



G-DWR-UIC-01-120817

Regulation of karst features used for stormwater management under the UIC Class V injection well program

DISCLAIMER: This document is guidance only and does not create legal rights or obligations. Agency decisions in any particular case will be made applying applicable laws and regulations to the specific facts.

1. PURPOSE OF GUIDANCE

This guidance is to clarify when a karst feature used for stormwater management is to be regulated as a Class V injection well under the UIC program.

The Division of Water Resources (DWR) implements an underground injection control (UIC) program under the authority of the Tennessee Water Quality Control Act (TWQCA), rules promulgated pursuant to the TWQCA, and delegated authority under the federal Safe Drinking Water Act (SDWA) and the rules promulgated thereunder. The objective of this program is to protect Tennessee's groundwater resources by regulating the injection of fluids into the subsurface. Per Rule Chapter 0400-45-06, the construction of an injection well, the conversion of a well into an injection well, and the use or operation of an injection well is prohibited unless authorized by an injection well permit or by rule of the Commissioner.

Pursuant to Rule 0400-45-06-.06, Class V injection wells include, but are not limited to:

- Drainage wells used to drain surface fluid, primarily storm runoff, into a subsurface formation;
- Infiltration cells;
- Modification of a recharge point or the area where the recharge originates; and
- Improved sinkholes.

2. SCOPE OF GUIDANCE

The scope of the Class V Injection Well program includes the intentional use of karst features, particularly sinkholes or sinking streams, for stormwater management. These features and their intentional use for stormwater management are collectively identified within the definition of "improved sinkhole" and/or "modified recharge point." Sinkholes provide a natural point of entry for stormwater from the surface to reach the subsurface environment, often directly to the water table aquifer. Therefore, the quality of groundwater in karst areas is very susceptible to impact by surface activities.



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3. GUIDANCE

3.1 Background and Regulatory Authority-

The purpose of the UIC program is to protect Tennessee's groundwater resources. The UIC program is authorized under the TWQCA, Tennessee Code Annotated (Tenn. Code Ann.) § 69-3-101 et seq. Under duties of and authority of the board, Tenn. Code Ann. § 69-3-105(a)(2) provides, "The general assembly recognizes that, due to various factors, no single standard of quality and purity is applicable to all waters of the state or to different segments of the same waters. It also recognizes the suitability of certain geologic formations for the placement of fluids and other substances through underground injection; provided that adequate protection can be afforded the geologic formations."

In addition, Tenn. Code Ann. § 69-3-108(b)(8) provides, "It is unlawful for any person...to carry out any of the following activities except in accordance with the conditions of a valid permit: ...(8) The discharge of sewage, industrial wastes, or other wastes into a well or a location where it is likely that the discharged substance will move into a well, or the underground placement of fluids and other substances that do or may affect the waters of the state." Similarly, Rule 0400-4-06-.03(1) requires a permit or authorization to construct, use, or operate an injection well.

3.2 Definitions

- a. "Discharge" means the addition of pollutants to waters of the state from a source.
- b. "Improved Sinkhole" means a naturally occurring karst depression modified by man in such a manner that the chemical, physical, biological, radiological, or bacteriological properties of the water or fluids moving into the subsurface through it have been or will be altered.
- c. "Modified recharge point" means a naturally occurring karst feature that has been modified by man with a structure or in any other manner that the chemical, physical, biological, radiological or bacteriological properties of the water or fluids moving into the subsurface through it or the groundwater has been or will be altered.



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- d. "Other wastes" means any and all other substances or forms of energy, with the exception of sewage and industrial wastes, including, but not limited to, decayed wood, sand, garbage, silt, municipal refuse, sawdust, shavings, bark, lime, ashes, offal, oil, hazardous materials, tar, sludge, or other petroleum byproducts, radioactive material, chemicals, heated substances, dredged spoil, solid waste, incinerator residue, sewage sludge, munitions, biological materials, wrecked and discarded equipment, rock, and cellar dirt.
- e. "Plugging" means the act or process of stopping the flow of water, oil, or gas into or out of a formation through a bore hole or well penetrating that formation
- f. "Pollutant" means sewage, industrial wastes, or other wastes.
- g. "Pollution" means such alteration of the physical, chemical, biological, bacteriological, or radiological properties of the waters of this state, including, but not limited to, changes in temperature, taste, color, turbidity, or odor of the waters that will:
 - (A) Result or will likely result in harm, potential harm or detriment to the public health, safety, or welfare;
 - (B) Result or will likely result in harm, potential harm or detriment to the health of animals, birds, fish, or aquatic life;
 - (C) Render or will likely render the waters substantially less useful for domestic, municipal, industrial, agricultural, recreational, or other reasonable uses; or
 - (D) Leave or likely leave the waters in such condition as to violate any standards of water quality established by the board.
- h. "Sinkhole" means a naturally occurring closed depression in a karst area characterized by inward drainage (inlets) accepting runoff from the surrounding area and having no visible surface outlet.
- i. "Subsurface fluid distribution system" (SFDS) means an assemblage of perforated pipes, drain tiles, or mechanisms intended to distribute fluids below the surface of the ground.



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- j. "Well" means a bored, drilled, driven or dug shaft or hole whose depth is greater than the largest surface dimension or an improved sinkhole; or a subsurface fluid distribution system.

