Responsiveness Summary to Public Comments
for
The Issuance of an Underground Injection Control (UIC) Permit
for
Catalyst Energy, Inc.

On July 22, 2021, the U.S. Environmental Protection Agency (EPA) Region 3 issued a public notice requesting comment and the opportunity for a public hearing for the proposed issuance of an Underground Injection Control (UIC) permit, PASR015BMCK, to Catalyst Energy, Inc. EPA did not receive a request to hold a public hearing.

The responsiveness summary which follows provides answers to 19 written comments and questions that were raised and sent to the attention of EPA Region III. The comments were grouped by similarity and summarized to which the EPA then responded. EPA wishes to thank the commenters for their informative and thoughtful comments.

1. COMMENT: *The Applicant reported production to be higher in the Lot 580-1 well than what the PADEP has on record.*

RESPONSE: The EPA does not base its decision to issue a permit on how much oil and/or gas a well has produced. In this case, the proposed injection well, the Lot 580-1 well, was drilled as a production well in 1990 and extracted oil and gas until 2007. Catalyst Energy ("Catalyst") applied to convert the Lot 580-1 well from a production well to an injection well. The proposed injection zone, the Onondaga formation, is an oil and gas reservoir that has had significant cumulative production creating capacity for the disposal of produced fluids.

2. COMMENT: *The Applicant in its permit application did not identify fourteen drinking water wells in or near the Area of Review (AOR) that were previously identified in the original oil and gas permit for the well.*

RESPONSE: The Applicant reported that there are no drinking water wells within the ¼-mile AOR and that only two drinking water wells were found within ½-mile of the proposed injection well and are identified in Table 1-3 of the permit application. The total depth of each individual drinking water well within ½-mile of the proposed injection well is 172 feet and 265 feet below ground surface. The applicant has proposed the lowermost underground source of drinking water (USDW) to be at 350 feet below ground surface. 40 C.F.R. § 147.1955 requires surface casing in the injection well to be installed from the surface to a depth of at least 50 feet below the base of the lowermost USDW and cemented back to the surface. The surface casing for the Lot 580-1 injection well is installed at an approximate depth of 426 feet below ground surface, which is at least approximately 85 feet below the total depth of the deepest drinking water well within ½-mile of the proposed injection well and cemented back to the surface to protect groundwater.

The Permit limits the injection of fluids for disposal to the Middle Devonian Onondaga Formation at a depth of approximately 5,169 to 5,266 feet below ground surface. The lowermost USDW is separated from the injection zone by approximately 4,819 feet. The upper confining

zone consists of numerous shale formations which include the Marcellus Shale, and Middle and Upper Devonian Shales. Beneath the Onondaga, the primary confining unit is the Silurian Salina Formation. As a result of these construction requirements and the operation requirements stated in the response to Comment #9, EPA does not anticipate any groundwater contamination events.

EPA does not know whether the fourteen drinking water wells the commenter refers to are still in use as drinking water wells. However, even if the wells are being used as a source of drinking water, the EPA's decision to issue the permit does not change. This is because, as described above and elsewhere in this Responsiveness Summary, the Permit has construction and operation requirements for the Applicant to meet, and the injection zone is thousands of feet below the lowermost USDW with several confining units separating them to ensure the protection of the groundwater.

3. COMMENT: *There are concerns that there are additional oil and gas wells that were not part of the nineteen abandoned wells that the Applicant identified and that oil and gas wells within the vicinity of the injection well could create potential pathways for fluid migration.*

RESPONSE: The determination of possible influence of the surrounding wells on the proposed injection well is carried out during the assessment of the AOR. 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. Catalyst proposed a fixed radius AOR of one-quarter mile, which EPA has determined to be acceptable because it is in compliance with applicable regulations. In determining the fixed radius, EPA has considered the following information provided by the Permittee: chemistry of injected and formation fluids; hydrogeology, population and groundwater use and dependence; and historical practices in the area. Catalyst has provided documentation on the fluid to be injected, groundwater use in the area, and the well population within the one-quarter mile AOR. Abandoned wells were addressed as part of the ¼-mile AOR, in which EPA reviewed the construction of all wells therein. Nineteen shallow abandoned wells were found to exist in the AOR. These nineteen wells have been permanently plugged and do not penetrate the injection zone and should not impact or be impacted by the proposed injection operation. These wells range in depth from 2077 to 2104 feet below ground surface while the injection zone is approximately 5169 to 5266 feet below ground surface with approximately 350 feet of shale confining intervals overlying the injection zone. If any unplugged/abandoned wells that penetrate the injection zone are found within the AOR later, Paragraph III.A.5. of the Permit requires the Permittee to perform corrective action.

