection zone does not initiate new fractures or propagate existing fractures in the injection zone, initiate fractures in the confining zone, or cause the migration of injected or formation fluids outside the injection zone or area.~~

~~(2) Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited.~~

~~(3) Provisions shall be made by the permittee for the monitoring of operating processes at the well head.~~

~~(4) All injection wells shall be afforded protection against damage during construction and use.~~

~~(f) Monitoring.~~

~~(1) Monitoring of any injection wells may be required by the Director as necessary to demonstrate adequate protection of underground sources of drinking water. In determining the type, density, frequency, and scope of monitoring, the Director shall consider the following:~~

~~(A) physical and chemical characteristics of the injection zone;~~

~~(B) physical and chemical characteristics of the injected fluid(s);~~

~~(C) volume and rate of discharge of the injected fluid(s);~~

~~(D) compatibility of the injected fluid(s) with the formation fluid(s);~~

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~~(E) the number, type and location of all wells, mines, surface bodies of water, and man-made structures within the area of review;~~

~~(F) proposed injection procedures;~~

~~(G) expected changes in pressure, formation fluid displacement, and direction of movement of injected fluid;~~

~~(H) proposals of corrective action to be taken in the event that a failure in any phase of injection operations endangers an underground source of drinking water; and~~

~~(I) the life expectancy of the injection operations.~~

~~(2) Monitoring, if required by the Director, shall be in accordance with the following requirements:~~

~~(A) Samples and measurements, taken for the purpose of monitoring, shall be representative of the monitored activity.~~

~~(B) Analysis of the physical and chemical characteristics of the injected fluid shall be made monthly or more frequently, as necessary, in order to provide representative data for characterization of the injectant.~~

~~(C) Monitoring of injection pressure, flow rate, and cumulative volume shall occur according to a schedule determined necessary by the Director.~~

~~(D) Monitoring wells associated with the injection site shall be monitored quarterly to detect any migration of injected fluids from the injection zone.~~

~~(E) Continuous recording devices to monitor the injection pressure, flow, rate, and volume of injected fluid shall be installed.~~

~~(g) Injection Well Identification Plate.~~

~~(1) An identification plate showing the name and registration number of the drilling contractor shall be permanently installed on the well within 24 hours after completion of the drilling.~~

~~(2) The identification plate shall be constructed of a durable weatherproof, rustproof metal or equivalent material.~~

~~(3) The identification plate shall be securely attached to the well casing, or other location approved by the Director due to its immediate proximity to another part of the injection well, where it is readily visible.~~

~~(4) The identification plate shall not be removed from the well by any person.~~

~~(5) The identification tag shall be stamped with a permanent marking within 30 days of completion of the well to show the following:~~

~~(A) total depth of well;~~

~~(B) casing depth (ft.) and inside diameter (in.);~~

~~(C) screened intervals of screened wells;~~

~~(D) gravel interval of gravel-packed wells;~~

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~~(E) yield, in gallons per minute (gpm), or specific capacity in gallons per minute per foot of drawdown (gpm ft. dd);~~

~~(F) static water level and date measured;~~

~~(G) drilling contractor and registration number; and~~

~~(H) date well completed.~~

~~(h) Reporting. The well owner shall be responsible for submitting to the Director on forms furnished by the Director, or on an alternate approved form which provides the same information:~~

~~(1) A record of the construction or abandonment or repairs of a well, to include: the owner's name; well location, size, and depth; casing record; method of completion or abandonment; formation log; static water level; injection apparatus; and records of any surveys, geophysical logs, tests, or water analyses, and changes in construction or in materials replaced. These records shall be submitted within 30 days of completion of specified activities or abandonment of the well, whichever occurs earliest.~~

~~(2) Quarterly reports on required monitoring activities, which shall include:~~

~~(A) the date, exact place, and time of sampling or measurements;~~

~~(B) the individual(s) who performed the sampling or measurements;~~

~~(C) the date(s) analyses are performed;~~

~~(D) the individual(s) who performed the analyses;~~

~~(E) the analytical techniques or methods used; and~~

~~(F) the results of such sampling, measurements or analyses.~~

History Note: *Authority G.S. 87-87; 87-88; 87-94; 87-95; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c);*
Eff. August 1, 1982;
Amended Eff. February 1, 1997; October 1, 1996; March 1, 1984.
Repealed Eff.

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15A NCAC 02C .0214 ABANDONMENT AND CHANGE-OF-STATUS (REPEALED)

~~(a) In the event any injection or associated monitoring well is abandoned, either temporarily or permanently, the well owner shall notify the Director within 15 days and the well(s) shall be abandoned in accordance with one of the following procedures or other alternatives approved by the Director based on a demonstration of not adversely affecting human health or the environment:~~

~~(1) Procedures for temporarily abandoned wells.~~

~~(A) Upon temporary removal from service, or prior to being put into service, the well shall be sealed with a water tight cap or seal compatible with the casing and installed so that it cannot be removed without the use of hand or powers tools.~~

~~(B) The well shall be maintained whereby it is not a source or channel of contamination to an underground source of drinking water during its temporary status.~~

~~(C) The well shall be repaired, to achieve compliance with the Rules in this Section, or permanently abandoned within 30 days of receipt of notice from the department, upon finding that a well is acting as a source or channel of contamination to an underground source of drinking water.~~

~~(2) Procedures for permanently abandoned wells.~~

~~(A) All casing and materials may be removed prior to initiation of abandonment procedures if the Director finds such removal will not be responsible for, or contribute to, the contamination of an underground source of drinking water. Any casing not grouted in accordance with 15A NCAC 2C .0113 shall be removed or properly grouted.~~

~~(B) The entire depth of the well shall be sounded before it is sealed to insure freedom from obstructions that may interfere with sealing operations.~~

~~(C) The well shall be thoroughly disinfected, prior to sealing, if the Director determines that failure to do so could lead to the contamination of an underground source of drinking water.~~

~~(D) Drilled wells shall be completely filled with cement grout, which shall be introduced into the well through a pipe which extends to the bottom of the well and is raised as the well is filled. "Bored" or hand dug wells over 24 inches in diameter may be filled with an alternative material approved by the Director based on a demonstration of not adversely affecting human health or the environment.~~

~~(E) In the case of gravel packed wells in which the casing and screens have not been removed, neat cement shall be injected into the well completely filling it from the bottom of the casing to the top.~~

~~(F) In those cases when, as a result of the injection operations, a subsurface cavity has been created, the well shall be abandoned in such a manner that will prevent the movement of fluids into or between underground sources of drinking water and in accordance with the terms and conditions of the permit.~~

~~(b) Exploratory or test wells, constructed for the purposes of obtaining information regarding an injection well site, shall be permanently abandoned in accordance with Subparagraph (2) of this Rule upon completion of their exploratory or testing status.~~

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~~(c) An injection well shall be permanently abandoned by the drilling contractor before removing his equipment from the site if the well casing has not been installed or has been removed from the well bore.~~

History Note: *Authority G.S. 87-87; 87-88; 143-211; 143-215.1A; 143-215.3(a)(1); 143-215.3(c);*
Eff. August 1, 1982;
Amended Eff. February 1, 1997; October 1, 1996.
Repealed Eff.

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15A NCAC 02C .0215 VARIANCE (REPEALED)

~~(a) The Director may grant a variance from any construction or operation standards under the rules of this Section. Any variance will be in writing, and may be granted upon written application to the Director, by the person responsible for the construction of the well for which the variance is sought, if the Director finds facts to support the following conclusions:~~

~~(1) that the use of the well will not endanger human health and welfare or the groundwater;~~

~~(2) that construction or operation in accordance with the standards was not technically feasible or desirable.~~

~~(b) The Director may require the variance applicant to submit such information as he deems necessary to make a decision to grant or deny the variance. The Director may impose such conditions on a variance or the use of a well for which a variance is granted as he deems necessary to protect human health and welfare and the groundwater resources. The findings of fact supporting any variance under this Rule shall be in writing and made part of the variance.~~

~~(c) A variance applicant who is dissatisfied with the decision of the Director may commence a contested case by filing a petition under G.S. 150B-23 within 60 days after receipt of the decision.~~

History Note: *Authority G.S. 87-87(4); 87-88; 143-215.1A; 143-215.3(a)(4); 150B-23;*
Eff. September 1, 1996.
Repealed Eff.

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15A NCAC 02C .0216 DELEGATION (REPEALED)

~~(a) The Director may grant permission for well construction under G.S. 87-87.~~

~~(b) The Director may give notices and sign orders for violations under G.S. 87-91.~~

~~(c) The Director may subdelegate, to an official of the Division, the granting of a variance from any construction standard, or the approval of alternate construction methods or materials, as specified under the rules in this Section.~~

History Note: *Authority G.S. 87-87(4); 143-215.1A; 143-215.3(a)(1); 143-215.3(a)(4);*
Eff. September 1, 1996.
Repealed Eff.

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15A NCAC 02C .0217 PERMITTING BY RULE

(a) The following injection well systems are deemed to be permitted by the Rules of this Section pursuant to G.S. 87-88(a) and it shall not be necessary for the Division to issue an individual permit for the construction or operation of the following injection well systems providing that the system does not result in the violation of any assigned surface water, groundwater, or air quality standard, there is no groundwater discharge of the injectant into surface waters, and all criteria for the specific systems are met:

(1) Aquifer Test Wells specified in Rule .0220 of this Section;

(2) Geothermal Aqueous Closed Loop Wells specified in Rule .0222 of this Section;

(3) Geothermal Direct Expansion Closed Loop Wells specified in Rule .0223 of this Section;

(4) Groundwater Remediation Wells specified in Rule .0225 of this Section; and

(5) Stormwater Drainage Wells specified in Rule .0227 of this Section.

(b) Nothing in this Rule or the Rules of this Section shall be construed to allow the violation of any assigned surface water, groundwater, or air quality standard.

(c) Any violation of this Rule shall be treated in accordance with Rule .0206 of this Section.

(d) Injection well systems permitted by rule under the Rules of this Section shall remain permitted by rule, notwithstanding any violations of the Rules of this Section, or until such time as the Director determines that they should not be deemed to be permitted.

(e) If the Director determines that an injection well system should not be permitted by rule, the Director may require the owner of the injection well system to obtain an individual permit. This determination shall be made based on existing or projected environmental impacts, compliance with the provisions of the Rules of this Section, or the compliance history of the facility owner.

