



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

DEP USE ONLY	
Permittee's eFACTS ID 72933	Auth ID 1051705
Watershed Name Wolf Run	Quality HQ

WELL PERMIT

Permittee SENECA RESOURCES CORPORATION		OGO.# OGO-15547	Permit Number 37-047-23835-00-01	Date Issued 03/27/2017
Address 51 ZENTS BLVD		Farm Name & Well Number FEE SENECA RESOURCES WARRANT 3771 38268		Well Serial #
		Municipality Highland Twp	County EIK	
BROOKVILLE, PA 15825-2701		7½' Quadrangle Name James City		Map Section # 2
Phone (814) 220-1511	Project #		Latitude 41-37-8.3700	Longitude -78-49-16.5600
Surf Elev at Site 2040 feet	Anticipated Maximum TVD 2530 feet	Well Type Disposal	Offset distances referenced to NE corner of map section. South 2189 feet West 8093 feet	

This permit covering the well operator and well location shown above is evidence of permission granted to conduct activities in accordance with the Oil and Gas Act, the Oil and Gas Conservation Law, if the well is subject to that act, and the Clean Streams Law, and the rules and regulations promulgated thereunder, including but not limited to Sections 78.18 and 91.51 of the Department's Regulations, subject to the conditions contained herein and in accordance with the application submitted for this permit. This permit does not convey any property rights.

This permit and the permittee's authority to conduct the activities authorized by this permit are conditioned upon operator's compliance with applicable law and regulations.

Notification must be given to the district oil and gas inspector, the surface landowner and political subdivision of the date well drilling, if any, will begin at least 24 hours prior to commencement of drilling activities.

The permittee hereby authorizes and consents to allow, without delay, employees or agents of the Department to have access to and to inspect all areas upon presentation of appropriate credentials, without advance notice or a search warrant. This includes any property, facility, operation or activity governed by the Oil and Gas Act, the Oil and Gas Conservation Law, the Coal and Gas Resource Coordination Act, the Clean Streams Law and other statutes applicable to oil and gas activities administered by the Department. The authorization and consent shall include consent to the Department to collect samples of wastewaters or gases, to take photographs, to perform measurements, surveys, and other tests, to inspect any monitoring equipment, to inspect the methods of operation and disposal, and to inspect and copy documents required by the Department to be maintained. The authorization and consent includes consent to the Department to examine books, papers, and records pertinent to any matter under investigation pursuant to the Oil and Gas Act or pertinent to a determination of whether the operator is in compliance with the above referenced statutes. This condition in no way limits any other powers granted to the Department under the Oil and Gas Act and other statutes, rules and regulations applicable to these activities as administered by the Department.

Special Permit Conditions:

Administrative and Compliance Monitoring and Reporting

1. Pursuant to §78.125, submit to the Department, a copy of the annual monitoring report submitted to the EPA summarizing the results of the monitoring as required by 40 CFR Part 146 (relating to underground injection control program) when these reports are submitted to the EPA. This summary, at a minimum, shall include the following:

- a. Monthly records of major changes in characteristics or sources of injected fluids.
- b. Reports of volumes and pressures of injection fluids.
- c. Reports of mechanical integrity testing.
- d. Other information or reports required to be submitted to the EPA under 40 CFR Part 146.

2. Submit, to the Department, copies of the periodic monitoring reports or reports of failures, releases, accidents or other incidents required to be submitted to the EPA under 40 CFR 146 when these reports are submitted to the EPA.

3. Prior to initiation of injection of waste into the disposal well, ensure an inspection is conducted by the Department's Oil and Gas Inspector for the well, which includes pressure readings of the annulus, to confirm compliance.

4. Prior to initiation of injection of waste into the disposal well, submit, to the Department, a copy of the EPA form 7520-10 that was submitted to the EPA, indicating completion of construction.

Seismic Monitoring and Mitigation

The permittee shall prepare and implement a seismic Monitoring and Mitigation Plan. The seismic Monitoring and Mitigation Plan shall be submitted to the Department of Environmental Protection ("Department") at least 30 days prior to the anticipated start date of disposal activities in an existing well. This plan, or the plan as modified by the Department, shall be fully implemented at the time disposal activities begin and thereafter shall include the following components:

1. Installation of a seismometer that includes the following:

- a. One 3-component velocity sensor (X, Y, and Z axes), high-frequency seismometer or a local network consisting of a minimum of four high-frequency seismometers that have 3-component velocity sensors.
- b. For purposes of this seismic Monitoring and Mitigation Plan, a "seismic event" shall mean circumstances which reflect tectonic seismic activity above the thresholds and within the distances set forth in Paragraphs (11) or (12) below.
- c. For purposes of this seismic Monitoring and Mitigation Plan, an "Injection-Induced Seismic Event" shall mean circumstances which reflect seismic activity that may be directly attributable to the permitted injection activities. Raw seismic data gathered by the seismometer(s) described in (1) a. will be processed to calculate event location (epicenter/hypocenter) and magnitude. Events attributable to surface activities (such as, but not limited to, mining or blasting) or system noise, or events with hypocenters deeper than the top of the Salina Salts will not be considered potential Injection-Induced Seismic Events.
- d. If the one sensor option is chosen, and an Injection-Induced Seismic Event occurs at or above the thresholds specified in (11) c and d below, the operator will mobilize a local network consisting of a minimum of four (4) high-frequency seismometers that have 3-component velocity sensors within 48 hours of the event.
- e. All seismometers shall be installed in accordance with the manufacturer's instructions prior to operation of the disposal well.