4. COMMENT: There are *concerns over the compliance history of Catalyst and that the Lot 580-1 well has not been active since 2007. There were also concerns that Catalyst will not be able to effectively manage a commercial disposal facility.*

RESPONSE: In response, EPA reiterates that it expects all operators to comply

with applicable regulatory requirements as well as their UIC permit requirements. An operator's failure to comply with a permit, including accurate monitoring and reporting to EPA, subjects that operator to possible civil or criminal penalties or both. EPA inspects every Class II disposal well in Pennsylvania at least annually. EPA's inspection of injection well facilities and review of annual reports helps ensure operator compliance and supplements the reporting by permittees. EPA adds that the Permittee's compliance *with other regulatory programs* is outside the scope of this UIC permitting action.

EPA must stress that its evaluation of the subject permit application is limited to ensuring that the Lot 580-1 well does not endanger USDWs pursuant to UIC Program requirements. Pursuant thereto, the proposed well identified in the permit application will be subject to all applicable UIC regulatory requirements and conditions for construction, testing, maintenance, and financial assurance to ensure that it maintains mechanical integrity throughout the life of the well and is properly closed. EPA further clarifies that the wells regulated under Pennsylvania's Oil and Gas Act are producing wells (*i.e.*, not injection wells), and therefore are *not under the UIC Program*. The UIC permit imposes specific conditions that are designed to ensure that USDWs are not endangered by injection activities. EPA will verify compliance with each UIC permit by reviewing reports required to be submitted and by conducting annual inspections.

The Permittee reported and a commenter also noted that the Lot 580-1 well has been shut-in since 2007, however, the amount of time that a production well has been out of operation is not a factor the EPA considers when making a permit decision. EPA evaluates how the well is constructed and whether it meets UIC construction standards to ensure the protection of USDWs. The Lot 580-1 well meets these standards.

EPA acknowledges commenters' concerns about various State agency activities, perceptions and concerns. However, these comments and the associated programs are outside of the scope of this UIC permitting decision. EPA also acknowledges commenters' general concerns about the oil and gas industry, including past violations and the industry's perceived unwillingness to address spills or contamination. However, as noted above, EPA's permitting decision for the Lot 580-1 well is focused on evaluation of the permit application and setting UIC permit conditions to ensure that injection operations do not endanger USDWs.

Finally, in accordance with Paragraph II.C.6. "the permittee shall maintain a record of every load received. The record shall include the hauler's name, the operator's name and the location from where the load was obtained, the volume of the load and whether the load was a split load. If the load was a split load, each operator's name and location shall be listed and the volume from each operator documented". Failure to adhere to these Permit conditions would result in a violation in which the Permittee could incur possible civil and/or criminal penalties.

5. COMMENT: *Several comments were made concerning the overall state of the surface where the Lot 580-1 well is located. It has been alleged that there is a lack of signage at the facility, tanks in disrepair, lack of labeling on the tanks and that fluid should not be stored on-site in the tanks.*

RESPONSE: EPA only has jurisdiction for the permitting of subsurface injection activities, through its UIC Program. Surface disturbances, fluid containment, spills, and proper signage and labeling are all regulated by PADEP, which is the state agency responsible for all surface construction and spill prevention at the proposed well site. Environmental complaints can be filed with PADEP at www.dep.pa.gov/About/Contact/Pages/default.aspx. In addition, the Commonwealth of Pennsylvania oil and gas laws and regulations found at 25 Pa. Code Chapter 78 and 78A "Environmental Protection Standards at Oil & Gas Well Sites", comprehensively address surface activities and industry practices at oil and gas well sites. These oversight activities include water supply protection, site specific Preparedness, Prevention and Contingency Plans for well site waste management, and secondary containment and corrosion control for storage tanks.

