## SECTION .1600 – GROUNDWATER REMEDIATION SYSTEMS

### 15A NCAC 02T .1601 SCOPE

~~The rules in this Section shall apply to all persons proposing to construct, modify, expand, or operate a groundwater treatment system that extracts and treats contaminated groundwater and reintroduces the treated groundwater. These systems shall include closed-loop groundwater remediation systems as defined in G.S. 143-215.1A. This Section shall not apply to in-situ groundwater remediation wells, as defined by 15A NCAC 02C .0225(a), unless such a system includes the withdrawal, treatment, and reintroduction of the treated groundwater.~~

*History Note:* *Authority G.S. 143-214.2(b); 143-215.1; 143-215.1A;*
*Eff. September 1, 2006;*
*Readopted Eff. September 1, ~~2018.~~ 2018;*
*Repealed Eff. <date>.*

### 15A NCAC 02T .1602 DEFINITIONS

~~The terms used for the purpose of this Section shall be defined as follows:~~

~~(1) "Closed-loop groundwater remediation system" is defined in G.S. 143-215.1A.~~

~~(2) "Contaminant" is defined in 15A NCAC 02L .0102.~~

~~(3) "Infiltration gallery" means a subsurface ground absorption system expressly designed for the introduction of wastewater into the subsurface environment.~~

~~(4) "Injection well" is defined in 15A NCAC 02C .0204.~~

~~(5) "Oversight agency" means the state or local agency with jurisdiction over the contamination incident.~~

~~(6) "Receptor" is defined in 15A NCAC 02L .0102.~~

~~(7) "Water table" is defined in 15A NCAC 02L .0102.~~

*History Note:* *Authority G.S. 143-214.2(b); 143-215.1; 143-215.1A;*
*Eff. September 1, 2006;*
*Readopted Eff. September 1, ~~2018.~~ 2018;*
*Repealed Eff. <date>.*

### 15A NCAC 02T .1603 RESERVED FOR FUTURE CODIFICATION

### 15A NCAC 02T .1604 APPLICATION SUBMITTAL

~~(a) Site Description and Incident Information shall be provided by the applicant to the Division including the following:~~

(1) The applicant shall identify the site by name, address, permit number, and incident number assigned by the oversight agency, if applicable.

(2) The applicant shall briefly describe the site, noting pertinent site information including:

(A) contaminants of concern;

(B) sources and dates of the contaminant release;

(C) remedial actions to date;

(D) current land use; and

(E) potential receptors.

(b) Soils Evaluation. For systems with proposed discharge within seven feet of land surface and above the seasonal high water table, a soil evaluation of the disposal site shall be provided to the Division by the applicant. If required by G.S. 89F, a soil scientist shall submit this evaluation. This evaluation shall be presented in a report that includes the following components:

(1) Field description of soil profile. Based on examinations of excavation pits or auger borings, the following parameters shall be described by individual diagnostic horizons to a depth of seven feet below land surface or to bedrock:

(A) thickness of the horizon;

(B) texture;

(C) color and other diagnostic features;

(D) structure;

(E) internal drainage;

(F) depth, thickness, and type of restrictive horizons;

(G) pH;

(H) cation exchange capacity; and

(I) presence or absence and depth of evidence of any seasonal high water table.

Applicants shall dig pits if necessary to evaluate of the soils at the site.

(2) Recommendations concerning annual and instantaneous loading rates of liquids, solids, other wastewater constituents, and amendments. Annual hydraulic loading rates shall be based on in-situ measurement of saturated hydraulic conductivity in the most restrictive horizon.

[Note: The North Carolina Board for Licensing of Soil Scientists has determined, via letter dated December 1, 2005, that preparation of soils reports pursuant to this Paragraph constitutes practicing soil science under G.S. 89F.]

(c) Hydrogeologic Evaluation. A hydrogeologic evaluation prepared by a Licensed Geologist, License Soil Scientist, or Professional Engineer if required by Chapters 89E, 89F, or 89C respectively of the disposal site shall be provided to the Division by the applicant. This evaluation shall be conducted to a depth that includes the depth of existing contamination and the total depth of the injection wells or infiltration galleries. This evaluation shall be based on borings for which the numbers, locations, and depths are sufficient to define the components of the hydrogeologic evaluation. In addition to borings, other techniques may be used to investigate the subsurface conditions at the site.

