



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

Response to Comments
for
The Reissuance of an Underground Injection Control (UIC) Permit
for
Windfall Oil & Gas, Inc.

On August 14, 2020, the U.S. Environmental Protection Agency Region III (EPA or the Region) issued a public notice requesting comment and announcing the opportunity for a public hearing for the proposed reissuance of an Underground Injection Control (UIC) permit, PAS2D020BCLE, to Windfall Oil and Gas, Inc. (Windfall) for one Class II-D underground injection well (sometimes referred to as the “Zelman #1 well”). EPA received various requests for a hearing which it held virtually on September 17, 2020. In addition, EPA received several written comments. During the public comment period, the draft permit, the statement of basis for the draft permit, and permit materials were posted on EPA’s website for review.

This response to comments consolidates and provides responses to questions and issues raised by parties who submitted timely written public comments during the public comment period or who provided comments at the public hearing. In relevant part, 40 CFR §124.13 states:

“All persons, including applicants, who believe any condition of a draft permit is inappropriate or that the Director’s tentative decision to deny an application, terminate a permit, or prepare a draft permit is inappropriate, must raise all reasonably ascertainable issues and submit all reasonable available arguments supporting their position by the close of the public comment period (including any public hearing) under §124.10. Any supporting materials which are submitted shall be included in full and may not be incorporated by reference, unless they are already part of the administrative record in the same proceeding, or consist of State or Federal statutes and regulations, EPA documents of general applicability, or other generally available reference materials.”

EPA wishes to thank the public for their informative and thoughtful comments.

1) COMMENT: The proposed permit does not address certain concerns that are not regulated by EPA’s UIC program.

RESPONSE: Many individuals raised concerns about matters that the EPA UIC program does not have the jurisdiction to address in this proceeding. EPA’s regulatory authority in the UIC permitting process is limited by the federal statutes and regulations governing this program. Some of the concerns raised included not having an evacuation plan, emergency response capabilities, increased traffic and noise, zoning issues, and the proposed location of the injection well in a residential area. These



concerns are outside the federal UIC permitting process and are commonly addressed by state and local regulations. For example, the Commonwealth of Pennsylvania oil and gas statutes found at 25 Pa. Code Chapter 78 and 78A, “Environmental Protection Standards at Oil & Gas Well Sites,” address surface activities and industry practices at oil and gas well sites.

The concerns described above may be relevant to residents. However, unless the issues raised are related to the protection of underground sources of drinking water (USDW) or compliance with applicable federal statutes and regulations, EPA is not authorized under the Safe Drinking Water Act, 42 U.S.C. §300f et seq, to address these concerns through the UIC permitting process. Other local, county, state or federal laws or regulations may address traffic, road noise, zoning concerns, surface spill prevention and other non-UIC permitting issues raised by commenters.

The UIC permit contains several conditions that address compliance with other local, state or federal laws. Part 1.A. of the permit provides that “Issuance of this permit does not convey property rights or mineral rights or any sort of exclusive privilege; nor does it authorize any injury to persons or property, and invasion of other property rights or any infringement of state or local law or regulations.” In addition, Part I.D.12 of the permit states, “Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation.” The operator must also receive a permit from the Pennsylvania Department of Environmental Protection (PADEP) applying Commonwealth law requirements regarding the construction and operation of the injection well. Therefore, EPA’s UIC permit is only one of several authorizations that a permittee may be required to obtain before being allowed to commence construction and/or operation,

2) COMMENT: The injection well may pose a risk to drinking water well or other drinking water supplies. Injection fluids could migrate from the injection formation and contaminate drinking water supplies.

RESPONSE: To protect USDWs, the UIC regulations at 40 C.F.R. §147.1955(b)(1) require the installation of surface casing “extending from the surface to a depth at least 50 feet below the base of the lowermost USDW.” Windfall identified the lowermost USDW where the injection well will be located to be at a depth of approximately 800 feet below the surface. This well will be constructed with a ground water protective casing from the surface to approximately 170 feet, and cemented back to the surface, a second water protective string of casing from the surface to approximately 375 feet and cemented back to surface and a third ground water protective casing from the surface to approximately 1000 feet and cemented back to surface. This three-level casing complies with the requirements of 40 C.F.R. §147.1955(b)(1).