6. COMMENT: *One comment asked that the EPA inspect the proposed injection well site.*

RESPONSE: As previously stated in the response to Comment #5, the PADEP has jurisdiction over all surface activities at oil and gas well sites. While EPA does not possess the requisite authority to enforce the Commonwealth of Pennsylvania's oil and gas regulations (that authority rests solely with the PADEP), EPA does have direct implementation and enforcement authority for the UIC program in Pennsylvania. EPA's UIC Program obligations and authorities include injection well permitting, the performance of compliance evaluation inspections and the initiation of appropriate enforcement activities when warranted. EPA Region III has a team of UIC inspectors, including one full time inspector whose sole responsibility is to perform Class II underground injection well inspections. When a final permit is issued to Catalyst, at least one EPA inspector will be present to witness the mechanical integrity tests conducted on the Lot 580-1 injection well and EPA will, at a minimum, inspect the well, during operation, on an annual basis. EPA reviews each injection well operator's annual report and the continuous monitoring reports of pressure and injection fluid volumes that each operator must submit to the Agency. Instances of operator noncompliance may subject any operator to an appropriate and responsive EPA enforcement action and associated penalties.

7. COMMENT: *A comment claimed that the issuance of the UIC permit would violate the Pennsylvania Constitution's guarantee of access to clean water.*

RESPONSE: EPA disagrees with the allegation that permit issuance would violate the Pennsylvania Constitution's guarantee of access to "clean air, pure water, and to the preservation of the natural scenic, historic and esthetic values of the environment." UIC requirements and permit conditions are designed to ensure non-endangerment of USDWs and to ensure that wastewater disposal operations can proceed in a manner that protects drinking water for local residents.

8. COMMENT: *A comment was made that the EPA disregarded the possibility of induced seismicity.*

RESPONSE: The EPA rejects the assertion that the possibility of injection-induced seismicity was not considered when reviewing this permit application. As explained in

the Statement of Basis for the Permit, EPA must consider appropriate geological data on the injection and confining zones when permitting Class II wells. However, unlike the Safe Drinking Water Act (SDWA) regulations for Class I wells used for the injection of hazardous waste (at 40 C.F.R. §§ 146.62(b)(1) and 146.68(f), the SDWA regulations for Class II wells do not require specific consideration of seismicity. Nevertheless, EPA evaluated factors relevant to seismic activity, such as the existence of any known faults and/or fractures and any history of, or potential for, seismic events in the area of the injection well as discussed below and addressed more fully in "Region 3 framework for evaluating seismic potential associated with UIC Class II permits", updated September 2013.

Initially EPA notes that the Class II injection well that is the subject of the UIC permit is not in a seismically active area or in an area with geologic conditions that have been identified as conducive to injection-induced seismicity. EPA evaluated the following information to make this determination:

- The USGS Seismic hazards Map for Pennsylvania provided by the Applicant indicates the Lot 580-1 well is situated in the lowest seismic risk area in the Commonwealth.

- The Applicant provided information that the proposed injection well is situated between an anticline to the northwest and a syncline to the southeast. No faults exist within half a mile of the Lot 580-1 well and there are no outcrops of the confining and injection formations within a 1¼-mile of the Lot 580-1 well.

- The depth to the top of the crystalline basement from the surface elevation of the Lot 580-1 well is approximately 10,500 feet below sea level, according to the PA DCNR "Precambrian Basement Map of the Appalachian Basin and Piedmont Province in Pennsylvania". The base of the Onondaga Formation at the Lot 580-1 well is approximately 3,100 feet, or approximately 7,400 feet above the estimated top of Precambrian basement.

EPA also wishes to point out that the Permit itself contains each of the several following provisions that limit the potential for induced seismicity activity or the adverse effects of a seismic event:

- Paragraph II.B.4.b. of the Permit limits the injection pressure 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) of the Marcellus Shale which is the confining unit directly above the Onondaga Limestone. 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 formula used to calculate the surface MAIP can be found in Paragraph III.B.4. of the Permit. The surface MAIP is less then both the ISIP and the fracture pressure to prevent the initiation of new, or the propagation of existing, fractures.

