



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

March 4, 2013

Mr. James Ashbaugh
P.E. Vice President Engineering
Pennsylvania General Energy Company, L.L.C.
120Market Street
Warren, PA 16365

Re: UIC Permit Application Submission Notice of Deficiency

Dear Mr. Ashbaugh:

EPA Region III staff has completed their review of Pennsylvania General Energy Company's application to construct and operate one Underground Injection Control (UIC) Class II-D brine disposal injection well in Grant Township, Indiana County, Pennsylvania. Please find enclosed a Notice of Deficiency (NOD) for this permit application. The NOD requires the submission of additional information that will allow this office to complete its review of the application and begin the process of developing a draft permit for the facility. Your application has been assigned the following permit identification: PAS2D013BIND. Please use this permit identification in all future correspondence. If you should have any questions please give me a call at 215-814-5464 or you may email me at platt.steve@epa.gov.

Sincerely,

A handwritten signature in black ink that reads "S. Stephen Platt".

S. Stephen Platt
Ground Water & Enforcement Branch (3WP22)
Office of Drinking Water & Source Water Protection

Enclosures



Notice of Deficiency

For

Pennsylvania General Energy Company, LLC

Underground Injection Control (UIC) Permit Application PAS2D013BIND

Please provide additional information on the deficiencies outlined below so that EPA Region III can take additional steps to process the UIC permit application. When submitting your response to the notice of deficiency, please provide two copies. You may submit your response as an addendum to the already submitted application. We would also appreciate if you would send a copy of your response to EPA UIC inspector Dave Rectenwald.

Cover Page

The cover page indicates that the proposed injection well will be a commercial well. EPA defines a commercial well as a well that would receive fluid for injection from companies other than Pennsylvania General Energy (PGE). Is it PGE's expectation that it will utilize the injection well commercially or will the injection well be used just for the injection of PGE's own production fluid?

Attachment A: Area of Review

Although PGE has chosen a fixed radius of one-quarter mile for the area of review, EPA needs to confirm, through a zone of endangering influence calculation, that the one-quarter mile fixed radius is acceptable. Please submit the following information: current injection zone reservoir pressure, injection zone porosity and injection zone permeability.

Attachment B: Maps of Wells in Area of Review

EPA also requires a map that extends one mile beyond the injection well location. This map should show topographic highlights as well as depict any water sources, any wells (including private and public drinking water wells, oil and gas production wells, etc.), and any geologic faults, if present. The quarter mile area map that was submitted, that depicted bedrock, was supposed to include a fault line, however, nothing is shown. Is there a fault present nearby? It was noted that the tributary to East Run has a long straight line stream segment. Would this be indicative of the presence of a fracture trace or fault line?

It was noted in the application that the location of the proposed injection well is in an area that was heavily surfaced mined. Please provide maps which depict the surface mining in the area. This information can be included on the one mile map discussed above. Please include

information regarding the depths of these surface mines, especially the Yanity mine located approximately 300 feet northeast of the injection well location.

Attachment C: Corrective Action

Please provide information on the names and addresses of property owners that live within one-quarter mile of the Area of Review.

Attachment G: Geological Data

Although the application provided ISIP information from the Yanity well 1025 stimulation, EPA did not see the actual stimulation data used to derive the ISIP. Please submit the actual stimulation data information.

The Marcellus formation is located above the Huntersville Chert and could be considered a confining unit. Is there any current or proposed gas development for the Marcellus formation in the vicinity of the injection well site? If development is planned, please explain how the horizontal drilling and fracture stimulation within the Marcellus will not jeopardize the confinement structure above the Huntersville Chert.

Attachment H: Operating Data

The application requested a maximum injection volume of 2000 barrels/day based on a short term injectivity test. This equates to a monthly injection volume of approximately 60,000 barrels. Based on just the data from the short term injectivity test, EPA is not inclined to permit the injection well for this high a volume. Do you have further data to support this high an injection volume? Injection pressure will ultimately dictate injection volume and rate. EPA would like to see the injection well operate for a period of time to be able to justify a 60,000 barrel/month injection volume. How much produced fluid does PGE anticipate sending to this injection well?

EPA did not see an analysis of Total Organic Carbon (TOC) in the analysis of the injection fluid submitted with the application. Please submit an analysis of the TOC.

Attachment K: Injection Procedures

The application indicates that the injection well will be equipped with an automatic shut down device set at maximum tubing and casing pressures. What does maximum casing pressure mean? Since a maximum injection pressure will be set for the well, it would be better to define the casing shut down pressure as a percentage of the operating pressure or some positive pressure, so that if a leak does occur, it would trip the automatic shut down device and shut the well in.

