



REGION 3

PHILADELPHIA, PA 19103

STATEMENT OF BASIS

U.S. EPA UNDERGROUND INJECTION CONTROL (UIC)
DRAFT CLASS II-D PERMIT PAS2D025BELK

FOR

SENECA RESOURCES COMPANY, LLC
2000 WESTINGHOUSE DRIVE, SUITE 400
HIGHLAND TOWNSHIP, PENNSYLVANIA 16066

FOR

A project consisting of one Class II-D injection well used for the disposal of fluids produced solely in association with oil and gas production located at:

Seneca Well #38268
SRC Kane Field
Highland Township
Elk County, Pennsylvania

On October 20, 2023, Seneca Resources Company (“Seneca” or “the Permittee”) submitted a UIC permit renewal application to the U.S. Environmental Protection Agency (“EPA” or the “Agency”), Region 3, for the renewed issuance of a permit that would allow for the operation of a Class II-D disposal injection well, Seneca Well #38268, API # 37-047-23835, (hereinafter, “Injection Well”, “Seneca Well #38268”, or the “Facility”), located in the SRC Kane Field, in Highland Township, Elk County, Pennsylvania. The coordinates for the Injection Well are: Latitude 41° 37' 08.1”, Longitude -78° 49' 17.5”. The permit application was deemed complete on December 14, 2023. The Permittee’s October 20, 2023 submittal is hereinafter referred to in this Statement of Basis as the “Permit Application”.

Pursuant to the federal Safe Drinking Water Act, 42 U.S.C. §§ 300f *et. seq.*, and its implementing regulations, 40 C.F.R. Parts 144 -146, and 40 C.F.R. §§ 147.1950 - 1955, the EPA has developed a federal UIC Program and, through the issuance of permits, is responsible for regulating the construction, operation, monitoring and closure of injection wells that place fluids underground for disposal or enhanced recovery in oil and gas production. The draft permit specifies conditions for Injection Well construction, operation, monitoring, reporting, and plugging and abandonment which are designed to protect and prevent the movement of fluids into Underground Sources of Drinking Water (“USDW”). The Permittee’s UIC project and the draft permit conditions specific to the project are described below:

Area of Review: Pursuant to the applicable regulations, 40 C.F.R. §§ 144.3 and 146.6(b), the “Area of Review” is an area surrounding the Injection Well for which the applicant must first research, and then develop, a program for corrective action to address any wells that penetrate the injection zone and which may provide conduits for fluid migration during the injection operation at the Facility. Seneca proposed a fixed radius Area of Review of one-quarter mile, which EPA has determined to be acceptable. In determining the fixed radius, EPA has considered the following information provided by the Permittee: current information available for all wells obtained from Seneca Resources Company, LLC internal records, maps produced by ARM Group LLC, and a list of property owners within ¼ mile of the wellbore. Seneca has provided documentation identifying and describing the fluid to be injected, the groundwater use in the area, and on the well population within the one-quarter mile Area of Review. The injection formation is an oil and gas bearing zone and therefore compatible with the injectate given that the fluids to be injected are byproducts of oil and gas production. The Permittee has reported the presence of one (1) plugged oil and gas well and one (1) existing oil and gas well within the Area of Review. The Permittee reports that the one existing oil and gas well is being used as a monitoring well for Seneca Well #38268. There is one (1) surface water body (unnamed tributary to Wolf Run) located 630’ south of Seneca Well #38268. If any unplugged/abandoned wells that penetrate the injection zone are found within the Area of Review at a later date, the draft permit requires the Permittee to perform corrective action.

Underground Sources of Drinking Water (USDW): An USDW is defined by the UIC regulations as an aquifer or its portion which, among other things, contains a sufficient quantity of ground water to supply a public water system and which also contains fewer than 10,000 mg/L (milligrams per liter) Total Dissolved Solids, and which is also not an exempted aquifer. The Permittee notes that the deepest groundwater drinking source in the site area, as indicated by the Pennsylvania Geologic Survey Ground Water Inventory System (PAGWIS), is approximately 320 feet below ground surface. Based on this information and site geologic conditions, EPA identified 450 feet below ground surface as a conservative estimate of the base of the lowermost USDW for the injection well area. Therefore, the current UIC permit for the well required requires the Permittee to install surface casing to a depth of approximately 553 feet and to cement that entire length of casing back to the surface. Paragraph III.A.2. of the draft Permit continues to include this requirement. The Permittee must, among other requirements, also install long string casing from the ground surface to an approximate depth of 2,354 feet and cement that long string casing back to at least 100 feet above the injection zone. Both the surface casing and the long string casing are required to protect groundwater.

Injection and Confining Zones: The draft permit limits the injection of fluids for disposal to the Upper Devonian Elk 3 Sandstone formation in the subsurface interval between approximately 2,354 feet and 2,403 feet.