- The Permittee is limited to injecting into the Onondaga Formation, as specified in Paragraph III.B.1. of the Permit. This formation is overlain by a confining zone that is free of known open faults or fractures within the AOR, as required pursuant to 40 C.F.R. § 146.22.

- The construction and testing that the Permittee must perform on the well, as described in Paragraph III.A. and Paragraph II.C.2. of the Permit, will help to prevent the well from failing in a seismic event and contributing to the contamination of a USDW. The Lot 580-1 well is constructed to withstand significant amounts of pressure, with multiple steel rings of casing that are cemented in place. Furthermore, the Permittee must mechanically test the injection well to ensure integrity before operations begin and continuously monitor the injection well during operations in order to identify any potential mechanical integrity failures. 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.

9. COMMENT: *There are concerns that the maximum injection volume limitation is too broad at 100,000 barrels per month and that the Permit should limit the volume to a per week interval to avoid a scenario in which too much fluid is injected in a short amount of time.*

RESPONSE: A significant volume of gas and brine has already been removed from the proposed injection reservoir, during previous oil and gas production operations, making the Onondaga formation receptive for the disposal of fluid. While there is a volume limitation of 100,000 barrels per month, the true limiting factor for how much fluid is injected into the formation is the surface MAIP. Requirements and provisions within the Permit have been developed to prevent over-pressurization of the injection formation by limiting the surface MAIP during the injection operations to 2,600 pounds per square inch (psi) and the bottom-hole injection pressure to 5,197 psi. The permitted surface MAIP pressure and bottom-hole pressure were conservatively calculated to ensure that injection pressure will not propagate existing fractures or create new fractures in the formation. By limiting both the surface MAIP and the bottom-hole injection pressure during injection operations, the proposed Permit effectively seeks to prevent over-pressurization of the injection formation and the potential propagation of fractures that could: (a) create potential channels for fluid movement into USDWs; and/or (b) create conduits for fluids to travel from the injection zone to known or unknown faults during operation of the proposed injection well.

10. COMMENT: *There are concerns over hazardous waste being injected into the injection well, including PFAS.*

RESPONSE: As stated in Part III.B.2. of the Permit, “The Permittee shall not inject any hazardous waste, as defined by 40 C.F.R. § 261, nor any other fluid, other than the fluids produced solely in association with oil and gas production, and additives necessary to maintain the integrity of the Injection Well.” Individual constituents within the fluid produced from an oil or gas production reservoir potentially may be toxic, hazardous, or radioactive.

However, Congress exempted oil and gas production fluids from hazardous waste regulation and such production wastes are not classified as hazardous under the Resource Conservation and Recovery Act (RCRA). As a result, EPA lacks the authority to regulate those fluids produced in association with oil and gas production activities as hazardous waste and the disposal of these fluids down a Class II brine disposal injection well is legally permissible. It should be noted that the EPA has not characterized PFAS as a hazardous waste and that PFAS would normally not be found in Class II fluids

The UIC Program's mandate is to protect USDWs from contamination caused by the subsurface emplacement of fluids, including oil and gas related fluids. The Program seeks to prevent oil and gas fluids from being uncontrollably discharged into a stream or a river or from overflowing and/or seeping into the groundwater from above-ground containment pits by providing a regulatory framework whereby the fluids can be safely managed. EPA faithfully seeks to fulfill the Program's mandate through UIC well requirements that include strict well construction criteria, monitoring and reporting requirements, and environmentally protective plugging and abandonment requirements. EPA also works to fulfill the Program's mandate by establishing testing criteria for well construction and well integrity. EPA also inspects injection well operations.