Attachment L: Construction Procedures

A complete set of drillers logs for the Yanity 1025 need to be submitted. Only partial logs were submitted with the application. At minimum, the submission should include gamma ray, density, neutron and caliper logs. In addition, please submit a Cement Evaluation Log (CEL) or Cement Bond/Variable Density Log (CBL/VDL) that shows the bonding of the cement run on the 4 ½ inch long string casing. If a CEL or CBL/VDL is not available, then one will need to be run, prior to running tubing and packer into the well, and submitted as part of the injection well completion report.

When the 2 3/8 inch tubing and packer is run inside the long string casing, it will need to be set no more than 50 feet above the uppermost perforations.

Please describe how PGE will provide and maintain security for the facility to prevent illegal trespass. For example, will the facility have fencing, locked gates, cameras, etc.? What will be the facility's anticipated hours of operation and will the facility be manned during hours of operation?

Attachment P: Monitoring Program

The application did not mention that cumulative volume will be monitored. Cumulative volume needs to be monitored continuously throughout the injection well's operation.

Attachment Q: Plugging and Abandonment

The plugging and abandonment plan did not show a final surface plug placed in the well. EPA typically requires a surface plug to be placed in the well during plugging. If for some EPA's requirement does not meet the Pennsylvania Department of Environmental Protection's requirements, then please stipulate.

Attachment R: Necessary Resources

EPA also requires that a Schedule A form be submitted with the Standby Trust Agreement. A copy of the Schedule A form has been enclosed with this deficiency notice for your use.

Response to Notice of Deficiency from EPA Region III

Marjorie C. Yanity #1025 UIC Application

Cover Page

Question: The cover page indicates that the proposed injection well will be a commercial well. EPA defines a commercial well as a well that would receive fluid for injection from companies other than Pennsylvania General Energy (PGE). Is it PGE's expectation that it will utilize the injection well commercially or will the injection well be used just for the injection of PGE's own production fluid?

Response: PGE plans to only inject fluids produced from PGE operated wells. A revised cover is enclosed.

Attachment A: Area of Review

Question: Although PGE has chosen a fixed radius or one-quarter mile for the area of review, EPA needs to confirm, through a zone of endangering influence calculation, that the one-quarter mile fixed radius is acceptable. Please submit the following information: current injection zone reservoir pressure, injection zone porosity and injection zone permeability.

Response: From analysis of the pre-injection test pressure data a current injection zone reservoir pressure of 1,450 psi was determined. Analysis of geophysical well logs and the injection test rate and pressure data determined a porosity of 3% and permeability of 2.2 md. Published porosity values for the Huntersville formation range from 2.5 to 8%, "Atlas of Major Appalachian Gas Plays".

Attachment B: Maps of Wells in Area of Review

Question: EPA also requires a map that extends one mile beyond the injection well location. This map should show topographic highlights as well as depict any water sources, any wells (including private and public drinking water wells, oil and gas production wells, etc.), and any geologic faults, if present. The quarter mile area map that was submitted, that depicted bedrock, was supposed to include a fault line, however, nothing is shown. Is there a fault present nearby? It was noted that the tributary to East Run has a long straight line stream segment. Would this be indicative of the presence of a fracture trace or fault line?

Response:

- Revised maps depicting all of the information requested above except water wells are enclosed. A survey of water wells within a 1-mile radius of the Yanity 1025 well is ongoing and a revised water source map will be supplied upon completion of the survey.
- The Bedrock/Fault Map legend had a "Fault" symbol listed, but PGE identified no actual faults in the mapped area.

- Review of the available geophysical (seismic) control indicates no evidence of faults that reach the surface from depth in this area. Any linear surface features in this area are a result of years of small scale surface mining operations and extensive farming.
- In regards to the "long, straight line stream segment" the EPA specifically noted in its Notice of Deficiency letter of March 4, 2013, on April 2, 2013 Michael Yanity, the surface owner of the subject premises, informed PGE that this straight section of stream was created by a previous farmer who had wanted to better facilitate plowing his land (note that the "straight segment" stops at the property boundary). Prior to that work, the stream had the same general morphology as the sections northwest and southeast of it (20' to 30' meanders). After straightening the creek, the farmer had dumped rocks into it to help maintain the straight segment. For their part, the Yanitys have periodically kept it cleaned out. As a result of this exchange, PGE has concluded the straight segment was a man-made linear feature, not a natural one.

