



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

STATEMENT OF BASIS

U.S. EPA UNDERGROUND INJECTION CONTROL (UIC)
DRAFT CLASS II-D PERMIT PAS2D050BPOT

FOR

ROULETTE OIL & GAS COMPANY, LLC
1140 ROUTE 44 SOUTH
SHINGLEHOUSE, PENNSYLVANIA 16748

FOR

A project consisting of one Class II-D injection well used for the disposal of produced fluids (brine) associated with oil and gas production located at:

Clara Field #20 Injection Well
Clara Field, Potato Oswago Creeks watershed
Potter County, Pennsylvania

On September 18, 2020, Roulette Oil & Gas Company, LLC (“Roulette” or “the Permittee”) submitted a UIC permit application to the U.S. Environmental Protection Agency (“EPA” or the “Agency”), Region 3, for the issuance of a permit that would allow for the construction and operation of a Class II-D brine disposal injection well, Clara Field #20, API # 37-105-21374, (hereinafter, “Injection Well,” Clara Field #20 well, or the “Facility”), located in the Clara Field, within the Potato Oswago Creeks watershed of the larger Ohio River watershed, in Clara Township of Potter County, Pennsylvania. The coordinates for the Injection Well are: Latitude 41° 53' 40.51" Longitude -78° 08' 53.31". EPA Region 3 staff reviewed this permit application and deemed it complete on September 30, 2020. The Permittee’s September 18, 2020 submittal is 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. §§ 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. Today’s 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. Roulette 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: chemistry of injected and formation fluids; hydrogeology, population and ground-water use and dependence; and historical practices in the area. Roulette has provided documentation on the fluid to be injected, the ground-water use in the area, and on the well population within the one-quarter mile Area of Review. The injection formations are oil and gas bearing zones and therefore compatible with the injectate given that the water to be injected is a byproduct of oil and gas production. There are no drinking water wells within a half mile radius of the Injection Well. The Permittee indicated that there are two active production wells within the Area of Review, Clara Field #11 (API No. 37-105-21136) and Clara Field #19 (API No. 37-105-21359); however, these wells are proposed to become monitoring wells. There are no plugged wells, and no known unplugged/abandoned wells, within the Area of Review. 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 reported that the deepest USDW zone reported by the driller of the proposed Injection Well was at 340 feet with a freshwater flow of 0.5 inches. Therefore, the EPA has determined the lowermost USDW to be located at 340 feet below ground surface. The construction of the Injection Well requires installation of surface casing from the surface to a depth of at least 50 feet below the base of the lowermost USDW and cementing that entire length of casing back to the surface. Roulette has set the surface casing for the Injection Well at an approximate depth of 501 feet below ground surface (161 feet deeper than the freshwater zone) and cemented the casing back to the surface to protect ground-water.

Injection and Confining Zones: The draft permit limits injection of fluids for disposal to the following Upper Devonian Sandstone formations and subsurface perforated intervals:

- Cooper 5-0 Formation between approximately 1,490 feet to 1,502 feet below ground surface;
- Sheffield 3-1 Formation between approximately 1,594 feet to 1,617 feet below ground surface;
- and
- Kane 3-0 Formation between approximately 1,823 feet to 1,833 feet below ground surface.

The lowermost USDW is separated from the injection zone by approximately 1,150 feet. The confining zone for the three proposed injection zones consists of numerous unnamed shale beds from the Bradford and Venango Groups having a total thickness of 461 feet between the depths of 1,445 feet and the base of the surface casing, at 501 feet.

Injection Fluid: The draft permit limits injection to treated fluids produced from Roulette’s oil and gas production operations into the Injection Well. The draft permit also establishes a maximum monthly injection volume of 15,500 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 ground water 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 maximum allowable surface injection pressure for the permitted operation of the Injection Well will be 974 pounds/square inch (“psi”) with a bottom-hole pressure of 1,683 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 Sandstone injection zones, the highest specific gravity Roulette’s Pennsylvania Clara Field operations expects to encounter (1.10) and a fracture gradient developed by using the instantaneous shut-in pressure.

Potential for Seismicity: The SDWA regulations for Class II wells do not require consideration of the seismicity of the region, unlike the SDWA regulations for Class I 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*”.