11. COMMENT: *One comment asked about what mechanical testing is required prior to being given authorization to inject.*

RESPONSE: In keeping with federal UIC regulatory requirements and Paragraph III.A.4. of the Permit, the injection well must have and demonstrate mechanical integrity prior to being placed into operation. The mechanical integrity test involves increasing the pressure in the casing, tubing, and annulus (the space between the injection tubing and long string casing) to a pressure above the surface MAIP authorized by the Permit. The pressure must be maintained over a period of 30 minutes to evaluate the mechanical integrity of the long string casing, tubing, and packer and to determine whether there are any leaks. Federal regulations found at 40 C.F.R. § 146.13(b)(3), and the Permit itself, require mechanical integrity testing to be performed at least once every two years during the life of the well. In addition, mechanical integrity testing is required after the well has undergone any repairs, modifications, or rework. EPA will also receive and thoroughly review Catalyst's Well Completion Report for this proposed injection well, which will include a review of all well construction information, an evaluation of the well logging, casing and cementing, and the results of all required mechanical integrity testing. EPA will thoroughly review the cement bond logs to further evaluate whether the well has been properly cemented, in accordance with 40 C.F.R §147.1955(b)(5) requirements, to prevent injected fluid from flowing through the wellbore outside the casing. Even after a successful mechanical integrity test is conducted, the Permit will require continuous monitoring of the injection well during its operation to verify its continuing mechanical integrity.

Federal Underground Injection Control Program
Permit Appeals Procedures

The provisions governing procedures for the appeal of an EPA UIC permit are specified at 40 C.F.R. Part 124.19 (Please note that changes to this regulation became effective on March 26, 2013. See 78 Federal Register 5281, Friday, January 25, 2013.) Any person who commented on the draft Permit can appeal the final Permit by filing a written petition for review with the Clerk of the EPA Environmental Appeals Board (EAB).

A petition for review must be filed within thirty (30) days of the date of the notice announcing EPA's permit decision. This means that the EAB must receive the petition within 30 days. EAB personnel are currently working remotely given current federal guidance concerning COVID-19. As such, they are unable to receive filings and correspondence sent by mail or hand delivery. As a result, all parties should utilize the EAB's electronic filing system accessible on its website" www.epa.gov/eab to filing the petition and sending other filings and correspondence to the EAB. Also, send a copy of the petition for review to EPA Region 3 at the email address listed below. See the Federal Register notice cited above or the EAB website for further information on how to file with the EAB electronically.

For the U.S. Environmental Protection Agency Region 3, Source Water & UIC Section (3WD22), send an email copy of the petition to the following email address: R3_UIC_Mailbox@epa.gov.

Note that pursuant to an order issued by the EAB on September 21, 2020, Revised Order Authorizing Electronic Service of Documents in Permit and Enforcement Appeals, the EAB authorized parties to all newly filed permit and enforcement appeals to utilize email to fulfill their service obligations under 40 C.F.R. §§ 22.5(b) and 124.19(i)3(ii). Thus, a party need not seek and obtain consent of another party in order to serve that party by email. Parties must promptly file notices informing the Board and the other parties of any changes in their email addresses.

The petition must clearly set forth the petitioner's contentions for why the EAB should review the Permit. The petition must identify the contested permit conditions or the specific challenge the permit decision. The petitioner must demonstrate the issues raised in the petition had been raised previously during the comment period. The petitioner must also state whether, in his or her opinion, the permit decision or the permit's conditions appealed are objectionable because of:

1. Factual or legal error, or
2. The incorporation of a policy consideration which the EAB should, at its discretion, review.

If a petition for review of this Permit is filed, the permit conditions appealed would be deemed not to be in effect pending a final agency action.

Within a reasonable time of receipt of the Appeals Petition, the EAB will either grant or deny the appeal. The EAB will decide the appeal on the basis of the written briefs and the total administrative record of the permit action. If the EAB denies the petition, EPA will notify the petitioner of the final permit decision. The petitioner may, thereafter, challenge the permit decision in Federal Court. If the EAB grants the appeal, it may direct the Region 3 office to implement its decision by permit issuance, modification or denial. The EAB may order all or part of the permit decision back to the EPA Region 3 office for reconsideration. In either case, if the Permit is appealed, a final agency decision occurs when after appeal the Permit is issued, modified or denied and an Agency decision is announced. After this time, all administrative appeals have been exhausted, and any further challenges to the permit decision must be made to Federal Court.