History Note: Authority G.S. 87-87; 87-88(a);
Amended Eff.

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15A NCAC 02C .0218 AQUIFER RECHARGE WELLS

These wells are used to recharge depleted aquifers and may inject uncontaminated water of equal or better quality than the aquifer being recharged. The requirements for Aquifer Recharge Wells shall be the same as described in Rule .0219 of this Section except that the Director may add or delete requirements based on the following considerations:

(1) protection of human health and the environment based on site specific criteria;

(2) existing or projected environmental impacts; or

(3) compliance with the provisions of the Rules of this Section.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);

Amended Eff.

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15A NCAC 02C .0219 AQUIFER STORAGE AND RECOVERY WELLS

These wells are used to inject potable water for the purposes of subsurface storage and for later recovery of the injected water. All Aquifer Storage and Recovery Wells require permits.

(1) Permit Applications. In addition to the permit requirements set forth in Rule .0211 of this Section, an application shall be submitted, in duplicate, to the Director on forms furnished by the Director and shall include the following:

(A) Site Description that includes the following:

(i) the name of the well owner or person otherwise legally responsible for the injection wells, their mailing address, telephone number, and status as a federal, state, private, public, tribal, or other entity;

(ii) the name of the property owner, if different from the well owner, their physical address, mailing address, and telephone number;

(iii) the name, mailing address, telephone number, and geographic coordinates of the facility for which the application is submitted; and

(iv) a list of all permits associated with the injection well system.

(B) Project Description. A description of what problem or objective the project is intended to solve or achieve and shall include the following:

(i) history and scope of the problem or objective;

(ii) what is currently being done to solve or achieve the problem or objective;

(iii) why existing practices are insufficient to solve or achieve the problem or objective;

(iv) what other alternatives were considered to solve or achieve the problem or objective; and

(v) how this option was determined to be the most effective or desirable to solve or achieve the problem or objective.

(C) Demonstration of Financial Responsibility as required in Rule .0208 of this Section.

(D) Hydrogeologic Evaluation. If required by G.S. 89E or 89C, a licensed geologist, or professional engineer shall prepare a hydrogeologic evaluation of the facility to a depth that includes the injection zone determined in accordance with Subparagraph (1)(E) of this Rule. A description of the hydrogeologic evaluation shall include all of the following:

(i) regional and local geology and hydrogeology;

(ii) significant changes in lithology underlying the facility;

(iii) depth to the mean seasonal high water table;

(iv) hydraulic conductivity, transmissivity, and storativity of the injection zone based on tests of site-specific material, including a description of the test(s) used to determine these parameters;

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(v) rate and direction of groundwater flow as determined by predictive calculations or computer modeling; and

(vi) lithostratigraphic and hydrostratigraphic logs of test and injection wells.

(E) Injection Zone Determination. The applicant shall specify the horizontal and vertical portion of the injection zone within which the proposed injection activity shall occur based on the hydraulic properties of that portion of the injection zone specified. No violation of groundwater quality standards specified in Subchapter 02L resulting from the injection shall occur outside the specified portion of the injection zone as detected by a monitoring plan approved by the Division.

(F) Area of Review. The area of review shall be calculated using the procedure for determining the zone of endangering influence specified in 40 Code of Federal Regulations (CFR) 146.6(a). The applicant must identify all wells within the area of review that penetrate the injection or confining zone, and repair or permanently abandon all wells that are improperly constructed or abandoned.

(G) Analyses of the injection zone(s) including:

(i) test results of the native groundwater and the proposed recharge water shall for the parameters listed in Subparagraph (7)(D) of this Rule;

(ii) geochemical analyses of representative samples of the aquifer matrix to determine the type and quantity of reactive minerals; and

(iii) evaluation of the chemical compatibility of the native groundwater, injected/recharge water, and the aquifer matrix using site specific geochemical data and hydraulic properties of the injection zones, geochemical modeling, and any other analytical tool required. The chemical compatibility evaluation shall identify potential changes in groundwater quality resulting from the injection activities within the zone of endangering influence specified in Subparagraph (1)(F) of this Rule.

(H) Injection Procedure. The applicant shall submit a detailed description of the proposed injection procedure that includes the following:

(i) the proposed average and maximum daily rate and quantity of injectant;

(ii) the average maximum injection pressure expressed in units of pounds per square inch (psi); and

(iii) calculation of fracture pressures of confining units expressed in units of psi.

(I) Injection well construction details including:

(i) the number and depth of injection wells;

(ii) indication whether the injection wells are existing or proposed;

(iii) well drilling contractor name and certification number;

(iv) depth and type of casing;

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(v) depth and type of screen material;

(vi) depth and type of grout; and

(vii) detailed plans and specifications of the surface and subsurface construction of each injection well or well system.

(J) Monitoring Wells. Monitoring wells shall be located so as to detect any movement of injection fluids, process by-products, or formation fluids outside the injection zone as determined by the applicant in accordance with Subparagraph (1)(E) of this Rule. The monitoring schedule shall be consistent with the proposed injection schedule, pace of the anticipated reactions, and rate of transport of the injected fluid. The applicant shall submit a monitoring plan that includes the following:

(i) a list of monitoring parameters and analytical methods to be used;

(ii) other parameters that may serve to indicate the progress of the intended reactions;

(iii) a list of existing and proposed monitoring wells to be used; and

(iv) a sampling schedule to monitor the proposed injection.

(K) Well Data Tabulation. A tabulation of data on all existing or abandoned wells within the area of review of the injection well(s) that penetrate the proposed injection zone, including, but not limited to, monitoring wells and wells proposed for use as injection or monitoring wells. Such data shall include a description of each well's type, depth, record of abandonment or completion, and any additional information the Director may require.

(L) Plan of Action. A proposed plan of action to be taken if the proposed injection operation causes fracturing of confining units, resulting in adverse geochemical reactions, or otherwise threatens groundwater.

(M) Maps and Cross-Sections. Scaled, site-specific site plans or maps depicting the location, orientation, and relationship of facility components including the following:

(i) area map based on the most recent United States Geologic Survey (USGS) 7.5' topographic map of the area, at a scale of 1:24,000 and showing the location of the proposed injection site;

(ii) topographic contour intervals showing all facility related structures, property boundaries, streams (ephemeral, intermittent, and perennial), springs, lakes, ponds, and other surface drainage features;

(iii) all existing or abandoned wells within the area of review of the injection well(s), listed in the tabulation required in Subparagraph (1)(K) of this Rule, that penetrate the proposed injection zone, including, but not limited to, water supply wells, monitoring wells, and wells proposed for use as injection wells;

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(iv) potentiometric surface map(s) of each hydrostratigraphic unit in the injection zone(s) that show the direction of groundwater movement, existing and proposed monitoring wells, recovery wells, and injection wells;

(v) cross-section(s) that show the horizontal and vertical extent of the injection zone(s), lithostratigraphic units, hydrostratigraphic units, existing and proposed monitoring wells, recovery wells, and existing and proposed injection wells, complete with casing and screen intervals; and

(vi) any existing sources of potential or known groundwater contamination, including waste storage, treatment, or disposal systems within the area of review of the injection well or well system.

(N) Such other information as deemed necessary by the Director for the protection of human health and the environment.

(2) Injection Volumes. The Director may establish maximum injection volumes and pressures necessary to assure that:

(A) fractures are not initiated in the confining zone(s);

(B) injected fluids do not migrate outside the injection zone or area;

(C) injected fluids do not cause or contribute to the migration of contamination into uncontaminated areas; and

(D) there is compliance with operating requirements.

(3) Injection.

(A) Injection may not commence until construction is complete, the permittee has submitted notice of completion of construction to the Director, and the Director has inspected or otherwise reviewed the injection well and finds it in compliance with the permit conditions. If the permittee has not received notice from the Director of intent to inspect or otherwise review the injection well within 10 days after the Director receives the notice, the permittee may commence injection.

(B) Prior to granting approval for the operation, the Director shall consider the following information:

(i) all available logging and testing data on the well;

(ii) a satisfactory demonstration of mechanical integrity pursuant to Rule .0207 of this Section;

(iii) the proposed operating procedures;

(iv) the results of the formation testing program; and

(v) the status of corrective action on defective wells in the area of review.

(4) Well Construction.

(A) Wells shall not be located where:

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(i) surface water or runoff will accumulate around the well due to depressions, drainage ways, or other landscapes that will concentrate water around the well;

(ii) a person would be required to enter confined spaces to perform sampling and inspection activities; and

(iii) injectants or formation fluids would migrate outside the approved injection zone as determined by the applicant in accordance with Subparagraph (1)(E) of this Rule.

(B) The methods and materials used in construction shall not threaten the physical and mechanical integrity of the well during its lifetime and shall be compatible with the proposed injection activities.

(C) The well shall be constructed in such a manner that surface water or contaminants from the land surface cannot migrate along the borehole annulus either during or after construction.

(D) The borehole shall not penetrate to a depth greater than the depth at which injection will occur unless the purpose of the borehole is the investigation of the geophysical and geochemical characteristics of an aquifer. Following completion of the investigation, the borehole beneath the zone of injection shall be grouted completely to prevent the vertical migration of any contaminants downward.

(E) Drilling fluids and additives shall contain only potable water and may be comprised of one or more of the following:

(i) the formation material encountered during drilling;

(ii) materials manufactured specifically for the purpose of borehole conditioning or well construction; or

(iii) materials approved by the Director, based on a demonstration of not adversely affecting human health or groundwater quality.

(F) The annular space between the borehole and casing shall be grouted:

(i) with an allowable grout listed under Rule .0107 of this Subchapter that is non-reactive with the casing or screen materials, the formation, or the injectant;

(ii) from land surface to within two feet of the top of the injection zone and between all discontinuous sections of well screen; and

(iii) so that the grout extends outward from the casing wall to a minimum thickness equal to either one-third of the diameter of the outside dimension of the casing or two inches, whichever is greater.

(G) Grout shall be emplaced around the casing by one of the following methods:

(i) Pressure. Grout shall be pumped or forced under pressure through the bottom of the casing until it fills the annular space around the casing and overflows at the surface;

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(ii) Pumping. Grout shall be pumped into place through a hose or pipe extended to the bottom of the annular space which can be raised as the grout is applied. The grout hose or pipe shall remain submerged in grout during the entire application; or

(iii) Other. Grout may be emplaced in the annular space by gravity flow in such a way to ensure complete filling of the space. Gravity flow shall not be used if water or any visible obstruction is present in the annular space at the time of grouting.