The lowermost USDW is separated from the upper limit of the injection zone by approximately 1,954 feet. Seneca has indicated that the Upper Devonian siltstones, shales, and sandstones between 635 feet and 2,354 feet below ground surface would effectively serve as an upper confining zone. In

addition, there are gas producing formations situated between some of the confining formations within that range from which Seneca is extracting gas. The fact that gas is found between these formations is evidence that the formations are indeed confining. Because of these ongoing gas operations, it would be immediately apparent if any of the injection fluid were to migrate upward and penetrate into any of these zones. These sequences provide structural competence and impermeable barriers that will limit the potential migration of fluids outside of the injection formation. There are no mapped faults or structural fronts in the ¼-mile and 1-mile radius Area of Review. The nearest fault to the Injection Well is located approximately thirteen (13) miles to the southeast of the site.

Injection Fluid: The draft permit limits injection to produced fluids produced solely in association with oil and gas production from Seneca Resources oil and gas production activities into the injection well. The draft permit also establishes a maximum monthly injection volume of 75,000 barrels per month of these disposal fluids into the Injection Well. One barrel of fluid is equal to 42 gallons.

The Permit Application includes analyses of the injection fluid that corresponds to the requirements stated in Paragraph II.C.3. in the draft permit. The parameters chosen for sampling reflect not only some of the typical constituents found in the injection fluid, but also in shallow ground water. Should a groundwater contamination event occur during the operation of the Injection Well, EPA will be able to compare samples collected from groundwater with the injection fluid analysis to help determine whether operation of the Injection Well may be the cause of the contamination.

Maximum Injection Pressure: The current permitted surface maximum allowable injection pressure ("MAIP") is 1,416 psi (pounds per square inch) with a bottom-hole pressure of 2,599 psi. The maximum surface injection pressure and bottom-hole pressure were developed using the injection pressure limitation calculation; a formula that considers the depth to the Upper Devonian Elk 3 Sandstone Formation injection zone, the highest specific gravity of injection fluid Seneca's operations expects to encounter (1.16) and a fracture gradient based on the results of injection testing of the permitted injection zone.

Potential for Seismicity: The SDWA UIC regulations for Class II injection wells do not require consideration of the seismicity of the region, unlike the SDWA UIC regulations for Class I injection wells for the injection of hazardous wastes. See regulations for Class I hazardous injection wells at 40 C.F.R. §§ 146.62(b)(1) and 146.68(f). Nonetheless, because of public concerns about injection-induced seismicity, EPA evaluated factors relevant to seismic activity as discussed below and addressed more fully in [*Region 3 framework for evaluating seismic potential associated with UIC Class II permits.*](#)

The final permit will provide that the Permittee shall only inject produced fluids through the Injection Well and into a formation which is overlain by a confining zone free of known open faults or fractures within the Area of Review, as required pursuant to 40 C.F.R. § 146.22. No known faults exist in close proximity to the Injection Well that would allow movement of fluids.

EPA's review of published information of seismicity in Pennsylvania reveals no evidence of faults that reach the land surface from basement rock. More information on seismicity can be found on a [website](#) about earthquakes from the Pennsylvania Department of Conservation & Natural Resources geology program.

Available geological information shows that Pennsylvania is approximately 2,000 miles to the east of the nearest plate boundary (the Mid-Atlantic Ridge). As such, page 18 of the "Earthquake Hazard in Pennsylvania" document (cited and linked within the accompanying Administrative Record Index) explains, "A probabilistic analysis that takes into consideration the threat from earthquakes both outside and inside Pennsylvania's borders indicates a relatively low level of earthquake hazard in our commonwealth."

The United States Geologic Survey ("USGS") has not recorded any major seismic activity that originated in Elk County, Pennsylvania from 1900 through the present day (USGS: "[Information by Region - Pennsylvania](#)"). The earthquakes recorded within the vicinity of Elk County, Pennsylvania since 1900 are all considered light, minor, or unfelt. The highest magnitude earthquake in all of Pennsylvania and the surrounding region occurred in 1998 as a 5.2-magnitude earthquake in the region of Pymatuning Lake in the northwestern part of the state. A 5.2-magnitude earthquake is considered moderate.

The draft permit includes the surface MAIP to prevent the initiation or propagation of fractures that could create conduits for the injected fluid to flow to any existing faults. The MAIP is set at a level less than both the Instantaneous Shut-In Pressure, which is the wellhead pressure immediately after pumps are shut down following a fracture treatment or test, and the fracture pressure in order to prevent the initiation of new, or the propagation of existing, fractures as a result of injection activities. The formula used to calculate the surface MAIP can be found in Paragraph III.B.4. of the draft permit.

