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

STATEMENT OF BASIS

U.S. EPA UNDERGROUND INJECTION CONTROL (UIC)
DRAFT CLASS IID PERMIT REISSUANCE VAS2D926BBUC

FOR

POCAHONTAS GAS LLC
P.O. BOX 570
POUNDING MILL, VA 24637

FOR

A project consisting of one Class IID Injection Well used for the disposal of produced fluids (brine) associated with coal bed methane and conventional gas production located at:

Well No. U7
Sealed V.P. Number 5 Mine Void, Prater District
Buchanan County, Virginia

On February 4, 2020, Pocahontas Gas LLC ("Pocahontas" or "the Permittee") submitted a UIC application for the reissuance of a permit that would allow for the continued operation of a class IID brine disposal Injection Well located at the sealed V.P. Number 5 Mine void in the Prater District of Buchanan County, Virginia. The coordinates for this Injection Well are: Latitude 37º 11' 02" and Longitude -82° 04' 54". EPA Region III staff reviewed Pocahontas's permit application and deemed it complete on February 13, 2020.

The permit was originally issued for the construction and operation of this Injection Well on April 12, 1994 for a period of 10 years. The permit was then modified and reissued on May 25, 1999 for an additional 10 years. On February 24, 2010, the permit was again reissued and expired on February 24, 2020.

Pursuant to the federal Safe Drinking Water Act, 42 U.S.C. §§ 300f *et. seq.*, and its implementing regulations 40 C.F.R. Parts 144-146, and § 147.2351, the EPA UIC Program is responsible for regulating, through the issuance of permits, the construction, operation, monitoring and closure of Injection Wells that place fluids underground for disposal or enhanced recovery in oil and gas production. Today's draft permit specifies conditions for Injection

Well construction, operation, monitoring, reporting, and plugging and abandonment which are specified to protect, and prevent the movement of fluids into Underground Sources of Drinking Water (USDW). The Permittee's UIC project and the draft permit conditions specific to the project are described below:

Area of Review: 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, 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. Pocahontas proposed a fixed radius Area of Review of one-quarter mile which EPA determined is acceptable. 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. Pocahontas has provided documentation on the fluid to be injected, the groundwater use in the area, and on the well population within the one-quarter mile Area of Review. The injectate is compatible with the mine void in which it will be injected as evidenced by successful use of the mine void since 1994. There are 31 coal bed methane wells within the Area of Review, two of which have been plugged and abandoned. The Area of Review also contains 11 exploration wells (all of which have been plugged and abandoned), 14 wells that were once used as mine ventilation wells or material supply wells, and a well that is used for natural gas collection. All of these wells penetrate the Pocahontas #3 Coal Seam and the confining layers for the Injection Well however, their total depths are deeper than that of the Injection Well and the injection zone. If any unplugged/abandoned wells that penetrate the injection zone are found within the Area of Review at a later date, the draft permit requires the Permittee to perform corrective action.

Underground Sources of Drinking Water (USDW): An USDW is defined by the UIC regulations as an aquifer or its portion which, among other things, contains a sufficient quantity of groundwater to supply a public water system and which also contains fewer than 10,000 mg/L (milligrams per liter) Total Dissolved Solids, and which is also not an exempted aquifer. The Permittee reported that the inventory of drinking water sources found water supplies varying in depth from a surface spring to a maximum depth of 305 feet, with most wells deriving their water supplies from depths of 60 feet to 150 feet. Therefore, the Permittee set the depth of the lowermost USDW as an unnamed geologic formation at 400 feet below ground surface. The construction of the Injection Well requires installation of surface casing from the surface to a depth of at least 50 feet below the base of the lowermost USDW and cementing that entire length of casing back to surface. Pocahontas has set the surface casing for the Injection Well at an approximate depth of 518 feet below ground surface and cemented the casing back to the surface to protect groundwater.

Injection and Confining Zones: The draft permit limits injection of fluids for disposal to the V.P. Number 5 Mine void, approximately 1,350 to 1,355 feet below ground surface. The lowermost USDW is separated from the injection zone by approximately 950 feet. Lying directly over the Pocahontas #3 coal seam are Pocahontas shales and siltstones of low permeability and the Pennsylvanian-age Lee Formation shales and dense, thick quartz arenite. Combined, these formations make up a confining zone of approximately 200 feet in thickness.

Injection Fluid: The draft permit limits the injection fluids in this well to treated fluids produced from Pocahontas's Virginia operations' conventional and coalbed methane wells. The draft permit also establishes a maximum daily injection volume of 3,000 barrels per day and a total of 90,000 barrels per month. One barrel of fluid is equal to 42 gallons.

The permit application includes analyses of the injection fluid that corresponds to the requirements stated in Paragraph II.C.5. in the draft permit. The parameters chosen for sampling reflect not only some of the typical constituents found in the injection fluid, but also in shallow groundwater. Should a groundwater contamination event occur during the operation of the Injection Well, EPA will be able to compare samples collected from groundwater with the injection fluid analysis to help determine whether operation of the Injection Well may be the cause of the contamination.

Maximum Injection Pressure: The maximum allowable surface injection pressure for the permitted operation will be 0 pounds/square inch (psi). The injection zone is simply a mine void; therefore, the void can be filled with produced fluid by gravity (pressure) alone, eliminating the need for surface pressure. The Permittee must continuously monitor and record the surface injection pressure, ensuring it does not rise above 0 psi.