(H) All grout mixtures shall be prepared prior to emplacement per the manufacturer's directions with the exception that bentonite chips or pellets may be emplaced by gravity flow if water is present or otherwise hydrated in place.

(I) If an outer casing is installed, it shall be grouted by either the pumping or pressure method.

(J) The well shall be grouted within seven days after the casing is set or before the drilling equipment leaves the site, whichever occurs first.

(K) No additives that will accelerate the process of hydration shall be used in grout for thermoplastic well casing.

(L) A casing shall be installed that extends from at least 12 inches above land surface to the top of the injection zone.

(M) Wells with casing extending less than 12 inches above land surface and wells without casing may be approved by the Director only when one of the following conditions are met:

(i) site specific conditions directly related to business activities, such as vehicle traffic, would endanger the physical integrity of the well; and

(ii) it is not operationally feasible for the well head to be completed 12 inches above land surface due to the engineering design requirements of the system.

(N) Multi-screened wells shall not connect aquifers or zones having differences in water quality which would result in a degradation of any aquifer or zone.

(O) Prior to removing the equipment from the site, the top of the casing shall be sealed with a water-tight cap or well seal, as defined in G.S. 87-85(16), to preclude the entrance of contaminants from entering the well.

(P) Packing materials for gravel and sand packed wells shall be:

(i) composed of quartz, granite, or other hard, non-reactive rock material and shall be clean, of uniform size, water-washed and free from clay, silt, or other deleterious material;

(ii) disinfected prior to subsurface emplacement;

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(iii) emplaced such that it shall not connect aquifers or zones having differences in water quality that would result in the deterioration of the water qualities in any aquifer or zone;

(iv) evenly distributed around the screen and shall extend to a depth at least one foot above the top of the screen. A one-foot thick seal, comprised of bentonite clay or other sealing material approved by the Director, shall be emplaced directly above and in contact with the packing material.

(Q) All permanent injection wells shall have a well identification plate that meets the criteria specified in Rule .0107 of this Subchapter.

(R) A hose bibb, sampling tap, or other collection equipment approved by the Director shall be installed on the line entering the injection well such that a sample of the injectant can be obtained immediately prior to its entering the injection well.

(S) If applicable, all piping, wiring, and vents shall enter the well through the top of the casing unless otherwise approved by the Director based on a design demonstrated to preclude surficial contaminants from entering the well.

(T) The wellhead shall be completed in such a manner so as to preclude surficial contaminants from entering the well; and well head protection shall include:

(i) an accessible external sanitary seal installed around the casing and grouting; and

(ii) a water-tight cap or seal compatible with the casing and installed so that it cannot be removed without the use of hand or power tools.

(5) Testing.

(A) Appropriate logs and other tests conducted during the drilling and construction of the wells shall be submitted to the Director within 30 days of completion of well construction. A descriptive report interpreting the results of such logs and tests shall be prepared by a knowledgeable log analyst and submitted to the Director within 30 days of completion of the tests. The appropriateness of the logs and tests shall be determined by the Director based on the intended function, depth, construction, and other characteristics of the well, availability of similar data in the area of the drilling site, and the need for additional information that may arise from time to time as the construction of the well progresses. At a minimum, such logs and tests shall include:

(i) lithostratigraphic logs of the entire borehole;

(ii) hydrosratigraphic logs of the entire borehole; and

(iii) deviation checks conducted on all holes where pilot holes and reaming are used, and at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drilling.

(B) In the case of area permits, the Director may authorize logs and tests of the well field as a whole, rather than of each individual well within the well field.

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(C) When the injection zone is a water-bearing formation, the following information concerning the injection zone as determined by the applicant in accordance with Subparagraph (1)(E) of this Rule shall be submitted to the Director within 30 days of completion of the determinations in an integrated form which includes the following:

(i) fluid pressure;

(ii) fluid temperature;

(iii) fracture pressure;

(iv) other physical and chemical characteristics of the injection zone;

(v) physical and chemical characteristics of the formation fluids; and

(vi) compatibility of injected fluids with formation fluids.

(D) When the injection formation is not a water bearing formation, only the fracture pressure and other physical and chemical characteristics of the injection zone shall be determined or calculated and submitted to the Director within 30 days of completion of the determinations.

(E) Tests for mechanical integrity shall be conducted annually in accordance with Rule .0207 of this Section.

(6) Operation and Maintenance.

(A) Pressure at the well head shall be limited to a maximum which will ensure that the pressure in the injection zone does not initiate new fractures or propagate existing fractures in the injection zone, initiate fractures in the confining zone, or cause the migration of injected or formation fluids outside the injection zone or area.

(B) Injection between the outermost casing and the well borehole is prohibited.

(C) Monitoring of the operating processes at the well head shall be provided for by the well owner, as well as protection against damage during construction and use.

(7) Monitoring.

(A) Monitoring of injection wells may be required by the Director to demonstrate protection of waters of the state. In determining the type, density, frequency, and scope of monitoring, the Director shall consider the following:

(i) physical and chemical characteristics of the injection zone;

(ii) physical and chemical characteristics of the injected fluid(s);

(iii) volume and rate of discharge of the injected fluid(s);

(iv) compatibility of the injected fluid(s) with the formation fluid(s);

(v) the number, type and location of all wells, mines, surface bodies of water, and structures within the area of review;

(vi) proposed injection procedures;

(vii) expected changes in pressure, formation fluid displacement, and direction of movement of injected fluid;

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(viii) proposals of corrective action to be taken in the event that a failure in any phase of injection operations that renders the groundwaters unsuitable for their best intended usage as defined in Rule .0202 of Subchapter 02L; and

(ix) the life expectancy of the injection operations.

(B) Monitoring wells completed in the injection zone and any of those zones adjacent to the injection zone may be affected by the injection operations. If affected, the Director may require additional wells located to detect any movement of injection fluids, process by products, or formation fluids outside the injection zone as determined by the applicant in accordance with Subparagraph (1)(E) of this Rule. If the operation is affected by subsidence or catastrophic collapse, the monitoring wells shall be located so that they will not be physically affected and shall be of an adequate number to detect movement of injected fluids, process by products, or formation fluids outside the injection zone or area. In determining the number, location and spacing of monitoring wells, the following criteria shall be considered by the Director:

(i) the population relying on the groundwater resource affected, or potentially affected, by the injection operation;

(ii) the proximity of the injection operation to points of withdrawal of groundwater.

(iii) The local geology and hydrology;

(iv) the operating pressures;

(v) the chemical characteristics and volume of the injected fluid, formation water, and process by products; and

(vi) the density of injection wells.

(C) If required by the Director, samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(D) The following analytical parameters shall be included:

(i) disinfectants and disinfection byproducts;

(ii) radium, radionuclides, and gross alpha radiation;

(iii) Reduction Potential (Eh), pH, Total Dissolved Solids (TDS), Biological Oxygen Demand (BOD), Total Oxygen Demand (TOD), Chemical Oxygen Demand (COD), temperature, conductivity, dissolved oxygen;

(iv) coliform, Escherichia coli (E. Coli), Giardia, Cryptosporidium;

(v) parameters deemed appropriate by the Director based on the source water, injection zone formation materials, native groundwater, or any other reason deemed necessary to protect groundwater, human health, or the environment; and

(vi) only parameters for which National Primary and Secondary Drinking Water Standards have been established.

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(E) Analysis of the physical, chemical, biological, or radiological characteristics of the injected fluid shall be made monthly or more frequently, as necessary, in order to provide representative data for characterization of the injectant.

(F) Monitoring of injection pressure, flow rate, and cumulative volume shall occur according to a schedule determined necessary by the Director.

(G) Monitoring wells associated with the injection site shall be monitored quarterly or on a schedule determined by the Director to detect any migration of injected fluids from the injection zone.

(H) Continuous recording devices to monitor the injection pressure, flow, rate, and volume of injected fluid shall be installed.

(8) Reporting.

(A) All sampling results shall be reported by the well owner to the Division on a frequency determined by the reaction rates, injection rates, likelihood of secondary impacts, and site-specific hydrogeologic information.

(B) The annual test results for mechanical integrity shall be submitted to the Director within 30 days of the completion of the test.

(9) Public Notice. Public notice of intent to issue permits for applications submitted pursuant to this Rule shall be given prior to permit issuance.

(A) Such notice shall:

(i) be posted on the Division website and/or mailed to all property owners within the area of review;

(ii) provide 30 days for public comments to be submitted to the Director; and

(iii) include a description of pertinent details of the project, such as the permit applicant; the location, number, and depth of injection wells; and the injectant type, source, and volume.

(B) After the public comment period has ended the Director shall:

(i) consider the comments submitted;

(ii) determine if the draft permit shall be issued, modified, or denied; and

(iii) post notice on the Division website as of the final permitting action, which shall include the issued permit or the reason for denial if the permit was denied.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);
Amended Eff.

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15A NCAC 02C .0220 AQUIFER TEST WELLS

These wells are used to inject uncontaminated fluid into an aquifer to determine the aquifer characteristics.

(1) Injection wells of this type are permitted by rule when constructed and operated in accordance with this Rule.

(2) Only potable water may be injected through this type of injection well.

(3) Tests for mechanical integrity shall be conducted in accordance with Rule .0207(b) of this Section.

(4) Injection wells of this type shall be constructed in accordance with the well construction standards applicable to monitoring wells specified in Rule .0108 of this Subchapter.

(5) The operation of the aquifer test well shall not cause contaminated groundwater to migrate into an area not contaminated prior to initiation of injection activities or cause a contravention of a groundwater quality standard as specified in Subchapter 02L.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);
Amended Eff.

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15A NCAC 02C .0221 EXPERIMENTAL TECHNOLOGY WELLS

These wells are used in experimental or unproven technologies where operation is in compliance with all appropriate rules and Statutes.

(1) Rule requirements for Experimental Technology Wells shall be evaluated and treated as one of the Class 5 injection well types in this Section that the Director determines most closely resembles the equivalent hydrogeologic complexity and potential to adversely affect groundwater quality.

(2) The Director may add or delete requirements based on the following considerations:

(A) protection of human health and the environment based on site specific criteria;

(B) existing or projected environmental impacts; or

(C) compliance with the provisions of the Rules of this Section.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);

Amended Eff.

