

1                                   **SECTION .1600 – GROUNDWATER REMEDIATION SYSTEMS**

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3   **15A NCAC 02T .1601   SCOPE**

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

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 13                           *Repealed Eff.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

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15   **15A NCAC 02T .1602   DEFINITIONS**

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

- 17           (1) ~~—"Closed loop groundwater remediation system" is defined in G.S. 143-215.1A.~~
- 18           (2) ~~—"Contaminant" is defined in 15A NCAC 02L .0102.~~
- 19           (3) ~~—"Infiltration gallery" means a subsurface ground absorption system expressly designed for the~~  
 20           ~~introduction of wastewater into the subsurface environment.~~
- 21           (4) ~~—"Injection well" is defined in 15A NCAC 02C .0204.~~
- 22           (5) ~~—"Oversight agency" means the state or local agency with jurisdiction over the contamination~~  
 23           ~~incident.~~
- 24           (6) ~~—"Receptor" is defined in 15A NCAC 02L .0102.~~
- 25           (7) ~~—"Water table" is defined in 15A NCAC 02L .0102.~~

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 30                           *Repealed Eff.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

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32   **15A NCAC 02T .1603   RESERVED FOR FUTURE CODIFICATION**

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34   **15A NCAC 02T .1604   APPLICATION SUBMITTAL**

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

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

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

4           ~~(A) contaminants of concern;~~

5           ~~(B) sources and dates of the contaminant release;~~

6           ~~(C) remedial actions to date;~~

7           ~~(D) current land use; and~~

8           ~~(E) potential receptors.~~

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

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

16           ~~(A) thickness of the horizon;~~

17           ~~(B) texture;~~

18           ~~(C) color and other diagnostic features;~~

19           ~~(D) structure;~~

20           ~~(E) internal drainage;~~

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

22           ~~(G) pH;~~

23           ~~(H) cation exchange capacity; and~~

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

32 ~~[Note: The North Carolina Board of Examiners for Engineers and Surveyors has determined, via letter dated December~~  
 33 ~~1, 2005, that locating boundaries and physical features, not under the purview of other licensed professions, on maps~~  
 34 ~~pursuant to this Paragraph constitutes practicing surveying under G.S. 89C.]~~

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

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

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

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

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

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

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

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

13 ~~(f) Engineering design documents. If required by G.S. 89C, a professional engineer shall prepare these documents.~~

14 ~~The following documents shall be provided to the Division by the applicant:~~

15 ~~[Note: The North Carolina Board of Examiners for Engineers and Surveyors has determined, via letter dated December~~  
 16 ~~1, 2005, that preparation of engineering design documents pursuant to this Paragraph constitutes practicing~~  
 17 ~~engineering under G.S. 89C.]~~

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

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

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

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

27 ~~(1) — The operating plan shall include:~~

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

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

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

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

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

33 ~~(2) — The monitoring plan shall include:~~

34 ~~(A) — the monitoring wells that will be sampled,~~

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

36 ~~(C) — the schedule for sampling.~~

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

## 6 **15A NCAC 02T .1605 DESIGN CRITERIA**

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

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

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

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

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

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

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

21  
 22 *History Note:* Authority G.S. 143-214.2(b); 143-215.1; 143-215.1A;  
 23 Eff. September 1, 2006;  
 24 *Readopted Eff. September 1, 2018, 2018;*  
 25 *Repealed Eff. <date>.*

## 27 **15A NCAC 02T .1606 SETBACKS**

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

33  
 34 ~~wells with the exception of an approved groundwater monitoring well \_\_\_\_\_ 100~~

35 ~~surface waters such as intermittent and perennial, perennial waterbodies, and wetlands \_\_\_\_\_ 100~~

36 ~~property under separate ownership \_\_\_\_\_ 50~~

37 ~~structures above ground, such as buildings, or retention walls \_\_\_\_\_ 10~~

|   |   |                |
|---|---|----------------|
| 1 | <del>structures—subsurface, such as utilities, basements, or swimming pools</del>         | <del>15</del>  |
| 2 | <del>water lines</del>  | <del>10</del>  |
| 3 | <del>rock outcrops</del>  | <del>50</del>  |
| 4 | <del>top of slope of embankments or cuts of two feet or more in vertical height</del>     | <del>15</del>  |
| 5 | <del>groundwater lowering ditches where the bottom of the ditch intersects the SHWT</del> | <del>100</del> |
| 6 | <del>surface water diversions such as ephemeral streams, waterways, and ditches</del>     | <del>25</del>  |
| 7 | <del>subsurface groundwater lowering drainage systems</del>                               | <del>100</del> |

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

#### 14 15A NCAC 02T .1607 MONITORING AND REPORTING REQUIREMENTS

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

- 17 ~~(1) be based on reaction rates, discharge rates, likelihood of secondary impacts, and site specific~~  
 18 ~~hydrogeologic information;~~  
 19 ~~(2) track the performance of the permitted remediation system and verify that the intended remediation~~  
 20 ~~processes are occurring; and~~  
 21 ~~(3) include water level and flow meter measurements to ensure the system is operating properly.~~

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

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

26

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

#### 32 15A NCAC 02T .1608 REQUIREMENTS FOR CLOSURE

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

- 35 ~~(1) the reasons for closure;~~  
 36 ~~(2) a letter from the oversight agency authorizing closure of the system; and~~  
 37 ~~(3) a description of the proposed closure procedure.~~

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

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

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

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

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

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

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

12  
13 *History Note:* Authority G.S. 143-214.2(b); 143-215.1; 143-215.1A;

14 *Eff. September 1, 2006;*

15 *Readopted Eff. September 1, ~~2018, 2018;~~*

16 *Repealed Eff. <date>.*

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