2. A description of and specification sheet for the seismometer(s) installed at the disposal well site.

3. The installation of a recorder that, at a minimum, continuously records 100 samples per second using a data logger with 24-bit digitizer and Global Positioning System (GPS) timing, in accordance with the manufacturer's instructions prior to operation of the disposal well.

4. A description of and specification sheet for the seismic recorder installed at the disposal well site.

5. A description of the protocol for operating and completing calibration of the seismometer and seismic recorder installed at the disposal well site demonstrating that it conforms with the standards employed by the Pennsylvania State Seismic Network (PASEIS) and the manufacturer's instructions.

6. A description of the routine maintenance and service checks that will be implemented to monitor the operability or running condition of the seismometer and seismic recorder installed at the disposal well site. The description should detail how the checks satisfy the manufacturer's instructions.

7. Verification that Seismic Event data will be captured at the disposal well site electronically and in a manner that is suitable for Seismic Event recordation and analysis.

8. Verification that seismic data will be provided to the Incorporated Research Institutions for Seismology (IRIS) Network in real time and that the continuous, real time data conforms to the data format required by IRIS for archiving under PASEIS' network code (PE) and open distribution. If data transmission is interrupted notification will be provided to the Department verbally within 24 hours and in writing within seven (7) days.

9. A description of measures that will be taken to install the seismometer in a manner that will minimize interference from background sources and allow for optimal Seismic Event identification and location (epicenter and hypocenter). This shall include a plan view map of proposed seismometer location(s).

10. Contact information for the responsible person in charge of conducting seismic monitoring activities at the disposal well site.

11. If the one sensor option is chosen, an Injection-Induced Seismic Event contingency plan that includes monitoring, reporting and mitigation provisions consistent with the following:

- a. Immediate electronic notification to the Department and the Department of Conservation and Natural Resources' Bureau of Topographic and Geologic Survey (BTGS) of detection of any measurable event, within six (6) miles measured radially from the disposal well.
- b. Notification within 10 minute via email to the Department and within 1 hour via telephone to the Department's statewide toll free number in the case of seismic activity referenced in a. above will include filtering/processing of raw seismic data to identify and remove non-tectonic events (e.g. mine blasts or system noise) and events hypocenters deeper than the top of the Salina Salts.
- c. Should an Injection-Induced Seismic Event occur (i.e., not a surface-related event, system noise or seismic events with hypocenters deeper than the top of the Salina Salts), the Operator will reduce the well's operating injection rates. Reduction of the disposal well's operating injection rates in use at the time of the Injection-Induced Seismic Event by 50% within 48 hours of the occurrence of 3 or more consecutive Injection-Induced Seismic Events greater than 1.0 and less than 2.0 on the Richter Scale over a seven (7) day period occurring within three (3) miles measured radially from the disposal well. The seven (7) day period is defined as starting with the occurrence of any

Injection-Induced Seismic Event of magnitude 1.0 or greater. Reduced operating injection rates shall be maintained until the Department provides written notice addressing injection rates.

d. Termination of all injection activities within 48 hours of the occurrence of an Injection-Induced Seismic Event of magnitude 2.0 or greater within three (3) miles measured radially from the disposal well until receipt of a written notice from the Department addressing continued well usage and operating conditions. The assessment of continued usage will include, but not limited to, the following criteria:

- i. Magnitude and frequency of events detected;
- ii. Operational history prior to the event and operating conditions at the time of the event (rates, volumes, pressures);
- iii. Any mitigation/intervention attempts made prior to termination of activities;
- iv. Ability of permittee to identify another potential source for the event based on data processing and analysis of conditions.