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15A NCAC 02C .0222 GEOTHERMAL AQUEOUS CLOSED-LOOP WELLS

These wells are used to house a subsurface system of closed-loop pipe that circulates potable water only or a mixture of potable water and performance-enhancing additives such as antifreeze, corrosion inhibitors, or scale inhibitors for heating and cooling purposes. Only additives that the Department of Health and Human Services' Division of Public Health determines to be protective of public health shall be used.

(1) Permitted by Rule. All Aqueous Closed-Loop Geothermal Wells are permitted by rule when constructed in accordance with the rules of this Section.

(2) Individual Permits. The Director may require an individual permit for any closed loop geothermal well system to ensure compliance with the rules of this Section, or protection of human health or water quality. If an individual permit is required, then an application for permit renewal shall be made at least 120 days prior to the expiration date of the permit.

(3) Notification. In addition to the requirements set forth in Rule .0211 of this Section, notifications shall be submitted at least 48 hours prior to the actual start date of well construction, excluding weekends and State holidays. The notification shall be submitted in duplicate, to the Director on forms furnished by the Director and shall include the following:

(A) the well owner's name and, if different from the property owner, the well operator's name, address, telephone number, email address (if available), and status as a federal, state, private, public, tribal, or other activity;

(B) the physical address or Parcel Identification Number of the well facility if different than the well owner's mailing address;

(C) a description of the proposed injection activities;

(D) a scaled, site-specific map showing the following:

(i) any water supply well, surface water body, septic tank and drainfield, or any other potential sources of contamination listed in Subparagraph (4)(D) of this Rule within 100 ft. of the proposed injection well(s);

(ii) property boundaries within 250 feet of the parcel on which the proposed wells are located; and

(iii) an arrow orienting the site to one of the cardinal directions;

(E) the types and concentrations of additives, if any, to be used in the closed-loop geothermal well system. All proposed additives not already approved for use at the time of application submittal shall be subject to a health risk evaluation. Only approved additives shall be used in any closed loop geothermal well system;

(F) detailed plans and specifications of the surface and subsurface construction details of the system;

(G) the well driller contractor's name, North Carolina Well Contactor Certification number, address, email address (if available), and telephone number;

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(H) the heating/cooling system installation contractor's name and certification number, address, email address (if available), and telephone number;

(I) description of how the septic system will be protected during well construction; and

(J) such other information as deemed necessary by the Director for the protection of human health and the environment.

(4) Well Construction.

(A) Only tubing that has passed pressure testing conducted in accordance Paragraph (6) of this Rule shall be used.

(B) The well shall be constructed in such a manner that surface water or contaminants from the land surface cannot migrate along the borehole annulus either during or after construction.

(C) The well shall be located such that:

(i) the injection well is not in an area where surface water or runoff will accumulate around the well due to depressions, drainage ways, or other landscapes that will concentrate water around the well; and

(ii) the injection well is not in an area that requires a person to enter confined spaces to perform sampling and inspection activities.

(D) The minimum horizontal separation from potential sources of groundwater contamination that exist at the time the well(s) are constructed shall be as follows, unless it can be demonstrated to the Director's satisfaction that a lesser separation distance will not result in a threat to human health or a contravention of a groundwater quality standard as specified in Subchapter 02L:

(i)	Building perimeters, including any attached structures	15 feet
(ii)	Septic tanks and drainfields, including drainfield repair areas	50 feet
(iii)	Sewage or liquid-waste collection or transfer facilities constructed to water main standards in accordance with Rule 0305(g)(2) of Subchapter 02T or Rule .1950(e) of Subchapter 18A, as applicable	15 feet
(iv)	Sewage or liquid-waste collection or transfer facilities not constructed to water main standards in accordance with Rule 0305(g)(2) of Subchapter 02T or Rule .1950(e) of Subchapter 18A, as applicable	25 feet
(v)	Aboveground or underground petroleum or chemical storage tanks	50 feet
(vi)	Land-based or subsurface waste storage or disposal systems	50 feet
(vii)	Gravesites	50 feet
(vii)	Any other potential sources of contamination	50 feet

(E) The methods and materials used in construction shall not threaten the physical and mechanical integrity of the well during its lifetime and shall be compatible with the proposed injection activities.

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(F) Drilling fluids and additives shall contain only potable water and may be comprised of one or more of the following:

(i) the formation material encountered during drilling;

(ii) materials manufactured specifically for the purpose of borehole conditioning or well construction; or

(iii) materials approved by the Director, based on a demonstration of not adversely affecting human health or the environment.

(G) Allowable grouts are listed under Rule .0107 of this Subchapter with the exception that bentonite chips or pellets shall not be used.

(H) Grout shall be placed the entire length of the well boring from the bottom of the boring to land surface or to the well header or manifold connection if completed below land surface.

(I) The grout shall be emplaced by one of the following methods:

(i) Pressure. Grout shall be pumped or forced under pressure through the bottom of the casing until it fills the annular area around the casing and overflows at the surface; or

(ii) Pumping. Grout shall be pumped into place through a hose or pipe extended to the bottom of the annular space which can be raised as the grout is applied. The grout hose or pipe shall remain submerged in grout during the entire application.

(J) If temporary outer casing is installed, it shall be removed during grouting of the borehole in such a way that maintains the integrity of the borehole and uniform grout coverage around the geothermal tubing.

(K) If a permanent outer casing is installed:

(i) The space between the interior wall of the casing and the geothermal tubing shall be grouted the entire length of the well boring from the bottom of the boring to land surface or to the well header or manifold connection if completed below land surface;

(ii) The annular space between the casing and the borehole shall be grouted with a grout that is non-reactive with the casing or the formation; and

(iii) Grout shall extend outward in all directions from the casing wall to borehole wall and have a minimum thickness equal to either one-third of the diameter of the outside dimension of the casing or two inches, whichever is greater.

(iv) In no case shall a well be required to have an annular grout seal thickness greater than four inches.

(L) Grout emplacement shall not threaten the physical or mechanical integrity of the well.

(M) The well shall be grouted within seven days after drilling is complete or before the drilling equipment leaves the site, whichever occurs first.

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(N) Prior to removing the equipment from the site, the top of the casing shall be sealed with a water-tight cap or well seal, as defined in G.S. 87-85(16), to preclude the entrance of contaminants from entering the well.

(O) No additives that will accelerate the process of hydration shall be used in grout for thermoplastic well casing.

(P) Well head completion shall be conducted in such a manner so as to preclude surficial contaminants from entering the well.

(5) Well Location. The location of each well boring and appurtenant underground piping leading to the heat exchanger(s) shall be identifiable such that they may be located, repaired, and abandoned as necessary after construction.

(A) The as-built locations of each well boring, header pit, and appurtenant underground piping shall be recorded on a scaled site-specific facility map, which shall be retained onsite and distributed as specified in Subparagraph (8)(A) of this Rule.

(B) Each well boring and header pit shall be located by a North Carolina registered land surveyor, a global positioning system (GPS) receiver, or by triangulation from at least two permanent features on the site, such as building foundation corners or property boundary iron pins.

(C) Well boring and appurtenant underground piping locations shall be identifiable in the field by tracer wire and warning tape, concrete monuments, or any other method approved by the Director upon a demonstration that such a method provides a reliable and accurate method of detection.

(D) If tracer wire and warning tape are used, then tracer wire consisting of copper wire of at least 14 gauge shall be placed adjacent to all horizontal piping during pipe installation, and warning tape shall be installed directly above the horizontal piping approximately 12 inches below final grade.

(E) If concrete monuments are used, then each monument shall be located directly above each individual well, at the perimeter corners of each well field, or in the center of each well cluster. Each concrete monument shall be permanently affixed with an identification plate constructed of durable weatherproof rustproof metal, or other material approved by the Director as equivalent, which shall be stamped with the following information:

(i) well contractor name and certification number;

(ii) number and depth of the boring(s);

(iii) grout depth interval;

(iv) well construction completion date; and

(v) identification as a geothermal well/well field.

(6) Testing.

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(A) Closed loop tubing shall pass a pressure test on-site prior to installation into the borehole. Any closed loop tubing that fails the pressure test shall either not be used or have the leaks located and repaired plus successfully pass a subsequent pressure test prior to installation.

(B) The closed loop well system shall pass a pressure test after installation and prior to operation. Any pressure fluctuation other than that due to thermal expansion and contraction of the testing medium shall be considered a failed test. Any leaks shall be located and repaired prior to operating the system.

(7) Operation.

(A) The well shall be afforded protection against damage during construction and use.

(B) The well shall be operated and maintained in accordance with the manufacturer's specifications throughout its operating life.

(8) Monitoring and Reporting.

(A) The well owner shall submit the as-built well locations as documented in accordance with Paragraph (5) of this Rule to the Director and applicable county health department. The well owner shall also record these documents with the register of deeds of the county in which the facility is located:

(B) Upon sale or transfer of the property, the owner shall give a copy of these records to the new property owner(s).

(C) The Director may require any monitoring necessary to demonstrate protection of waters of the state to the level of the applicable groundwater standards.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);
Amended Eff.

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15A NCAC 02C .0223 GEOTHERMAL DIRECT EXPANSION CLOSED-LOOP WELLS

These wells are used to house a subsurface system of closed-loop pipe that circulates refrigerant gas for heating and cooling purposes. Only gasses that the Department of Health and Human Services' Division of Public Health determines to be protective of public health shall be used.

(1) Permitted by Rule. All Direct Expansion Closed-Loop Geothermal Wells are permitted by rule when constructed in accordance with the rules of this Section.

(2) Individual Permits. The Director may require an individual permit for any closed loop geothermal well system to ensure compliance with the rules of this Section, or protection of human health or water quality. If an individual permit is required, then an application for permit renewal shall be made at least 120 days prior to the expiration date of the permit.