Finally, a number of factors help to prevent injection wells from failing in a seismic event and contributing to the contamination of a USDW. Most Class I or Class II injection wells, including this Injection Well, are constructed to withstand significant amounts of pressure. Seneca Well #38268 is constructed with multiple steel rings of casing that are cemented in place. Furthermore, the draft permit requires Seneca to mechanically test the Injection Well to ensure integrity before operations begin and to continuously monitor the Injection Well during operations in order to identify any potential mechanical integrity concerns. The Injection Well is also designed to automatically cease operation in the event that the mechanical integrity of the well is compromised, including by a seismic event.

Testing, Monitoring and Reporting Requirements: The Permittee conducted a mechanical integrity test ("MIT") after construction of the Injection Well. The MIT consists of a pressure test and a fluid movement test. The purpose of the pressure test is to ensure that the casing, tubing and packer in the Injection Well do not leak. The purpose of the fluid movement test, which includes casing cement record and cement bond log or temperature log reviews, is to ensure that fluid movement does not occur outside of the injection zone. In addition to the testing described above, additional pressure

testing of the casing, tubing and packer will occur every five (5) years and whenever a rework on the Injection Well requires the tubing and packer to be released and reset. The most recent MIT occurred August 30, 2022.

The Permittee is responsible for continuously monitoring the Injection Well for surface injection pressure, annular pressure, flow rate and cumulative volume from the date on which the Injection Well commences operation and until such date that the Injection Well is plugged and abandoned. The Permittee must submit an Annual Report to the EPA summarizing the results of the monitoring and testing activities required by the permit, including monthly monitoring records of the injection fluid, the results of any mechanical integrity testing and information identifying any major changes in the characteristics of the injected fluid. The Annual Report must be submitted to EPA by January 31 of each calendar year.

Plugging and Abandonment: The Permittee has submitted a Plugging and Abandonment Plan that will result in an environmentally protective Injection Well closure at the time of cessation of operations. The Permittee shall continuously maintain financial responsibility and resources to close, plug, and abandon the Injection Well in accordance with 40 C.F.R. § 144.52(a)(7) in the amount of at least \$100,750. If the circumstances regarding the acceptability of the Financial Statement, submitted to EPA to demonstrate financial responsibility should change, the Permittee shall provide advance notification to the Director, and the Director may seek an alternative financial demonstration from the Permittee. The financial statement demonstration must be submitted to the EPA Director on an annual basis for evaluation and approval.

Expiration Date: This permit and its authorization to inject shall remain in effect for the operational life of the Facility, which includes the proper plugging and abandonment of the Injection Well when operations cease. EPA will conduct an annual review of the Permittee's Injection Well operation. The final permit will contain the same conditions as in this draft permit unless EPA receives information supporting and warranting alternative final permit conditions or actions on this Permit Application.

Additional Information: The Administrative Record for the draft permit is available for public inspection. All information submitted by the Permittee in support of the draft permit, unless deemed confidential, is included in the Administrative Record for the draft permit and is available to the public for review. Copies of the Permit Application, the draft permit, the Statement of Basis, and the Administrative Record index are available for review and inspection on EPA's [website](#). Please direct any questions, comments, and requests for additional information to the contact listed below. **The Administrative Record for this action will remain open for public comment until June 26, 2024.**

Tentative Public Hearing: EPA has tentatively scheduled a virtual public hearing on June 24, 2024. An in-person hearing will not take place. The call-in and log-in information for the virtual meeting is listed below:

Call-in Number: (484) 352-3221

6:00 PM – 8:00 PM Eastern Standard Time

Conference ID: 286 419 290#

MS Teams Link: <https://msteams.link/856R>

There is no need to register in advance for the virtual hearing. Attendees may utilize MS Teams by calling via telephone or entering the URL into a web browser. Participants who want to submit written or printed materials can do so using the information listed below.

EPA will hold the virtual public hearing only if EPA receives requests from the public to do so. Requests to hold this public hearing must be received by EPA via email or telephone by June 17, 2024. When requesting a public hearing, please state the nature of the issues you propose to raise. EPA expressly reserves the right to cancel this hearing unless a significant degree of public interest is evidenced by June 17, 2024.

General Notice: If you would like to be added to a general mailing list for notice of any UIC permitting actions in EPA Region 3 jurisdictions (Pennsylvania, Virginia, and Washington D.C.), please notify EPA by sending an email to R3_UIC_Mailbox@epa.gov. Please specify if you are interested in permitting actions in all three jurisdictions or only in particular jurisdiction(s). If you don't have access to email, you may also send a request to be included on the list at the physical address listed below.

Submit comments or requests for a hearing or for additional information to:

Ryan Hancharick
Water Division (Mail Code: 3WD22)
U.S. Environmental Protection Agency Region 3
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