After the injection well is drilled, the long string casing is cemented, and tubing and packer installed, but before injection begins, the permittee is required by the permit to submit to EPA notice of completion of construction ([EPA Form 7520-18](#)), providing details about the drilling, completion and testing of the well. The completion report must include the injection well drilling records, logging information, cementing records and mechanical integrity testing information. EPA will review this information to verify that the geological information submitted in the permit application is accurate, and that the injection well is properly constructed and cemented to prevent leaks during operation and fluid movement out of the injection zone through the injection well bore.

EPA will review the cementing records and logs to verify proper cementing without channels between the casing and well bore that could provide a conduit for fluid movement. Also, the required mechanical integrity pressure test must show that there are no internal failures in the tubing, casing or packer installed within the well before injection begins. If new information obtained from the completion report warrants changes to the permit, EPA will modify the permit conditions as appropriate.

EPA recognizes that without certain precautions, abandoned wells near an injection well may pose a risk to USDWs by providing a conduit for the migration of fluid out an injection zone. Therefore, the UIC regulations and the permit impose certain requirements on an injection well operator to protect USDWs from that risk. Specifically, the operator is required to determine whether any abandoned wells exist within a specified area, calculated and defined as the area of review (AOR) around the proposed well, 40 CFR §144.55, which could pose a threat to USDWs. If abandoned wells are found which penetrate the injection zone within a one-quarter mile AOR, the permittee must perform corrective action.

As authorized by 40 CFR §146.6(b), Windfall proposed a “fixed radius” of one-quarter mile (1320 feet) for the AOR. No wells that penetrate the injection or confining zones were identified in the permit application within the fixed AOR. To evaluate the acceptability of the AOR, the EPA calculated a Zone of Endangering Influence (ZEI), pursuant to 40 CFR §146.6(a), which indicated that after ten years of operation, the ZEI would only extend 400 feet from the Zelman #1 well. PADEP determined after review of the ZEI calculation that the ¼ mile AOR is adequate.

At the location of this injection well, a confining zone of approximately 14-18 feet of limestone, and numerous other confining zones consisting of low-permeability shale and limestone formations are located above the injection zone and separate that formation from the lowermost USDW. It was the confinement of natural gas in the Huntersville Chert/Oriskany formation that enabled successful production of gas at this location. The natural gas and fluids in the formation were under pressure prior to and during production. The confining zone kept this natural gas in place. It required gas production wells to be drilled into the formation before natural gas could be recovered. The confining zone will similarly prevent fluid movement out of the injection formation.

Windfall identified several private water supplies within the vicinity, with the deepest water well providing an underground source of drinking water at a depth of 360 feet. The permittee has identified the lowermost USDW as the Mississippian aged Pocono Formation at a depth of approximately 800 feet below surface elevation. The injection zone, the Huntersville Chert/Oriskany Formation, is separated from the lowermost USDW by an interval of approximately 6500 feet. According to PADEP’s response to comment for the Zelman #1 well dated March 21, 2018, no public water supplies exist within the AOR, and the location of the disposal well is approximately 13,500 feet southwest of the closest portion of the City of Dubois Source Water Protection Plan Zone II boundary, and approximately 15,000 feet southwest of the closes City of Dubois public water supply well. In developing the permit conditions, the drinking water wells identified in Windfall’s application were considered and the permit conditions are deemed sufficient to protect all USDWs in the vicinity. Furthermore, no USDWs exist below 800 feet and no conduits were identified within the area of review that would allow upward fluid migration into USDWs.

Furthermore, the permit does not allow the injection pressure to exceed the injection formation’s fracture pressure and thereby prevents fracturing that could allow fluid to migrate out of the injection

zone. To confirm mechanical integrity and ensure that the injected fluid remains in the receiving formation, the permit requires continuous monitoring of pressure conditions within the injection well.

3) COMMENT: The proposed injection well is located close to several geologic faults and this could cause fluid migration and seismic activity.

RESPONSE: EPA must consider appropriate geological data on the injection and confining zones when permitting Class II wells. The SDWA regulations for Class II wells do not specifically require consideration of seismicity, unlike the SDWA regulations for Class I wells used for the injection of hazardous waste. See 40 CFR §§ 146.62(b)(1) and 146.68(f). 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. EPA Region 3 has outlined this evaluation process in "[Region 3 framework for evaluating seismic potential associated with UIC Class II permits](#)", updated September, 2013.