(3) Notification. In addition to the requirements set forth in Rule .0211 of this Section, notifications shall be submitted at least 48 hours prior to the actual start date of well construction, excluding weekends and State holidays. The notification shall be submitted in duplicate, to the Director on forms furnished by the Director and shall include the following:

(A) the well owner's name and, if different from the property owner, the well operator's name, address, telephone number, email address (if available), and status as a federal, state, private, public, tribal, or other activity;

(B) the physical address or Parcel Identification Number of the well facility if different than the well owner's mailing address;

(C) a description of the proposed injection activities;

(D) a scaled, site specific map showing the following:

(i) any water supply well, surface water body, septic tank and drainfield, or any other potential sources of contamination listed in Subparagraph (4)(E) of this Rule within 100 ft. of the proposed injection well(s);

(ii) property boundaries within 250 feet of the parcel on which the proposed wells are located; and

(iii) an arrow orienting the site to one of the cardinal directions;

(E) the type of gas to be used in the closed-loop geothermal well system. All proposed gases not already approved for use at the time of application submittal shall be subject to a health risk evaluation. Only approved gases shall be used in any closed loop geothermal well system;

(F) detailed plans and specifications of the surface and subsurface construction details of the system;

(G) the well driller contractor's name, North Carolina Well Contactor Certification number, address, email address (if available), and telephone number;

(H) the heating/cooling system installation contractor's name and certification number, address, email address (if available), and telephone number;

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(I) description of how the septic system will be protected during well construction; and

(J) such other information as deemed necessary by the Director for the protection of human health and the environment.

(4) Well Construction.

(A) Closed loop tubing shall consist of refrigeration-grade copper pipe as defined/described in ASTM B280-08, which is hereby incorporated by reference, including subsequent amendments and editions, and can be obtained from ASTM International, 100 Bar Harbor Drive, P.O. Box C 700, West Conshohocken, PA, 19428-2959 at a cost of thirty-eight dollars ($38.00). Tubing with any measureable leak shall not be used. Testing shall be conducted in accordance with Paragraph (6) of this Rule.

(B) All systems shall be constructed with cathodic protection unless testing conducted in accordance with Paragraph (6) of this Rule indicates that all pH test results are within the range of 5.5 to 11.0 standard units.

(C) The well shall be constructed in such a manner that surface water or contaminants from the land surface cannot migrate along the borehole annulus either during or after construction.

(D) The well shall be located such that:

(i) the injection well is not in an area where surface water or runoff will accumulate around the well due to depressions, drainage ways, or other landscapes that will concentrate water around the well; and

(ii) the injection well is not in an area that requires a person to enter confined spaces to perform sampling and inspection activities.

(E) The minimum separation distance of the entire length of the borehole from potential sources of groundwater contamination that exist at the time the well(s) are constructed shall be as follows, unless it can be demonstrated to the Director's satisfaction that a lesser separation distance will not result in a threat to human health or a contravention of a groundwater quality standard as specified in Subchapter 02L:

(i) Building perimeters, including any attached structures 15 feet

(ii) Septic tanks and drainfields, including drainfield repair areas 50 feet

(iii) Sewage or liquid-waste collection or transfer facilities constructed to water main standards in accordance with Rule 0305(g)(2) of Subchapter 02T or Rule .1950(e) of Subchapter 18A, as applicable 15 feet

(iv) Sewage or liquid-waste collection or transfer facilities not constructed to water main standards in accordance with Rule 0305(g)(2) of Subchapter 02T or Rule .1950(e) of Subchapter 18A, as applicable 25 feet

(v) Aboveground or underground petroleum or chemical storage tanks 50 feet

(vi) Land-based or subsurface waste storage or disposal systems 50 feet

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(vii) Gravesites 50 feet

(viii) Any other potential sources of contamination 50 feet

(F) Angled boreholes shall not be drilled in the direction of underground petroleum or chemical storage tanks unless it can be demonstrated to the satisfaction of the Director that doing so will not result in a threat to human health or a contravention of a groundwater quality standard as specified in Subchapter 02L.

(G) The methods and materials used in construction shall not threaten the physical and mechanical integrity of the well during its lifetime and shall be compatible with the proposed injection activities.

(H) Drilling fluids and additives shall contain only potable water and may be comprised of one or more of the following:

(i) the formation material encountered during drilling;

(ii) materials manufactured specifically for the purpose of borehole conditioning or well construction; or

(iii) materials approved by the Director, based on a demonstration of not adversely affecting human health or the environment.

(I) Allowable grouts are listed under Rule .0107 of this Subchapter with the exception that bentonite chips or pellets shall not be used.

(J) Grout shall be placed the entire length of the well boring from the bottom of the boring to land surface or to the well header or manifold connection if completed below land surface.

(K) The grout shall be emplaced by one of the following methods:

(i) Pressure. Grout shall be pumped or forced under pressure through the bottom of the casing until it fills the annular area around the casing and overflows at the surface; or

(ii) Pumping. Grout shall be pumped into place through a hose or pipe extended to the bottom of the annular space which can be raised as the grout is applied. The grout hose or pipe shall remain submerged in grout during the entire application.

(L) If temporary outer casing is installed, it shall be removed during grouting of the borehole in such a way that maintains the integrity of the borehole and uniform grout coverage around the geothermal tubing.

(M) If a permanent outer casing is installed:

(i) The space between the interior wall of the casing and the geothermal tubing shall be grouted the entire length of the well boring from the bottom of the boring to land surface or to the well header or manifold connection if completed below land surface.

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(ii) The annular space between the casing and the borehole shall be grouted with a grout that is non-reactive with the casing or the formation.

(iii) Grout shall extend outward in all directions from the casing wall to borehole wall and have a minimum thickness equal to either one-third of the diameter of the outside dimension of the casing or two inches, whichever is greater.

(iv) In no case shall a well be required to have an annular grout seal thickness greater than four inches.

(N) Grout emplacement shall not threaten the physical or mechanical integrity of the well.

(O) The well shall be grouted within seven days after drilling is complete or before the drilling equipment leaves the site, whichever occurs first.

(P) Prior to removing the equipment from the site, the top of the casing shall be sealed with a water-tight cap or well seal, as defined in G.S. 87-85(16), to preclude the entrance of contaminants from entering the well.

(Q) No additives that will accelerate the process of hydration shall be used in grout for thermoplastic well casing.

(R) Well head completion shall be conducted in such a manner so as to preclude surficial contaminants from entering the well.

(5) Well Location. The location of each well boring and appurtenant underground piping leading to the heat exchanger(s) shall be identifiable such that they may be located, repaired, and abandoned as necessary after construction.

(A) The as-built locations of each well boring, header pit, and appurtenant underground piping shall be recorded on a scaled site-specific facility map, which shall be retained onsite and distributed as specified in Subparagraph (8)(A) of this Rule.

(B) Each well boring and header pit shall be located by a North Carolina registered land surveyor, a GPS receiver, or by triangulation from at least two permanent features on the site, such as building foundation corners or property boundary iron pins.

(C) Well boring and appurtenant underground piping locations shall be identifiable in the field by tracer wire and warning tape, concrete monuments, or any other method approved by the Director upon a demonstration that such a method provides a reliable and accurate method of detection.

(D) If tracer wire and warning tape are used, then tracer wire consisting of copper wire of at least 14 gauge shall be placed adjacent to all horizontal piping during pipe installation, and warning tape shall be installed directly above the horizontal piping approximately 12 inches below final grade.

(E) If concrete monuments are used, then each monument shall be located directly above each individual well, at the perimeter corners of each well field, or in the center of each well cluster. Each concrete monument shall be permanently affixed with an

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identification plate constructed of durable weatherproof rustproof metal, or other material approved by the Director as equivalent, which shall be stamped with the following information:

(i) well contractor name and certification number;

(ii) number and depth of the boring(s);

(iii) grout depth interval;

(iv) well construction completion date; and

(v) identification as a geothermal well/well field.

(6) Testing.

(A) Closed loop tubing shall pass a pressure test on-site prior to installation into the borehole. Any closed loop tubing that fails the pressure test shall either not be used or have the leaks located and repaired plus successfully pass a subsequent pressure test prior to installation.

(B) The closed loop well system shall pass a pressure test after installation and prior to operation. Any pressure fluctuation other than that due to thermal expansion and contraction of the testing medium shall be considered a failed test. Any leaks shall be located and repaired prior to operating the system.

(C) When not providing cathodic protection as specified in Subparagraph (4)(B) of this Rule drilling cuttings shall be tested for pH at a frequency of at least every 10 feet of boring length using a pH meter that has been calibrated prior to use according to the manufacturer's instructions.

(7) Operation.

(A) The well shall be afforded protection against damage during construction and use.

(B) The well shall be operated and maintained in accordance with the manufacturer's specifications throughout its operating life. Cathodic protection, if required, shall be maintained at all times in accordance with the manufacturer's specifications throughout the operating life of the well(s).

(8) Monitoring and Reporting.

(A) The well owner shall submit the as-built well locations as documented in accordance with Paragraph (5) of this Rule to the Director and applicable county health department. The well owner shall also record these documents with the register of deeds of the county in which the facility is located:

(B) Upon sale or transfer of the property, the owner shall give a copy of these records to the new property owner(s).

(C) The Director may require any monitoring necessary to demonstrate protection of waters of the state to the level of the applicable groundwater standards.

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History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);
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15A NCAC 02C .0224 GEOTHERMAL HEATING/COOLING WATER RETURN WELLS

These wells reinject groundwater used to provide heating or cooling for structures. These wells may be approved by the Director only if the temperature of the injection fluid is not in excess of 30 degrees Fahrenheit above or below the naturally occurring temperature of the receiving groundwater. This includes wells using a geothermal fluid source. All Geothermal Heating/Cooling Water Return Wells require a permit.

(1) Permit Applications. In addition to the permit requirements set forth in Rule .0211 of this Section, an application shall be submitted, in duplicate, to the Director on forms furnished by the Director and shall include the following:

(A) the permit well owner's and (if different from the property owner) the well operator's name, address, telephone number, email address (if available), and status as a federal, state, private, public, tribal, or other activity;

(B) the physical address of the location of the well site if different than the well owner's mailing address;

(C) a description of the injection activities proposed by the applicant;

(D) a scaled, site-specific map showing at a minimum, the following:

(i) any water supply well, surface water body, septic tank and drainfield, or any other potential sources of contamination listed under Rule .0107 of this Subchapter within 100 ft. of the proposed injection well(s);

(ii) all property boundaries; and

(iii) an arrow orienting the site to one of the cardinal directions;

(E) the proposed average and maximum daily injection rate, volume, pressure, temperature, and quantity of fluid to be injected;

(F) detailed plans and specifications of the surface and subsurface construction details of the system including a schematic of the injection and/or source well(s) construction;

(G) the well driller contractor's name, North Carolina Well Contactor Certification number, address, email address (if available), and telephone number;

(H) the heating/cooling system installation contractor's name, address, email address (if available), and telephone number;

(I) a copy of the property deed or other document indicating property ownership; and

(J) such other information as deemed necessary by the Director for the protection of human health and the environment.