[https://yosemite.epa.gov/oa/eab_web_docket.nsf/Attachments%20By%20ParentFilingId/0EA8C0D9BA82F48B85257CD9006624C2/\\$FILE/Tab%20I%20seismicity%20framework9-26-13.pdf](https://yosemite.epa.gov/oa/eab_web_docket.nsf/Attachments%20By%20ParentFilingId/0EA8C0D9BA82F48B85257CD9006624C2/$FILE/Tab%20I%20seismicity%20framework9-26-13.pdf)

The permit provides 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. The Permittee submitted geologic information indicating an absence of faults or fractures within a one-mile radius of the Injection Well. The Facility lies approximately 8,300 feet northwest of the subsurface trace of the Clermont syncline and approximately 17,300 feet southeast of the subsurface trace of the Smethport anticline. These folds and the areas adjacent to them are not associated with any known faults in the shallow Upper Devonian section, particularly those associated with the injection zones within this area.

The depth to the top of the crystalline basement from the surface elevation of the Clara Field #20 well is approximately 5,900 feet based on the PA-DCNR Open File Report (Gold *et al*, 2004. *Basement depth and related geospatial database for Pennsylvania*. PA Geological Survey, 4th sur., Open File Report, OFGG 05.01.0). This is approximately 3,600 feet below the total depth of the Clara Field #20 well. The nearest inferred fault to the Clara Field #20 well trends southwest to northeast and is located approximately 12,000 feet southeast of the Clara Field #20 well. This inferred fault is associated with much deeper Cambrian and Lower Ordovician Rocks (Wagner, 1976. *Growth faults in Cambrian and Lower Ordovician rocks of Western Pennsylvania*. AAPG Bulletin v60, 3 pp.414-427).

Based upon the map of Pennsylvania Earthquake Epicenters (Faill, 2004) and *Seismicity in Pennsylvania and the Pennsylvania State Seismic Network* (Nyblade & Honman, 2017), there has not been any measurable seismic activity recorded in Potter County.

The final permit will include an injection pressure limit to prevent the initiation or propagation of fractures that could create conduits for the injected fluid to flow to any existing faults. The surface

maximum allowable injection pressure (MAIP) for this permit was calculated by the instantaneous shut-in pressure (ISIP). The ISIP is the minimum pressure necessary to begin to reopen any fractures created during the fracture stimulation process and is significantly lower than the pressure required to fracture the rock. The surface MAIP is less than both the ISIP and the fracture pressure to prevent the initiation of new, or the propagation of existing, fractures. 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. The Clara Field #20 Injection Well is constructed with multiple steel rings of casing that are cemented in place. Furthermore, the draft permit requires Roulette 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 is required to conduct a mechanical integrity test (“MIT”) after construction of the Injection Well. The MIT consists of a pressure test and a fluid movement test. The pressure test will be conducted in order to ensure that the casing, tubing and packer in the Injection Well do not leak. The fluid movement test, which includes case cement record and cement bond log or temperature log reviews, will be conducted 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 Permittee will be 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 will secure a Certificate of Deposit along with a Standby Trust Agreement to ensure proper plugging of the Injection Well. The amount of the Certificate of Deposit shall cover the estimated cost to close, plug and abandon the Injection Well and shall be in the amount of at least Five Thousand Five Hundred Dollars (\$5,500). The amount of the Certificate of Deposit, which is based upon an independent, third-party professional’s estimate of the costs associated with the plugging and abandonment of the Injection Well, must also be sufficient to preclude the possibility of abandonment without proper plugging and closure. Authorization to construct and operate the Injection Well will not be given by EPA until financial assurance is in place.

Expiration Date: When issued, a final permit will be in effect for ten (10) years from the date of that final permit’s effective date. 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 at <https://www.epa.gov/pa/epa-public-notice-pennsylvania>. 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 February 1, 2021.**

Tentative Public Hearing: EPA has tentatively scheduled a virtual public hearing on February 2, 2021. An in-person hearing will not take place. The call-in information for the teleconference is listed below:

Call-in Number: (866) 609-3139 6:00 PM – 8:00 PM Eastern Standard Time

There is no need to register in advance for the virtual hearing. You may call 15 minutes in advance of the start time or any time during the session to listen to the hearing. During the hearing, callers will receive instructions on how to join the queue to make a comment. The operator will call on people to deliver their oral comments. The virtual hearing is an audio-only teleconference. Participants who want to supply written or printed materials, should do so, via email, addressed to the contact listed below.

Request for Public Hearing: Requests to hold this public hearing must be received by EPA, via email or telephone, on or before January 25, 2021. When requesting a public hearing, please state the nature of the issue(s) you propose to raise. EPA expressly reserves the right to not hold a hearing unless a significant degree of public interest is evidenced by January 25, 2021.

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

Kevin Rowsey
Source Water & UIC Section
Drinking Water & Source Water Protection Branch
U.S. Environmental Protection Agency
215-814-5463
Rowsey.kevin@epa.gov