~~These techniques may include geophysical well logs, surface geophysical surveys, and tracer studies. This evaluation shall be presented in a report that includes the following components:~~

~~[Note: The North Carolina Board for Licensing of Geologists, via letter dated April 6, 2006, North Carolina Board for Licensing of Soil Scientists, via letter dated December 1, 2005, and North Carolina Board of Examiners for Engineers and Surveyors, via letter dated December 1, 2005, have determined that preparation of hydrogeologic description documents pursuant to this Paragraph constitutes practicing geology under G.S. 89E, soil science under G.S. 89F, or engineering under G.S. 89C.]~~

~~(1) a description of the regional and local geology and hydrogeology;~~

~~(2) a description, based on field observations of the site, of the site topographic setting, streams, springs and other groundwater discharge features, drainage features, existing and abandoned wells, rock outcrops, and other features that may affect the movement of the contaminant plume and treated wastewater;~~

~~(3) changes in lithology underlying the site;~~

~~(4) depth to bedrock and occurrence of any rock outcrops;~~

~~(5) the hydraulic conductivity, transmissivity, and storativity including specific yield if an aquifer is unconfined of the affected aquifers;~~

~~(6) depth to the seasonal high water table;~~

~~(7) a discussion of the relationship between the affected aquifers of the site to local and regional geologic and hydrogeologic features; and~~

~~(8) a discussion of the groundwater flow regime of the site focusing on the relationship of the plume and remediation system to groundwater receptors, groundwater discharge features, and groundwater flow media.~~

~~(d) Demonstration of Hydraulic Control. Computer modeling or predictive calculations based on site specific conditions shall be provided to the Division by the applicant to demonstrate that operation of the system will not cause or contribute to:~~

~~(1) the migration of contaminants into previously uncontaminated areas, and~~

~~(2) a violation of the groundwater standards at the compliance boundary.~~

~~(e) Maps and Cross Sections. If required by G.S. 89C, a professional land surveyor shall provide location information on boundaries and physical features not under the purview of other licensed professions. Site plans or maps shall be provided to the Division by the applicant depicting the location, orientation and relationship of facility components including:~~

~~[Note: The North Carolina Board of Examiners for Engineers and Surveyors has determined, via letter dated December 1, 2005, that locating boundaries and physical features, not under the purview of other licensed professions, on maps pursuant to this Paragraph constitutes practicing surveying under G.S. 89C.]~~

~~(1) a scaled map of the site, with site specific topographic contour intervals and showing all facility related structures and fences within the treatment, storage, and disposal areas;~~

~~(2) locations of all test auger borings or inspection pits;~~

(3) the location of all wells, including usage and construction details if available; designated wellhead protection areas; ephemeral, intermittent, and perennial streams; springs; lakes; ponds; other surface drainage features; and other site activities or features that may involve possible exposure to contamination within 500 feet of all waste treatment, storage, and disposal sites;

(4) setbacks as required by Rule .1606 of this Section;

(5) delineation of the property boundaries, review boundaries, and compliance boundaries;

(6) the horizontal and vertical extent of the contaminant plume for each of the contaminants of concern, including isoconcentration lines and plume cross-sections;

(7) cross-sections depicting soil and rock layers and features to a depth including the depth of existing contamination and the total depth of the injection wells or infiltration galleries; and

(8) hydrologic features such as potentiometric surface / water table contours and the direction of groundwater flow.

(f) Engineering design documents. If required by G.S. 89C, a professional engineer shall prepare these documents. The following documents shall be provided to the Division by the applicant:

[Note: The North Carolina Board of Examiners for Engineers and Surveyors has determined, via letter dated December 1, 2005, that preparation of engineering design documents pursuant to this Paragraph constitutes practicing engineering under G.S. 89C.]

(1) engineering plans for the entire system, including treatment, storage, application, and disposal facilities and equipment except those previously permitted unless they are directly tied into the new units or are critical to the understanding of the complete process;

(2) specifications describing materials to be used, methods of construction, and means for ensuring quality and integrity of the finished product; and

(3) plans that include construction details of recovery, injection, and monitoring wells and infiltration galleries.

(g) Operating and Monitoring Plans. An operation and monitoring plan shall be provided to the Division by the applicant. These documents shall be specific to the site and include:

(1) The operating plan shall include:

(A) the operating schedule including any periodic shut-down times;

(B) required maintenance activities for all structural and mechanical elements;

(C) all consumable and waste materials with their intended source and disposal locations;

(D) restrictions on access to the site and equipment; and

(E) compliance with Rule .1605(b) of this Section.

(2) The monitoring plan shall include:

(A) the monitoring wells that will be sampled,

(B) the constituents for which those samples will be analyzed, and

(C) the schedule for sampling.