(2) Permit Renewals. Application for permit renewal shall be made at least 120 days prior to the expiration date of the permit.

(3) Well Construction.

(A) The water supply well shall be constructed in accordance with the requirements of Rule .0107 of this Subchapter.

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(B) If a separate injection/return well is used then it shall also be constructed in accordance with the requirements of Rule .0107 of this Subchapter except that the entire length of the casing shall be grouted from land surface to a depth of two feet above the screen or, for open-end wells, to the bottom of the casing.

(C) The injection well system shall be constructed such that a sampling tap or other collection equipment approved by the Director provides a functional source of water when the system is operational. Such equipment shall provide the means to collect a water sample immediately after emerging from the water supply well and immediately prior to injection into the return well.

(4) Operation and Maintenance.

(A) Pressure at the well head shall be limited to a maximum which will ensure that the pressure in the injection zone does not initiate new fractures or propagate existing fractures in the injection zone, initiate fractures in the confining zone, or cause the migration of injected or formation fluids outside the injection zone or area.

(B) Injection between the outermost casing and the well borehole is prohibited.

(C) Monitoring of the operating processes shall be provided for by the well owner, as well as protection against damage during construction and use.

(5) Monitoring and Reporting.

(A) Monitoring of any well may be required by the Director as necessary to demonstrate adequate protection of waters of the state to the level of applicable groundwater standards.

(B) The well owner shall retain copies of records of any site maps showing the location of the injection wells, and any testing, calibration, or monitoring information done on-site. Upon sale or transfer of the property, the owner shall give a copy of these records to the new property owner(s).

(C) The permittee shall record the number and location of the wells with the register of deeds in the county in which the facility is located.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);
Amended Eff.

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15A NCAC 02C .0225 GROUNDWATER REMEDIATION WELLS

These wells are used to inject additives, treated groundwater, ambient air, or any combination of these for the treatment of contaminated soil or groundwater. Only additives that the Department of Health and Human Services' Division of Public Health determines to be protective of public health shall be approved for injection.

(1) Permitted by Rule. The following are permitted by rule pursuant to Rule .0217 of this Section when constructed and operated in accordance with Paragraphs (3) through (9) of this Rule, all criteria for the specific injection system are met, hydraulic or pneumatic fracturing are not conducted, and the injection wells or injection activities do not result in the violation of any groundwater or surface water standard outside the injection zone:

(A) Passive Injection Systems. Injection wells that use in-well delivery systems to diffuse injectants through injection wells into the subsurface;

(B) Small-scale Injection Operations. Injection wells used to remediate contaminant plumes located within a land surface area not to exceed 2,500 square feet;

(C) Pilot Tests. Preliminary studies conducted for the purpose of evaluating the technical feasibility of a remediation strategy in order to develop a full scale remediation plan for future implementation, and where the surface area of the injection zone wells are located within an area that does not exceed five percent of the land surface above of the known extent of groundwater contamination. Only a single pilot test shall be conducted on each separate contaminant plume. An individual permit shall be required to conduct more than one pilot test on any separate groundwater contaminant plume;

(D) Air Injection Wells. Injection wells used to inject ambient air to enhance in-situ treatment of groundwater.

(i) The air to be injected shall not exceed the ambient air quality standards set forth in Rule .0400 of Subchapter 02D and shall not contain petroleum or any other constituent that would cause a violation of groundwater standards specified in Subchapter 02L.

(ii) Injection wells of this type shall be constructed in accordance with the well construction standards applicable to monitoring wells specified in Rule .0108 of this Subchapter.

(E) When on-site contaminated groundwater is used, the groundwater remediation injection wells shall be permitted in accordance with Rule .1600 of Subchapter 02T.

(2) Notification for Injection Wells Permitted by Rule. Notification for injection well systems permitted by rule pursuant to Paragraph (1) of this Rule shall be submitted to the Director on forms supplied by the Director two weeks prior to injection. Such notification shall include the following:

(A) name and contact information of the well owner;

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(B) name and contact information of the person who can answer technical questions about the proposed injection system if different from the well owner;

(C) geographic coordinates of the injection well or well field;

(D) maps of the injection zone relative to the known extent of contamination:

(i) contaminant plume map(s) with isoconcentration lines that show the horizontal extent of the contaminant plume in soil and groundwater, existing and proposed monitoring wells, and existing and proposed injection wells.

(ii) cross-section(s) to the known or projected depth of contamination that show the horizontal and vertical extent of the contaminant plume in soil and groundwater, major changes in lithology, existing and proposed monitoring wells, and existing and proposed injection wells;

(E) purpose, scope, and goals of the proposed injection activity;

(F) name, volume, concentration, and Material Safety Data Sheet of each injectant;

(G) schedule of injection well construction and injection activities;

(H) plans and specifications of each injection well or well system, which include:

(i) the number and depth of injection wells;

(ii) indication whether the injection wells are existing or proposed;

(iii) well contractor name and certification number when necessary; and

(iv) indication of whether the injection wells are permanent wells, "direct push" temporary injection wells, or are subsurface distribution systems; and

(I) description of monitoring plan capable of determining if violations of groundwater quality standards specified in Subchapter 02L result from the injection activity.

(3) Permit Applications for Injection Wells not Permitted by Rule. In addition to the permit requirements set forth in Rule .0211 of this Section, an application shall be submitted, in duplicate, to the Director on forms furnished by the Director and shall include the following:

(A) site description and incident information that include the following:

(i) name of the well owner or person otherwise legally responsible for the injection wells, mailing address, telephone number, and status as a federal, state, private, public, tribal, or other entity;

(ii) name of the property owner, if different from the well owner, physical address, mailing address, and telephone number;

(iii) name, mailing address, telephone number, and geographic coordinates of the facility for which the application is submitted and a brief description of the nature of the business;

(iv) a brief description of the contamination incident including the source, type, cause, and release date(s) of the contamination; a list of all contaminants in the affected soil or groundwater; the presence and thickness of free product; and the

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maximum contaminant concentrations detected in the affected soil and groundwater;

(v) the State agency responsible for management of the contamination incident, including the incident tracking number, and the incident manager's name and telephone number; and

(vi) a list of all permits issued for the facility or contamination incident, including, but not limited to: Hazardous Waste Management program permits or approval under the Resource Conservation and Recovery Act (RCRA), waste disposal permits issued in accordance with G.S. 143-215.1, Sewage Treatment and Disposal Permits issued in accordance with G.S. 130A, and other environmental permits required by state or federal law.

(B) Hydrogeologic Evaluation. If required by G.S. 89E or 89C, a licensed geologist, or professional engineer shall prepare an evaluation of the facility to a depth that includes injection zone determined in accordance with Subparagraph (3)(C) of this Rule. The hydrogeologic description shall include all of the following:

(i) regional and local geology and hydrogeology;

(ii) significant changes in lithology underlying the facility;

(iii) depth to bedrock;

(iv) depth to the mean seasonal high water table;

(v) hydraulic conductivity, transmissivity, and storativity, of the injection zone based on tests of site-specific material, including a description of the test(s) used to determine these parameters;

(vi) rate and direction of groundwater flow as determined by predictive calculations or computer modeling; and

(vii) lithostratigraphic and hydrostratigraphic logs of test and injection wells.

(C) Injection Zone Determination. The applicant shall specify the horizontal and vertical portion of the injection zone within which the proposed injection activity shall occur based on the hydraulic properties of that portion of the injection zone specified. No violation of groundwater quality standards specified in Subchapter 02L resulting from the injection shall occur outside the specified portion of the injection zone as detected by a monitoring plan approved by the Division.

(D) Area of Review. The area of review shall be calculated using the procedure for determining the zone of endangering influence specified in 40 CFR 146.6(a). The applicant must identify all wells within the area of review that penetrate the injection or confining zone, and repair or permanently abandon all wells that are improperly constructed or abandoned.

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(E) Injectant Information. The applicant shall submit the following information for each proposed injectant:

(i) injectant name and manufacturer, concentration at the point of injection, and percentage if present in a mixture with other injectants;

(ii) the chemical, physical, biological, or radiological characteristics necessary to evaluate the potential to adversely affect human health or groundwater quality;

(iii) the source of fluids used to dilute, carry, or otherwise distribute the injectant throughout the injection zone as determined in accordance with Subparagraph (3)(C) of this Rule. If any well within the area of review of the injection facility is to be used as the fluid source, then the following information shall be submitted: location/ID number, depth of source, formation, rock/sediment type, and a complete chemical analysis of the water from the source well, including analyses for all contaminants suspected or historically recognized in soil or groundwater on the site;

(iv) a description of the rationale for selecting the injectants and concentrations proposed for injection, including an explanation and/or calculations of how the proposed injectant volumes and concentrations were determined;

(v) a description of the reactions between the injectants and the contaminants present including specific breakdown products or intermediate compounds that may be formed by the injection;

(vi) a summary of results if modeling or testing was performed to investigate the injectant's potential or susceptibility for biological, chemical, or physical change in the subsurface; and

(vii) an evaluation concerning the development of byproducts of the injection process, including increases in the concentrations of naturally occurring substances. Such an evaluation shall include, but may not be limited to, the identification of the specific byproducts of the injection process, projected concentrations of byproducts, and areas of migration as determined through modeling or other predictive calculations.

(F) Injection Procedure. The applicant shall submit a detailed description of the proposed injection procedure that includes the following:

(i) the proposed average and maximum daily rate and quantity of injectant;

(ii) the average maximum injection pressure expressed in units of psi; and

(iii) the total or estimated total volume to be injected.

(G) Fracturing Plan. If hydraulic or pneumatic fracturing is proposed, then the applicant shall submit a detailed description of the fracturing plan that includes the following:

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(i) Material Safety Data Sheets of fracturing media including information on any proppants used;

(ii) a map of fracturing well locations relative to the known extent of groundwater contamination plus all buildings, wells, septic systems, underground storage tanks, and underground utilities located within the Area of Review;

(iii) a demonstration that buildings, wells, septic systems, underground storage tanks, and underground utilities will not be adversely affected by the fracturing process;

(iv) injection rate and volume;

(vi) orientation of bedding planes, joints, and fracture sets of the fracture zone;

(vii) performance monitoring plan for determining the fracture well radius of influence; and

(viii) if conducted, the results of geophysical testing or pilot demonstration of fracture behavior conducted in an uncontaminated area of the site.