An EPA report examining injection-induced seismicity ("[Minimizing and Managing Potential Impacts of Injection-Induced Seismicity from Class II Disposal Wells: Practical Approaches](#)," EPA UIC National Technical Workgroup, February 5, 2015) provides a standard operating procedure for assessing regional and local seismicity when reviewing UIC Class II permit applications. This procedure correlates any area seismicity with past injection practices; evaluates geological information to assess the likelihood of activating any faults; evaluates storage capacity of the formation with consideration of porosity and permeability; includes operational parameters to limit injection rate and volume, and to limit operation at below fracture pressure; and requires monitoring of injection pressure and rates.

The applicant submitted geologic information indicating the presence of at least one fault within one-quarter mile of the injection well site. These faults appear to be localized, non-transmissive faults. There is no geologic evidence that indicates these faults are transmissive to the deep Precambrian crystalline basement rock to the surface. Most disposal wells in the United States do not pose a hazard for induced seismicity. However, faults in the Precambrian basement are believed by some experts to have generated seismic events in other states. The proposed Zelman #1 well's injection zone is separated from the Precambrian basement by approximately 9200 feet with multiple low-permeability geologic confining zones within this distance.

The United States Geologic Survey (USGS) tracks, records and maps faults and earthquake epicenters in certain areas throughout the United States. The Pennsylvania State Seismic Network (PASEIS) operates a network of 43 seismic stations across the state, one of which is located at the Pennsylvania State University, Dubois Campus. PADEP reviewed the data made available by USGS and PASEIS and determined that Clearfield County is located in a seismically stable area ([Frank & Susan Zelman #1 Comment-Response](#), March 21, 2018).

The Windfall permit has been developed to prevent the over-pressurization of the injection formation by limiting the surface injection pressure during the injection operations to 2593 psi and the bottom-hole injection pressure to 6575 psi. Research indicates that a very high rate of injection or over-pressurization of a geologic formation can contribute to the possibility of seismic activity. The permitted maximum surface injection pressure and bottom-hole pressure was calculated to ensure that, during operation, the injection pressure will not propagate existing fractures or create new fractures in the formation. Limiting pressure prevents the propagation of fractures that could (a) create potential

channels for fluid movement into USDWs, or (b) create conduits for fluids to travel from the injection zone to known or unknown faults.

The Windfall permit also requires a yearly pressure fall-off test. The test consists of fluid injected into the well at a constant rate for a period of time, followed by shut-in of the well and monitoring the pressure decline. The pressure change data is analyzed, which helps determine injection potential and damage to the formation. This data may also be used to derive permeability, reservoir boundary shape and distance, and reservoir pressures. Analyzing flow conditions can help determine whether a preferential flow pattern exists in determining whether that flow could be moving toward or contacting nearby faults.

Since the late 1950's/early 1960s, a significant volume of gas and brine has been produced from the proposed injection reservoir, making the Huntersville Chert/Oriskany formation receptive for the disposal of fluid. Records of gas production in this area are available from the oil and gas reporting [website](#) published by the PADEP Office of Oil and Gas Management. This information shows that gas production wells -- located within the fault structure where the injection well is proposed -- have produced significantly greater volumes of natural gas and produced water than gas production wells located outside of this fault structure. The removal of these fluids has not resulted in any seismic activity nor has the presence of the fault allowed fluid to move out of the formation and into USDWs. Also, the production of both natural gas and brine from the natural pore spaces that exist in this formation have lowered the formation's reservoir pressure and has created available storage, making this reservoir an appropriate candidate for the disposal of fluids.

Other gas production wells drilled outside the fault block in which the Windfall well is located were plugged back for lack of production from the Huntersville Chert/Oriskany formation. For example, gas production well #20325, was documented as a dry hole and was plugged and abandoned in 1960 shortly after completion. This gas production history helps to illustrate that the displacement of the Huntersville Chert/Oriskany formation created by the faults established confinement of the gas and formation fluids within the immediate fault block structure. Flow of gas or fluid flow along or across the faults is not evident. Because of the non-transmissive nature of the faults, fluid that is injected into the Huntersville/Chert Oriskany formation at the proposed injection well location should be confined within the fault block.