Question: It was noted in the application that the location of the proposed injection well is in an area that was heavily surface mined. Please provide maps which depict the surface mining the area. This information can be included on the one mile map discussed above. Please include information regarding the depths of these surface mines, especially the Yanity mine located approximately 300 feet northeast of the injection location.

Response: The Majorie C. Yanity well 1025 is located within an abandoned strip mine as evidenced by a high wall to the north and irregular topography to the southeast of the existing well location. The Pennsylvania Bureau of Abandoned Mine Reclamation was consulted to obtain details of the strip mining activities that have occurred on the Yanity parcel. Mining occurred between 1948 and 1960 with a total disturbance of approximately 42 acres. The primary coal seam targeted was likely the Upper Freeport coal seam, although it is possible that the Lower Freeport could have also been mined. The maximum overburden thickness to the Upper Freeport is 60 feet while the maximum overburden thickness is approximately 100 feet to the Lower Freeport. Given that the Lower Freeport reaches a maximum thickness of 5 feet in Grant Township, It is concluded that the depth of strip mining activities would not have exceeded 110 feet.

Attachment C: Corrective Action

Question: Please provide information on the names and addresses of property owners that live within one-quarter mile of the Area of Review.

Response: Enclosed is contact information for landowners within the one-quarter mile Area of Review.

Attachment G: Geologic Data

Question: Although the application provided ISIP information from the Yanity well 1025 stimulation, EPA did not see the actual stimulation data used to derive the ISIP. Please submit the actual stimulation data information.

Response: A plot of the injection rate and wellhead pressure from the initial acid frac stimulation of the Yanity well 1025 is enclosed. The ISIP noted in the initial service company report and the projected fracture closure stress based on the pressure plot are both noted on the plot.

Question: The Marcellus Formation is located above the Huntersville Chert and could be considered a confining unit. Is there any current or proposed gas development for the Marcellus Formation in the vicinity of the injection well site? If development is planned, please explain how the horizontal drilling and fracture stimulation within the Marcellus will not jeopardize the confinement structure above the Huntersville Chert?

Response:

- Since the inception of the Marcellus play in 2005, only one (1) Marcellus well was drilled within 3.5 miles of the Yanity injection site. It is the Chevron 10H Buterbaugh (37-063-37021), and is located roughly 3.4 miles to the southeast of the prospect. This well was completed in the Marcellus Shale on December 20, 2011 with reportedly poor results. No additional Marcellus wells have been permitted or drilled since that time.
- The Yanity 1026 was drilled on the upper flank of a relatively narrow salt-cored anticline, one that has 4-way closure. Although this structural style facilitated the trapping of natural gas within the anticline, and created a drilling target for primary production from the Huntersville Chert, it is generally considered a "geohazard" with respect to Marcellus Shale drilling operations and would result in shortened lateral wellbores. Operators in this region appear to be focusing their efforts on the more tectonically-quiet synclinal areas or broad, gentle anticlinal features in order to maximize their lateral lengths.
- Although PGE does not control the oil and gas rights to the Marcellus Shale under the 147 acre Marjorie C. Yanity tract itself, the company currently holds Marcellus rights under the adjoining properties on three sides. Within a 1.0 mile radius around the Yanity well, PGE holds roughly 920 acres of Marcellus rights, while roughly the same amount of acreage is held by various other Operators. For its part, PGE has no intention of conducting Marcellus operations in this area. In addition, it is extremely unlikely another Operator would attempt to drill Marcellus laterals on the Yanity tract or the surrounding area for several reasons. First, the presence of the steep, narrow anticline discussed above represents a serious impediment to drilling a lateral of any reasonable length while staying within the targeted zone. Second, the fact that PGE currently holds the Marcellus rights on the tracts surrounding the Yanity precludes another Operator from being able to develop wells with sufficiently long wellbores to be economic as a result of PGE's Marcellus acreage position. PGE does not believe it to be economic or prudent for our company, or any other Operator, to attempt to develop a Marcellus Shale project within this immediate area.

Attachment H: Operating Data

Question: The application requests a maximum injection volume of 2,000 barrels/day based on a short term injectivity test. This equates to a monthly injection volume of approximately 60,000 barrels. Based on just the data from the short term injectivity test, EPA is not inclined to permit the injection well for this high a volume. Do you have further data to support this high an injection volume? Injection pressure will ultimately dictate injection volume and rate. EPA would like to see the injection well operate for a period of time to be able to justify a 60,000 barrel/month injection volume. How much produced fluid does PGE anticipate sending to this well?