(H) Injection well construction details including:

(i) number and depth of injection wells;

(ii) number and depth of borings if using multi-level or "nested" well systems;

(iii) indication whether the injection wells are existing or proposed;

(iv) well drilling contractor name and certification number;

(v) depth and type of casing;

(vii) depth and type of screen material;

(viii) depth and type of grout;

(ix) indication whether the injection wells are permanent or temporary "direct push" points; and

(x) detailed plans and specifications of the surface and subsurface construction of each injection well or well system.

(I) Monitoring Wells. Monitoring wells shall be of sufficient quantity and location as determined by the Director so as to detect any movement of injection fluids, injection process by-products, or formation fluids outside the injection zone as determined by the applicant in accordance with Subparagraph (3)(C) of this Rule. The monitoring schedule shall be consistent with the proposed injection schedule, pace of the anticipated reactions, and rate of transport of the injectants and contaminants. The applicant shall submit a monitoring plan that includes the following:

(i) target contaminants plus secondary or intermediate contaminants that may result from the injection;

(ii) other parameters that may serve to indicate the progress of the intended reactions;

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(iii) a list of existing and proposed monitoring wells to be used; and

(iv) a sampling schedule to monitor the proposed injection.

(J) Well Data Tabulation. A tabulation of data on all existing or abandoned wells within the area of review of the injection well(s) that penetrate the proposed injection zone, including, but not limited to, monitoring wells and wells proposed for use as injection wells. Such data shall include a description of each well's type, depth, record of abandonment or completion, and any additional information the Director may require.

(K) Maps and Cross-Sections. Scaled, site-specific site plans or maps depicting the location, orientation, and relationship of facility components including the following:

(i) area map based on the most recent USGS 7.5' topographic map of the area, at a scale of 1:24,000 and showing the location of the proposed injection site;

(ii) topographic contour intervals showing all facility related structures, property boundaries, streams (ephemeral, intermittent, and perennial), springs, lakes, ponds, and other surface drainage features;

(iii) all existing or abandoned wells within the area of review of the injection well(s), listed in the tabulation required in Subparagraph (3)(J) of this Rule, that penetrate the proposed injection zone, including, but not limited to, water supply wells, monitoring wells, and wells proposed for use as injection wells;

(iv) potentiometric surface map(s) that show the direction of groundwater movement, existing and proposed monitoring wells, and existing and proposed injection wells;

(v) contaminant plume map(s) with isoconcentration lines that show the horizontal extent of the contaminant plume in soil and groundwater, existing and proposed monitoring wells, and existing and proposed injection wells;

(vi) cross-section(s) to the known or projected depth of contamination that show the horizontal and vertical extent of the contaminant plume in soil and groundwater, major changes in lithology, existing and proposed monitoring wells, and existing and proposed injection wells; and

(vii) any existing sources of potential or known groundwater contamination, including waste storage, treatment, or disposal systems within the area of review of the injection well or well system.

(L) Such other information as deemed necessary by the director for the protection of human health and the environment.

(4) Injection Volumes. The Director may establish maximum injection volumes and pressures necessary to assure that:

(A) fractures are not initiated in the confining zone of the injection zone determined in accordance with Subparagraph (3)(C) of this Rule;

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(B) injected fluids do not migrate outside the injection zone or area;

(C) injected fluids and fractures do not cause or contribute to the migration of contamination into uncontaminated areas; and

(D) there is compliance with operating requirements.

(5) Well Construction.

(A) Wells shall not be located where:

(i) surface water or runoff will accumulate around the well due to depressions, drainage ways, or other landscapes that will concentrate water around the well;

(ii) a person would be required to enter confined spaces to perform sampling and inspection activities; and

(iii) injectants or formation fluids would migrate outside the approved injection zone as determined by the applicant in accordance with Subparagraph (3)(C) of this Rule.

(B) Wells used for hydraulic or pneumatic fracturing shall be located within the extent of known groundwater contamination but no closer than 75 feet to this boundary unless it can be demonstrated to the satisfaction of the Director that a lesser separation distance will not result in a threat to human health or a contravention of a groundwater quality standard as specified in Subchapter 02L, such as through the use of directional fracturing.

(C) The methods and materials used in construction shall not threaten the physical and mechanical integrity of the well during its lifetime and shall be compatible with the proposed injection activities.

(D) The well shall be constructed in such a manner that surface water or contaminants from the land surface cannot migrate along the borehole annulus either during or after construction.

(E) The borehole shall not penetrate to a depth greater than the depth at which injection will occur unless the purpose of the borehole is the investigation of the geophysical and geochemical characteristics of an aquifer. Following completion of the investigation the borehole beneath the zone of injection shall be grouted completely to prevent the vertical migration of any contaminants downward.

(F) For "direct-push" temporary injection wells constructed without permanent or temporary casing, injection and well abandonment activities shall be conducted within the same working day as when the borehole is constructed.

(G) Drilling fluids and additives shall contain only potable water and may be comprised of one or more of the following:

(i) the formation material encountered during drilling;

(ii) materials manufactured specifically for the purpose of borehole conditioning or well construction; and

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(iii) materials approved by the Director, based on a demonstration of not adversely affecting human health or groundwater quality.

(H) The annular space between the borehole and casing shall be grouted:

(i) with an allowable grout listed under Rule 0107 of this Subchapter that is non-reactive with the casing or screen materials, the formation, or the injectant;

(ii) from land surface to within two feet of the top of the injection zone and between all discontinuous sections of well screen; and

(iii) so that the grout extends outward from the casing wall to a minimum thickness equal to either one-third of the diameter of the outside dimension of the casing or two inches, whichever is greater.

(I) Grout shall be emplaced around the casing by one of the following methods:

(i) Pressure. Grout shall be pumped or forced under pressure through the bottom of the casing until it fills the annular space around the casing and overflows at the surface;

(ii) Pumping. Grout shall be pumped into place through a hose or pipe extended to the bottom of the annular space which can be raised as the grout is applied. The grout hose or pipe shall remain submerged in grout during the entire application; or

(iii) Other. Grout may be emplaced in the annular space by gravity flow in such a way to ensure complete filling of the space. Gravity flow shall not be used if water or any visible obstruction is present in the annular space at the time of grouting.

(J) All grout mixtures shall be prepared prior to emplacement with the exception that bentonite chips or pellets may be emplaced by gravity flow if water is present or otherwise hydrated in place.

(K) If an outer casing is installed, it shall be grouted by either the pumping or pressure method.

(L) The well shall be grouted within seven days after the casing is set or before the drilling equipment leaves the site, whichever occurs first.

(M) No additives that will accelerate the process of hydration shall be used in grout for thermoplastic well casing.

(N) A casing shall be installed that extends from at least 12 inches above land surface to the top of the injection zone.

(O) Wells with casing extending less than 12 inches above land surface and wells without casing may be approved by the Director only when one of the following conditions are met:

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(i) site specific conditions directly related to business activities, such as vehicle traffic, would endanger the physical integrity of the well; or

(ii) it is not operationally feasible for the wellhead to be completed 12 inches above land surface due to the engineering design requirements of the system.

(P) Multi-screened wells shall not connect aquifers or zones having differences in water quality which would result in a degradation of any aquifer or zone.

(Q) Prior to removing the equipment from the site, the top of the casing shall be sealed with a water-tight cap or well seal, as defined in G.S. 87-85(16), to preclude the entrance of contaminants from entering the well.

(R) Packing materials for gravel and sand packed wells shall be:

(i) composed of quartz, granite, or other hard, non-reactive rock material and shall be clean, of uniform size, water-washed and free from clay, silt, or other deleterious material;

(ii) disinfected prior to subsurface emplacement;

(iii) emplaced such that it shall not connect aquifers or zones having differences in water quality that would result in the deterioration of the water qualities in any aquifer or zone; and

(iv) evenly distributed around the screen and shall extend to a depth at least one foot above the top of the screen. A one foot thick seal, comprised of bentonite clay or other sealing material approved by the Director shall be emplaced directly above and in contact with the packing material.

(S) All permanent injection wells shall have a well identification plate that meets the criteria specified in Rule .0107 of this Subchapter.

(T) A hose bibb, sampling tap, or other collection equipment approved by the Director shall be installed on the line entering the injection well such that a sample of the injectant can be obtained immediately prior to its entering the injection well.

(U) If applicable, all piping, wiring, and vents shall enter the well through the top of the casing unless otherwise approved by the Director based on a design demonstrated to preclude surficial contaminants from entering the well.

(V) The well head shall be completed in such a manner so as to preclude surficial contaminants from entering the well; and well head protection shall include:

(i) an accessible external sanitary seal installed around the casing and grouting; and

(ii) a water-tight cap or seal compatible with the casing and installed so that it cannot be removed without the use of hand or power tools.

(W) For subsurface distribution systems the following shall apply:

(i) for systems designed to be constructed within seven feet of land and above the seasonal high water table, the distribution system design volume, injection

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volume, and injection rate shall be based on the hydraulic conductivity of the geologic material having the lowest permeability as determined by appropriate *in situ* or laboratory test methods; and

(ii) the land surface directly above all systems shall be covered with pavement or compacted soil to prevent stormwater or other fluids on the land surface from infiltrating into the subsurface distribution system.

(6) Mechanical Integrity. All permanent injection wells require tests for mechanical integrity, which shall be conducted in accordance with Rule .0207(b) of this Section.

(7) Operation and Maintenance.

(A) Pressure at the well head shall be limited to a maximum which will ensure that the pressure in the injection zone does not initiate new fractures or propagate existing fractures in the injection zone, initiate fractures in the confining zone, or cause the migration of injected or formation fluids outside the injection zone or area.

(B) Injection between the outermost casing and the well borehole is prohibited.

(C) Monitoring of the operating processes at the well head shall be provided for by the well owner, as well as protection against damage during construction and use.

(8) Monitoring.

(A) Monitoring of the injection well may be required by the Director to demonstrate protection of groundwaters of the state.

(i) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(ii) Analysis of the physical, chemical, biological, or radiological characteristics of the injectant shall be made monthly or more frequently, as necessary, in order to provide representative data for characterization of the injectant.

(iii) Monitoring of injection pressure, flow rate, and cumulative volume shall occur according to a schedule determined necessary by the Director.

(iv) Monitoring wells associated with the injection site shall be monitored quarterly or on a schedule determined by the Director to detect any migration of injected fluids from the injection zone.