4) COMMENT: The permit reissuance is for ten years and the original permit was for five years.

RESPONSE: 40 CFR §144.36(a) states that UIC permits for Class II wells “shall be issued for a period up to the operating life of the facility,” It also states the Director shall review each issued Class II permit at least once every 5 years to determine whether it should be modified, revoked and reissued, terminated or a minor modification made. 40 CFR §144.36(c) provides that permits may be issued “for a duration that is less than the full allowable term.” All UIC other Class II disposal well permits in Pennsylvania are permitted for a period of ten years. EPA Region III took these factors into consideration in determining that it is appropriate to reissue the Windfall permit for a period of ten years.

5) COMMENT: The Redbird #4 Brine disposal well in Ohio presents analogous risks of fluid migration and endangerment of USDWs.

RESPONSE: An August 2020 report issued to the Ohio Attorney General and the Ohio Department of Natural Resources, prepared by Resource Services International, entitled [Brine Intrusion in Washington County Producing Wells](#) reached the following conclusions:

Wastewater injected into the Ohio Shale Formation from the Redbird #4 (brine disposal well) is the source of brine that has appeared in several production wells drilled into the adjacent Berea formation. The conclusion is based on data and water samples obtained from both the injection well and the production wells.

Naturally occurring fissures exist between the Ohio Shale formation and the Berea Sandstone formation, allowing wastewater to migrate between the formations and the production wells.

The brine is transported through existing natural fractures, which provide a linear flow path and low-pressure resistance to water injected during the Redbird #4 disposal operations

Since Redbird #4 is no longer injecting brine into the Ohio Shale formation, brine volumes in the impacted production wells are expected to decrease and natural gas production will return to expected rates.

It is unlikely that wastewater will migrate farther – including into underground sources of drinking water due to the composition of the rock layers and other factors.

In the case of the Redbird #4 well, the reported permeability of the Ohio Shale is extremely low. Since the formation is a non-permeable reservoir and fluid was injected into a fissure between the Ohio Shale and Berea Sandstone formations and no fluid flowed from the fracture into the Ohio Shale reservoir, the fluid traveled considerable distance and impacted conventional gas wells. As the report states, “The conclusion reached from this data and analysis is the source of the water is the Redbird #4 and moved from the well to the producing wells in a linear feature, likely an in-situ fracture, with a N79E trend.”

The Ohio Shale is not a formation used for disposal of produced fluid in Ohio because of the low natural permeability associated with a shale formation. In contrast, the Windfall permit only allows injection into the Huntersville Chert/Oriskany formation, a sedimentary rock formation of Lower Devonian age commonly used for disposal of produced fluids in Pennsylvania, which has a higher natural porosity and greater interconnection of the pore space (permeability) throughout the formation than the Ohio shale. Also, the Huntersville Chert/Oriskany formation has been a prolific gas producing horizon in this area since the late 1950s/early 1960s.

The potential faults identified within the one quarter mile area of review of the Windfall disposal well were determined to be non-transmissive, and do not extend to the surface and show displacement caused by the faults extending upward. The maximum injection pressure authorized by the permit was developed to prevent both the development of new fractures as well as the propagation of existing fractures in the injection zone. A review of historic production information from the area documents that a significant volume of gas and brine has already been removed from the proposed injection zone. EPA believes that after reviewing the conditions and conclusions reached in the Ohio Department of Natural Resources executive summary of the Washington County Produced Water Investigation, the same geologic conditions do not exist at the Windfall facility and adequate UIC permit requirements are in place to protect USDWs.

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. (Petitioners receiving notice of the final permit by mail have 3 additional days in accordance with 40 C.F.R. 124.20(d).) The petition for review can be filed by regular mail sent to the address listed below with a copy sent to EPA Region III at the address listed below.

Environmental Appeals Board
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue N.W.
Mail Code 1103M
Washington, DC 20460-0001

U.S. Environmental Protection Agency Region III
Ground Water & Enforcement Branch (3WP22)
Water Protection Division
1650 Arch Street
Philadelphia, PA 19103-2029

See the Federal Register notice cited above or the EAB [website](#) for how to file with the EAB electronically or by hand delivery.

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 to 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 III 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 III 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.