*History Note:* *Authority G.S. 143-214.2(b); 143-215.1; 143-215.1A;*
*Eff. September 1, 2006;*
*Readopted Eff. September 1, ~~2018.~~ 2018;*
*Repealed Eff. <date>.*

**15A NCAC 02T .1605 DESIGN CRITERIA**

~~(a) The infiltration galleries or injection wells shall be designed such that the infiltration galleries or injection wells will not cause or contribute to any of the following:~~

~~(1) the migration of contaminants into previously uncontaminated areas;~~

~~(2) a violation of the groundwater standards at the compliance boundary if discharge is within the compliance boundary of the disposal facility; or~~

~~(3) a violation of the groundwater standards at the point of the discharge if discharge is not within the compliance boundary of the disposal facility.~~

~~(b) There shall be provisions in the operating plan to ensure the quality of the treated effluent and hydraulic control of the system at all times when any portion of the system ceases to function, such as standby power capability, complete system off status, or duplicity of system components.~~

~~(c) The infiltration galleries and injection wells shall be designed to include elevation protection of two feet above the 100 year flood elevation.~~

~~(d) Flow equalization of 25 percent of the facility's permitted hydraulic capacity shall be provided for facilities with fluctuations in influent flow that may adversely affect the performance of the system.~~

*History Note:* *Authority G.S. 143-214.2(b); 143-215.1; 143-215.1A;*
*Eff. September 1, 2006;*
*Readopted Eff. September 1, ~~2018.~~ 2018;*
*Repealed Eff. <date>.*

**15A NCAC 02T .1606 SETBACKS**

~~The location of the infiltration galleries or injection wells shall meet the setback requirements specified below unless it can be demonstrated that these requirements cannot be met and that operation of the infiltration galleries or injection wells at the proposed locations will not result in the migration of contaminants into previously uncontaminated areas and a contravention of groundwater standards beyond the compliance boundary. The following setbacks, in feet, shall be applicable to these systems:~~

| | |
|---|---|
| ~~wells with the exception of an approved groundwater monitoring well~~ | ~~100~~ |
| ~~surface waters such as intermittent and perennial, perennial waterbodies, and wetlands~~ | ~~100~~ |
| ~~property under separate ownership~~ | ~~50~~ |
| ~~structures above ground, such as buildings, or retention walls~~ | ~~10~~ |

| | |
|---|---|
| ~~structures – subsurface, such as utilities, basements, or swimming pools~~ | ~~15~~ |
| ~~water lines~~ | ~~10~~ |
| ~~rock outcrops~~ | ~~50~~ |
| ~~top of slope of embankments or cuts of two feet or more in vertical height~~ | ~~15~~ |
| ~~groundwater lowering ditches where the bottom of the ditch intersects the SHWT~~ | ~~100~~ |
| ~~surface water diversions such as ephemeral streams, waterways, and ditches~~ | ~~25~~ |
| ~~subsurface groundwater lowering drainage systems~~ | ~~100~~ |

*History Note:* *Authority G.S. 143-214.2(b); 143-215.1; 143-215.1A;*
*Eff. September 1, 2006;*
*Readopted Eff. September 1, ~~2018.~~ 2018;*
*Repealed Eff. <date>.*

**15A NCAC 02T .1607 MONITORING AND REPORTING REQUIREMENTS**

~~(a) A system monitoring plan shall be established to assess the impact of the discharge on groundwater quality. The monitoring plan shall:~~

~~(1) be based on reaction rates, discharge rates, likelihood of secondary impacts, and site specific hydrogeologic information;~~

~~(2) track the performance of the permitted remediation system and verify that the intended remediation processes are occurring; and~~

~~(3) include water level and flow meter measurements to ensure the system is operating properly.~~

~~(b) All sampling results shall be reported by the permittee to the Division on a frequency determined by the reaction rates, discharge rates, likelihood of secondary impacts, and site specific hydrogeologic information.~~

~~(c) A report of the summarized results of related groundwater, influent, and effluent monitoring shall be submitted by the permittee to the Division annually.~~

*History Note:* *Authority G.S. 143-214.2(b); 143-215.1; 143-215.1A;*
*Eff. September 1, 2006;*
*Readopted Eff. September 1, ~~2018.~~ 2018;*
*Repealed Eff. <date>.*

**15A NCAC 02T .1608 REQUIREMENTS FOR CLOSURE**

~~(a) 30 days prior to initiation of closure of a groundwater remediation system, the permittee shall submit the following documentation to the Division:~~

~~(1) the reasons for closure;~~

~~(2) a letter from the oversight agency authorizing closure of the system; and~~

~~(3) a description of the proposed closure procedure.~~

~~(b) The following closure procedures shall be followed:~~

~~(1) injection well closure procedures as specified in 15A NCAC 02C .0214; and~~

~~(2) infiltration galleries shall be closed such that the infiltration gallery will be rendered permanently unusable for the disposal or infiltration of fluids and will not serve as a source or channel of contamination.~~

~~(c) Within 30 days following upon completion of the closure of a groundwater remediation system, the permittee shall submit the following documentation to the Division:~~

~~(1) a description of the completed closure procedure;~~

~~(2) the dates of all actions taken relative to the procedure; and~~

~~(3) a written certification that the closure has been accomplished and that the information submitted is complete, factual, and accurate.~~

*History Note:* *Authority G.S. 143-214.2(b); 143-215.1; 143-215.1A;*
*Eff. September 1, 2006;*
*Readopted Eff. September 1, ~~2018.~~ 2018;*
*Repealed Eff. <date>.*