(B) In determining the type, density, frequency, and scope of monitoring, the Director shall consider the following:

(i) physical and chemical characteristics of the injection zone;

(ii) physical and chemical characteristics of the injected fluid(s);

(iii) volume and rate of discharge of the injected fluid(s);

(iv) compatibility of the injected fluid(s) with the formation fluid(s);

(v) the number, type and location of all wells, mines, surface bodies of water, and structures within the area of review;

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(vi) proposed injection procedures;

(vii) expected changes in pressure, formation fluid displacement, and direction of movement of injected fluid;

(viii) proposals of corrective action to be taken in the event that a failure in any phase of injection operations that renders the groundwaters unsuitable for their best intended usage as defined in Rule .0202 of Subchapter 02L; and

(ix) the life expectancy of the injection operations.

(C) Monitoring wells completed in the injection zone and any of those zones adjacent to the injection zone may be affected by the injection operations. If affected, the Director may require additional well(s) located to detect any movement of injection fluids, injection process by products, or formation fluids outside the injection zone as determined by the applicant in accordance with Subparagraph (3)(C) of this Rule. If the operation is affected by subsidence or catastrophic collapse, the monitoring wells shall be located so that they will not be physically affected and shall be of an adequate number to detect movement of injected fluids, process by products, or formation fluids outside the injection zone or area. In determining the number, location and spacing of monitoring wells, the following criteria shall be considered by the Director:

(i) the population relying on the groundwater resource affected, or potentially affected, by the injection operation;

(ii) the proximity of the injection operation to points of withdrawal of groundwater;

(iii) the local geology and hydrology;

(iv) the operating pressures;

(v) the chemical characteristics and volume of the injected fluid, formation water, and process by products; and

(vi) the density of injection wells.

(9) Reporting.

(A) The well owner shall be responsible for submitting to the Director on forms furnished by the Director, or on an alternate approved form that provides the same information:

(i) a record of the construction, abandonment, or repairs of the injection well within 30 days of completion of the specified activities;

(ii) the Injection Event Record within 30 days of completing each injection; and

(iii) hydraulic or pneumatic fracturing performance monitoring results.

(B) All sampling results shall be reported by the well owner to the Division on a frequency determined by the reaction rates, injection rates, likelihood of secondary impacts, and site-specific hydrogeologic information.

(C) A Final Project Evaluation report shall be submitted within nine months after completing all injection-related activities associated with the permit or produce a project interim

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evaluation before submitting a renewal application for the permit. This document shall assess the injection projects findings in a written summary. The final project evaluation shall also contain monitoring well sampling data, contaminant plume maps and potentiometric surface maps.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);
Amended Eff.

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15A NCAC 02C .0226 SALINITY BARRIER WELLS

These wells inject uncontaminated water into an aquifer to prevent the intrusion of salt water into the fresh water. The requirements for Salinity Barrier Wells shall be the same as in Rule .0219 of this Section except that the Director may add or delete requirements based on the following considerations:

(1) protection of human health and the environment based on site specific criteria;

(2) existing or projected environmental impacts; or

(3) compliance with the provisions of the Rules of this Section.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);

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15A NCAC 02C .0227 STORMWATER DRAINAGE WELL

These wells receive the flow of water that results from precipitation that occurs immediately following rainfall or a snowmelt event.

(1) The following are permitted by rule pursuant to Rule .0217 of this Section:

(A) systems designed in accordance with stormwater controls required by federal laws and regulations, state statutes and rules, or local controls adopted consistent with these federal or state requirements and

(B) roof-top runoff infiltration systems.

(2) Nothing in this Rule shall be construed as to allow untreated stormwater to be emplaced directly into any aquifer or to otherwise result in the violation of any groundwater quality standard as specified in Subchapter 02L.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);
Amended Eff.

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15A NCAC 02C .0228 SUBSIDENCE CONTROL WELLS

These wells are used to inject uncontaminated fluids into a non-oil or gas-producing zone to reduce or eliminate subsidence associated with overdraft of fresh water and not used for the purpose of oil or natural gas production. The requirements for Subsidence Control Wells shall be the same as described in Rule .0219 of this Section except that the Director may add or delete requirements based on the following considerations:

(1) protection of human health and the environment based on site specific criteria;

(2) existing or projected environmental impacts; or

(3) compliance with the provisions of the Rules of this Section.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);
Amended Eff.

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15A NCAC 02C .0229 TRACER WELLS

These wells are used to inject substances for purpose of determining hydrogeologic properties of aquifers. The requirements for Tracer Wells shall be the same as described in Paragraphs (3) through (9) of Rule .0225 of this Section.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);
Amended Eff.

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15A NCAC 02C .0230 OTHER WELLS

Rule requirements for Other Wells shall be evaluated and treated as one of the Class 5 injection well types in this Section that the Director determines most closely resembles the equivalent hydrogeologic complexity and potential to adversely affect groundwater quality.

(1) The Director may add or delete requirements based on the following considerations:

(A) protection of human health and the environment based on site specific criteria;

(B) existing or projected environmental impacts; or

(C) compliance with the provisions of the Rules of this Section.

(2) The Director may permit by rule the emplacement or discharge of a fluid or solid into the subsurface for any activity that meets the technical definition of an "injection well" that the Director determines not to have the potential to adversely affect groundwater quality and does not fall under other rules in this Section.

History Note: Authority G.S. 87-87; 87-88; 87-90; 87-94; 87-95; 89E-13; 89E-18; 143-211; 143-214.2(b); 143-215.1A; 143-215.3(a)(1); 143-215.3(c); 150B-19(4); 40 CFR Part 144.52(a)(7); 40 CFR Part 145.11(a)(20);

Amended Eff.

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15A NCAC 02C .0231 RESERVED FOR FUTURE USE

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15A NCAC 02C .0232 RESERVED FOR FUTURE USE

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15A NCAC 02C .0233 ABANDONMENT AND CHANGE-OF-STATUS OF WELLS

(a) In the event any injection well is abandoned, either temporarily or permanently, the well owner shall notify the Director 15 days prior to abandonment and the well(s) shall be abandoned in accordance with one of the following procedures or other alternatives approved by the Director based on a demonstration of not adversely affecting human health or the environment:

(1) Procedures for temporarily abandoning wells other than closed-loop geothermal wells shall be the same as described in Subparagraph (a)(1) and (a)(2) of Rule .0113 of this Subchapter.

(2) For temporarily abandoning a closed-loop geothermal well, the well shall be maintained whereby it is not a source or channel of contamination during the period of abandonment.

(3) Procedures for permanently abandoning wells other than closed-loop geothermal wells shall be the same as described in Paragraph (b) of Rule .0113 of this Subchapter.

(4) Procedures for permanently abandoning closed-loop geothermal wells shall be as follows:

(A) all casing, tubing or piping, and associated materials shall be removed prior to initiation of abandonment procedures if such removal will not cause or contribute to contamination of groundwater;

(B) the boring shall be filled from bottom to top with grout through a hose or pipe which extends to the bottom of the well and is raised as the well is filled;

(C) for tubing with an inner diameter of one-half inch or greater, the entire vertical length of the inner tubing shall be grouted;

(D) for tubing with an inner diameter less than one-half inch, the tubing shall be refilled with potable water and capped or sealed at a depth not less than two feet below land surface in the event that grouting of the inner tubing cannot feasibly be grouted; and

(E) any protective or surface casing not grouted in accordance with the requirements set forth in this Section shall be removed and grouted in accordance with the requirements set forth in this Section.

(5) In those cases when, as a result of the injection operations, a subsurface cavity has been created, the well shall be abandoned in such a manner that will prevent the movement of fluids into or between aquifers and in accordance with the terms and conditions of the permit.

(b) Any well which acts as a source or channel of contamination shall be brought into compliance with the standards and criteria of these Rules, repaired, or permanently abandoned. Repair or permanent abandonment shall be completed within 15 days of the discovery of the violation.

(c) Exploratory or test wells, constructed for the purposes of obtaining information regarding an injection well site, shall be permanently abandoned in accordance with Rule .0113 of this Subchapter within two days after drilling or two days after testing is complete, whichever is less restrictive. An exception would be when a test well is being converted to a permanent injection well, in which case conversion shall be completed within 30 days.

(d) An injection well shall be permanently abandoned by the drilling contractor before removing his equipment from the site if the well casing has not been installed or has been removed from the well bore.

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(e) The well owner is responsible for permanent abandonment of a well except when the well contractor is responsible due to improper location, construction, repair, or completion of the well.

History Note: Authority G.S. 87-87; 87-88; 143-211; 143-215.1A; 143-215.3(a)(1); 143-215.3(c);
Eff. August 1, 1982;
Amended Eff. February 1, 1997; October 1, 1996.

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15A NCAC 02C .0234 VARIANCE

(a) The Director may grant a variance from any construction or operation standards under the rules of this Section. Any variance shall be in writing, and shall be granted upon written application to the Director, by the person responsible for the construction of the well for which the variance is sought, if the Director finds facts to support the following conclusions:

(1) that the use of the well will not endanger human health and welfare or the groundwater; and

(2) that construction or operation in accordance with the standards was not technically feasible or the proposed construction provides equal or better protection of groundwater.

(b) The Director may require the variance applicant to submit such information as the Director deems necessary to make a decision to grant or deny the variance. The Director may impose such conditions on a variance or the use of a well for which a variance is granted as the Director deems necessary to protect human health and welfare and the groundwater resources. The findings of fact supporting any variance under this Rule shall be in writing and made part of the variance.

(c) The Director shall respond in writing to a request for a variance within 30 days from the receipt of the variance request.

(d) For variances requested as a part of a permit application, the Director may include approval as a permit condition.

(e) A variance applicant who is dissatisfied with the decision of the Director may commence a contested case by filing a petition under G.S. 150B-23 within 60 days after receipt of the decision.

History Note: Authority G.S. 87-87(4); 87-88; 143-215.1A; 143-215.3(a)(4); 150B-23;
Eff. September 1, 1996.
Amended Eff.

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15A NCAC 02C .0235 DELEGATION

(a) The Secretary is delegated the authority to grant permission for well construction under G.S. 87-87.

(b) The Secretary is delegated the authority to give notices and sign orders for violations under G.S. 87-91.

(c) The Secretary may grant a variance from any construction standard, or the approval of alternate construction methods or materials, as specified under the Rules of this Section.

History Note: Authority G.S. 87-87(4); 143-215.1A; 143-215.3(a)(1); 143-215.3(a)(4);
Eff. September 1, 1996.
Amended Eff.

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