3.3 Who needs a UIC authorization if they have a sinkhole on their property?

Not all sinkholes are Class V Injection Wells, only those that are a naturally occurring karst depression or other natural crevice which have been modified by man for the purpose of directing and emplacing fluids into the subsurface.¹ This section addresses common scenarios and explains which types of activities are subject to regulation.

a. You do not need to get a Class V authorization for stormwater management if:

- A. The sinkhole is up-gradient of any grading or development on your property and no stormwater from your site will be directed to the sinkhole.
- B. All stormwater is directed away from the sinkhole (e.g., toward surface drainage).
- C. You are plugging or filling a sinkhole that is not otherwise regulated as a Class V injection well.

b. The sinkhole is regulated as a Class V well if it is located on a property that has been, or is being, developed in a manner that will cause water flowing to the sinkhole to be altered or if the sinkhole receiving the fluids is on an offsite property. This includes altering the properties of water flowing into the subsurface. This also includes directing stormwater to the subsurface by pipe or other conveyance towards the sinkhole, as well as any structures or devices that are used to facilitate flow into the sinkhole or grading the property in a manner that directs flow to the sinkhole.

c. Discussion:

¹ All sinkholes should be listed on the plat as prescribed in Tenn. Code Ann. § 66-5-212.



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There are numerous sinkholes that receive stormwater across the state, and most of these are not subject to regulation as Class V injection wells. The typical trigger for regulation is development in an area from which stormwater flow is directed into the subsurface, or that specifically incorporates a sinkhole as part of a stormwater collection system. The following table provides a sequence of questions and answers to aid in the determination of whether a sinkhole is also a Class V Injection Well:

Are Stormwater Management Practices Associated With A Property Subject a Sinkhole to Class V Injection Well Requirements?		
Questions:	If the Answer is Yes...	If the Answer is No...
1. Are you developing or redeveloping a piece of property with a sinkhole on the property or that discharges to a sinkhole offsite	Go to Question 2	Class V Injection Well Requirements Do Not Apply
2. Are you modifying the existing drainage patterns or constructing or operating a stormwater collection system?	Go to Question 3.	Class V Injection Well Requirements Do Not Apply
3. Will or does any part of the drainage modifications or the stormwater collection system discharge to the subsurface?	Go to Question 4.	Class V Injection Well Requirements Do Not Apply
4. Will or does the drainage modifications or stormwater collection system discharge to the subsurface through "Green Infrastructure Techniques"?	Class V Injection Well Requirements May Not Apply. See Part 3.4.	Go to Question 5.



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5. Will or does the stormwater collection system include an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground into trenches that are deeper than their widest surface dimension?	The stormwater collection system is subject to Class V Injection Well requirements as a Subsurface Fluid Distribution System.	Go to Question 6.
6. Will or does the stormwater collection system discharge to a bored, drilled, driven or dug shaft?	The stormwater collection system is subject to Class V Injection Well requirements as a Drainage Well or Dry Well.	Go to Question 7.
7. Will or does the stormwater collection system discharge to the subsurface through a sinkhole or is a sinkhole incorporated into the stormwater collection system?	The stormwater collection system is subject to Class V Injection Well requirements as an Improved Sinkhole.	Not Applicable

In addition, the TWQCA makes it unlawful for any person to discharge any substance into the waters of the State or to place or cause any substance to be placed in any location where such substances, either by themselves or in combination with others, cause pollution. Therefore, pollution of groundwater - whether through an injection well or not - is unlawful and is subject to enforcement and corrective action.



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3.4 Stormwater Infiltration

Stormwater infiltration practices generally do not require a Class V authorization.

Stormwater Management Practice	Is Class V authorization required?
<p>Commercially-Manufactured Stormwater Infiltration Devices</p> <p>Includes a variety of pre-cast or pre-built proprietary subsurface detention vaults, chambers or other devices designed to capture and infiltrate stormwater runoff.</p>	<p>Probably Not. The division encourages the use of infiltration practices. However if your subsurface detention vaults, chambers or other devices are designed to capture and infiltrate fluids into the subsurface and discharge to the subsurface then your site is subject to Class V authorization. If your system discharges only to the surface then there is no requirement for a Class V authorization.</p>
<p>Downspout Disconnection</p> <p>A practice where downspouts are redirected from sewer inlets to permeable surfaces where runoff can infiltrate.</p>	<p>No.</p>
<p>Drywells, Seepage Pits, Improved Sinkholes</p> <p>Includes any bored, drilled, driven, or dug shaft or naturally occurring hole where fluids are directed.</p>	<p>Yes. If stormwater management includes a manmade injection well or improved sinkhole, it would be subject to Class V authorization.</p>



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<p>Infiltration Trenches</p> <p>An infiltration trench is a rock-filled trench designed to receive and infiltrate stormwater runoff. Runoff may or may not pass through one or more pretreatment measures, such as a swale, prior to entering the trench. Within the trench, runoff is stored in the void space between the stones and gradually infiltrates into the soil matrix. There are a number of different design variations.</p>	<p>Probably Not. Most infiltration trenches do not require Class V authorization. However, if an infiltration trench is “deeper than its widest surface dimension,” or includes an assemblage of perforated pipes, drain tiles, or other similar mechanisms, it would be considered a Class V injection well.</p>
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4) EFFECTIVE DATE:

December 8, 2017

5) SIGNATURES:



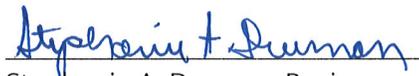
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Revision Number	Date	Brief Summary of Change
0	6-9-17	Draft guidance



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1	12-08-17	Initial issuance of the guidance
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