

EXHIBIT

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

DEP USE ONLY	
Permittee's eFACTS ID 213205	Auth ID 1069509
Watershed Name	Quality

WELL PERMIT

Permittee PENNSYLVANIA GENERAL ENERGY COMPANY, L.L.C.		OGO.# OGO-63025	Permit Number 37-063-31807-00-00	Date Issued 3/27/2017
Address 120 MARKET ST		Farm Name & Well Number MARJORIE C YANITY 1025		Well Serial #
		Municipality Grant Twp	County Indiana	
WARREN, PA 16365-2510		7½' Quadrangle Name Commodore		Map Section # 2
Phone (814) 723-3230	Project #	Latitude 40-44-43.0300	Longitude -78-55-32.5500	
Surf Elev at Site 1614 feet	Anticipated Maximum TVD 7795 feet	Well Type Disposal	Offset distances referenced to NE corner of map section. South 1717 feet West 2505 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, 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:

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 and shall include the following components:

(1) Installation of a seismometer that, at minimum, 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 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 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 tectonic seismic event data will be captured at the disposal well site electronically and in a manner that is suitable for tectonic 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, a tectonic 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 minutes via email to the Department and 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).

c. Should an Injection-Induced Seismic Event occur (i.e., not a surface-related event or system noise), 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, a tectonic seismic event contingency plan that includes monitoring, reporting and mitigation provisions consistent with the following:

- a. Immediate electronic notification to the Department and the BTGS of detection of any measurable event, within three (3) miles measured radially from the disposal well.
- b. Notification within 10 minutes via email to the Department and 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).
- c. Should an Injection-Induced Seismic Event occur (i.e., not a surface-related event or system noise), 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 two (2) 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.

(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 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 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 tectonic seismic event data electronically in an appropriate format for analysis (event location and magnitude) and maintain daily records of tectonic seismic event data electronically for review at the request of the Department. Tectonic 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 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 to the Department, on a monthly basis, an electronic and graphical record of injection pressures, annular pressures, injection rates, 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 maintain records of this information for review at the request of the Department on a 12-month rolling basis.

(20) The permittee shall provide notice to the Department prior to the initial injection of fluids into the disposal well, so the Department can conduct an inspection of the well site, seismometer and recorder.

(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.

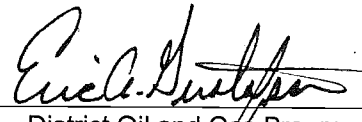
(23) The permittee shall vent the intermediate casing (the production by intermediate casing annulus, 4-1/2" x 8-5/8") to an atmospheric tank or, if the intermediate casing is shut-in, shall continuously monitor and have an automatic shutdown device installed and set to a maximum surface pressure of approximately 200 psi.

Other Conditions

(24) This permit modification is conditioned upon the existence of the Class II-D brine disposal injection Well dated March 19, 2014, U.S. EPA permit #PAS2D013BIND ("EPA Permit") and the well's operation as a disposal well.

(25) 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.

(26) The statements in the March 30, 2015 permit application and updates for this modification are incorporated into this permit.



District Oil and Gas Program Manager

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