Response: To meet PGE's disposal needs and minimize on-site storage, we propose an initial monthly limit of 30,000 bbls and maximum rate of 1,500 bbl/day subject to wellhead pressure limitations.

Question: EPA did not see an analysis of Total Organic Carbon (TOC) in the analysis of the injection fluid submitted with the application. Please submit an analysis of the TOC.

Response: Enclosed

Attachment K: Injection Procedures

Question: The application indicates that the injection well will be equipped with an automatic shut down device set at maximum tubing and casing pressures. What does maximum casing pressure mean? Since maximum injection pressure will be set for the well, it would be better to define the casing shut down pressure as a percentage of the operating pressure or some positive pressure, so that if a leak does occur, it would trip the automatic shutdown device and shut the well in.

Response: A Programmable Logic Controller (PLC) would be used to control operation of the injection pump. This would allow for decisions on pump speed to be made based on input from multiple sources (injection rate, tubing pressure, casing pressure, etc.). One of the operating parameters would be the "maximum allowable casing pressure" (MACP). Casing pressure is the pressure in the annulus between the 2 3/8" injection string and the 4 1/2" production casing. The MACP will be set as 200 psi above the base operating casing pressure. The base operating casing pressure is the pressure in the annulus under normal operating conditions which is anticipated to be less than 300 PSI. If a leak in the tubing or packer should occur, the increased pressure due to the leak will cause the casing pressure to increase and shut the pump down at a maximum allowable casing pressure of 500 psi. The 4 1/2" production casing is rated for 7,780 psi.

Attachment L: Construction Procedures

Question: A complete set of drillers logs for the Yanity 1025 need to be submitted. Only partial logs were submitted with the application. At a minimum, the submission should include gamma ray, density, neutron, and caliper logs. In addition, please submit a Cement Evaluation Log (CEL) or Cement Bond/Variable Density Log (CBL/VDL) that shows the bonding of the cement run on the 4-1/2" long string casing. If a CEL or CBL/VDL is not available, then one will need to be run prior to running tubing and packer into the well, and submitted as part of the injection well completion report.

Response: Enclosed is a complete Litho-Density/Compensated Neutron/GR/Caliper log for the Yanity 1025. Also enclosed is a CBL/VDL run April 16, 2013. The CBL/VDL starts at a depth 7,490 ft as a plug was set at 7,510 ft, 34 ft above the perforations, so the long string casing could be filled with water to run the CBL/VDL.

Question: When the 2-3/8" tubing and packer is run inside the long string casing, it will need to be set no more than 50 feet above the perforations.

Response: The packer, with a plug installed in it, was set at 7,510 feet to facilitate running of the CBL/VDL. Details of the packer setting can be found in the enclosed well log dated April 16, 2013. After the CBL was run, the tubing was run back in the well, an inhibited packer fluid was circulated into the tubing/casing annulus and the tubing seated in the packer. The plug was then removed from the packer.

Question: Please describe how PGE will provide and maintain security for the facility to prevent illegal trespass. For example, will the facility have fencing, locked gates, cameras, etc.? What will be the facility's anticipated hours of operation and will the facility be manned during hours of operation?

Response: The offloading, storage and pumping facilities will be fenced and gated. Anticipated hours of operation for offloading fluids is 7 am to 7 pm. The facility will be manned during all offloading operations. Pumping operations will operate continuously as long as fluid is available. In addition to the automated shutdown controls, the pumps will be connected to a SCADA network to allow remote monitoring and control of the system.

Attachment P: Monitoring Program

Question: The application did not mention that cumulative volume will be monitored. Cumulative volume needs to be monitored continuously throughout the injection well's operation.

Response: A meter that registers both instantaneous rate and cumulative volume will be used to monitor the well.

Attachment Q: Plugging and Abandonment

Question: The plugging and abandonment plan did not show a final surface plug placed in the well. EPA typically requires a surface plug to be placed in the well during plugging. If for some reason EPA's requirement does not meet the Pennsylvania Department of Environmental Protection's requirements, then please stipulate.

Response: Pa Code Title 25 Chapter 78.95 (a)(3) requires that we set a 100 foot cement plug from 50 feet below the surface casing shoe to 50 feet inside the surface casing and fill the casing to surface with a noncementing material.

Attachment R: Necessary resources

Question: EPA also requires that a Schedule A form be submitted with the Standby Trust Agreement. A copy of the Schedule A form has been enclosed with this deficiency notice for your use.

Response: A completed Schedule A is enclosed.