12. If the network option is chosen, an Injection-Induced Seismic Event contingency plan that includes monitoring, reporting and mitigation provisions consistent with the following:

a. Immediate electronic notification to the Department and the Department of Conservation and Natural Resources' BTGS of detection of any measurable event, within three (3) miles measured radially from the disposal well.

b. Notification within 10 minute via email to the Department and within 1 hour via telephone to the Department's statewide toll free number in the case of seismic activity referenced in a. above will include filtering/processing of raw seismic data to identify and remove non-tectonic events (e.g. mine blasts or system noise) and events hypocenter deeper than the top of the Salina Salts.

c. Should an Injection-Induced Seismic Event occur (i.e., not a surface-related event, system noise or seismic events with hypocenters deeper than the top of the Salina Salts), the Operator will reduce the well's operating injection rates. Reduction of the disposal well's operating injection rates in use at the time of the Injection-Induced Seismic Event by 50% within 48 hours of the occurrence of 3 or more consecutive Injection-Induced Seismic Events greater than 1.0 and less than 2.0 on the Richter Scale over a seven (7) day period occurring within two (2) miles measured radially from the disposal well. The seven (7) day period is defined as starting with the occurrence of any Injection-Induced Seismic Event of magnitude 1.0 or greater. Reduced operating injection rates shall be maintained until the Department provides written notice addressing injection rates.

d. Termination of all injection activities within 48 hours of the occurrence of an Injection-Induced Seismic Event of magnitude 2.0 or greater within two (2) miles measured radially from the disposal well until receipt of a written notice from the Department addressing continued well usage and/or addressing injection rates. The assessment of continued usage will include, but not limited to, the following criteria:

- i. Magnitude and frequency of events detected;
- ii. Operational history prior to the event and operating conditions at the time of the event (rates, volumes, pressures);
- iii. Any mitigation/intervention attempts made prior to termination of activities;
- iv. Ability of permittee to identify another potential source for the event based on data processing and analysis of conditions.

13. Provisions for submitting an updated seismic Monitoring and Mitigation Plan, as needed or as may be required by the Department. Updates may be necessary in cases where the risk profile associated with injection activities changes. A signed and certified statement by a qualified professional person responsible for preparing the seismic Monitoring and Mitigation Plan that the plan is true and accurate and includes the components outlined above. The certification shall provide: "I, (insert name), hereby certify, under penalty of law as provided in 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that I prepared the seismic Monitoring and Mitigation Plan for (insert facility name) and the information provided is true, accurate and complete to the best of my knowledge and belief."

14. Upon commencement of disposal activities at the disposal well, the permittee shall record Injection-Induced Seismic Event data electronically in an appropriate format for analysis (event location and magnitude) and maintain daily records of Injection-Induced Seismic Event data electronically for review at the request of the Department. Injection-Induced Seismic Event records must be maintained for one (1) year.

15. The permittee shall maintain all calibration, maintenance and repair records for the seismometer for at least five (5) years.

16. The permittee shall maintain all calibration, maintenance and repair records for the seismic recorder for at least five (5) years.

17. The operator may submit a summary report and plan for modification or discontinuation of the seismic Monitoring and Mitigation Plan five (5) years after injection activities commence. The Department's review will be completed as soon as practicable after receipt of the summary report and a written response will be provided to the operator. DEP's assessment of the report will be dependent on, but not limited to, the following criteria:

- a. Magnitude and frequency of any events during the monitoring period;
- b. Operational history during the monitoring period (rates, volumes, pressures);
- c. Planned operational conditions moving ahead (rates, volumes, pressures);

- d. Demonstration through pressure fall-off that system is at equilibrium and behaving in as a homogenous reservoir;
- e. Need for any mitigation/intervention during the monitoring period.

Mechanical Integrity Special Permit Conditions

- 18. At least 30 days prior to any formation stimulation, the permittee shall submit a treatment plan to the Department.
- 19. The permittee shall provide on a monthly basis an electronic and graphical record of injection pressures, annular pressures, injection rates, and injection volumes and cumulative volumes in a format acceptable to the Department. All pressures and rates shall be monitored continuously with digital devices. The permittee shall also maintain records of this information for review at the request of the Department, for one (1) year.
- 20. Prior to the initial injection of fluids into the disposal well, the permittee shall coordinate and conduct an inspection of the well site, including the seismometer and recorder, with the Department's Bureau of Oil and Gas Management.
- 21. Prior to operation of the disposal well, the permittee shall provide the Department with documentation showing how it complied with provision Part II, D.2.b. of the EPA UIC Permit, demonstrating that the well has mechanical integrity.
- 22. The permittee shall notify the Department verbally within 24 hours and in writing within seven (7) days of obtaining information showing evidence of compromised mechanical integrity and immediately cease injection operations.

Other Conditions

- 23. This permit modification is conditioned upon the existence of the Class II-D brine disposal Injection Well dated November 17, 2014, U.S. EPA permit #PAS2D025BELK ("EPA Permit")
- 24. A wellbore diagram of the proposed Plugging and Abandonment Plan shall be provided to the Department with a "Notice of Intention by Well Operator to Plug Well" form (8000-FM-OOGM0005) prior to plugging the well.
- 25. The statements in the November 12, 2014 permit application and updates for this modification are incorporated into this permit.



Regional Oil and Gas Program Manager

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