Potential for Seismicity: The SDWA regulations for Class II wells do not require consideration of the seismicity, unlike the SDWA regulations for Class I wells for the injection of hazardous wastes. See regulations for Class I hazardous Injection Wells at 40 C.F.R. §§ 146.62(b)(1), 146.68(f). Nonetheless, because of public concerns about injection-induced seismicity, EPA evaluated factors relevant to seismic activity as discussed below and addressed more fully in *"Region 3 framework for evaluating seismic potential associated with UIC Class II permits"* (https://yosemite.epa.gov/oa/eab_web_docket.nsf/Attachments%20By%20ParentFilingId/0EA8C0D9BA82F48B85257CD9006624C2/$FILE/Tab%20I%20seismicity%20framework9-26-13.pdf).

Due to unique nature of this Injection Well in that the surface injection pressure is 0 psi, the risks for fracturing and injection-induced seismicity is substantially low.

The permit provides that the Permittee shall inject through the Injection Well only into the V.P. Number 5 Mine void (within the Pocahontas #3 coal seam). The injection zone is overlain by the Pocahontas shales, which could be fractured and broken due to mining and overburden stresses as reported by the Permittee. However, the confining units above the Pocahontas shales are free of known open faults or fractures within the Area of Review as required in 40 C.F.R. § 146.22. The Permitee reported no faulting or fracturing in the confining units immediately above the Pocahontas shales.

Additionally, the region in which the Facility is located consists of an extensive, thick, sedimentary sequence with numerous confining strata between the surface and the Injection Well. The entire Appalachian Plateau, on which the Facility is located, is considered geologically stable with no active faults.

The available geophysical and seismic information in Virginia reviewed by the EPA shows no evidence of faults that reach the land surface from basement rock. More information can be found on a website about Earthquakes from the Virginia Department of Mines, Minerals, and Energy, Division of Geology and Minerals (http://www.dmme.virginia.gov/dgmr/earthquakes.shtml). The Permittee reported that there are no outcroppings of the confining or injection layers that overlie the mine void due to the rock formations being generally flat-lying and horizontal sedimentary rock layers that slightly dip to the west and south.

Geological information shows that the Appalachian Basin, including southwestern Virginia, which lies on the passive continental margin, is not currently seismically active because insufficient pressure exists to cause movement along ancient faults and fractures. These faults and fractures are closed and non-transmissive due in large measure to the tremendous downward pressure exerted by thousands of feet of overlying sediment deposited since their creation.

The United States Geologic Survey (USGS) has not recorded any seismic activity that originated in Buchanan County, Virginia from 1900 through present day (USGS: "Information by Region-Virginia-All Earthquakes 1900-Present": http://earthquake.usgs.gov/earthquakes/byregion/virginia.php). Virginia is located near the center of the North American Plate, thus experiences a much lower rate of seismicity in comparison with an area like California, which is located closer to a plate boundary and experiences shallower, more energetic seismic events due in part to less coherency in the basement rock. Additionally, California earthquakes often break the ground surface, while earthquakes in Virginia usually occur on faults at depths from three to fifteen miles below the ground surface. The rare earthquakes felt in Virginia today generally have no relationship with faults seen at surface. Residual stresses from the formation of the Appalachian Range and the Piedmont province hundreds of millions of years ago appear to be the mechanism for Virginia's earthquakes. Earthquake activity in Virginia has been associated with basement rock, either from basement faulting or faulting at a shallower depth caused by tectonic stresses that originated from the basement rock.
The permit will include injection pressure limits to prevent the initiation or propagation of fractures that could create conduits for the injected fluid to flow to any existing faults. The maximum allowable injection pressure for this permit was set at 0 psi because production fluids will be injected into a sealed mine void and the only pressure needed to fill the void is gravity.

Testing, Monitoring and Reporting Requirements: The Permittee is required to conduct a mechanical integrity test (MIT) after construction of the Injection Well. The MIT consists of a pressure test to make sure the casing, tubing, and packer in the well does not leak and a fluid movement test, through the review of cementing records and a cement bond log or a temperature log to make sure that movement of fluid does not occur outside of the injection zone. In addition to the monitoring described above, additional pressure testing of the casing, tubing and packer will occur every five years and whenever a rework on the well requires the tubing and packer to be released and reset.
The Permittee will be responsible for continuously monitoring the Injection Well for surface injection pressure, flow rate and cumulative volume beginning on the date which the Injection Well commences operation and concluding when the Injection Well is plugged and abandoned.

The Permittee must submit an Annual Report to the EPA Director summarizing the results of the monitoring required by the draft permit, including monthly monitoring records of the injection fluid, the results of any mechanical integrity testing and any major changes in the characteristics of the injected fluid. The annual report must be submitted to EPA by January 31 of each year and report the previous calendar year information.
In addition, the permit provides a tiered monitoring approach for monitoring the level of fluid in the mine void. The monitoring schedule is designed so the Permittee will submit monitoring results either quarterly or monthly based on the fluid level in relation to the depth of the mine void seals. Therefore, when the mine void is essentially "at capacity", EPA will determine what action the Permittee will be required to take. EPA may determine at this point that the injection well must be properly plugged and abandoned according to the Permittee's EPA-approved Plugging & Abandonment Plan.

Plugging and Abandonment: The Permittee has submitted a plugging and abandonment plan that will result in an environmentally protective well closure at the time of cessation of operations. The Permittee has established a Trust Fund to ensure proper plugging of the Injection Well. The amount of the Performance Surety Bond shall cover the estimated cost to close, plug and abandon the Injection Well in the amount of at least $34,500. The amount of the Trust Fund is based on an independent third-party estimate for the cost of plugging and abandonment of the Injection Well. This should preclude the possibility of abandonment without proper closure.

Expiration Date: When issued, a final permit will be in effect for ten years from the date of the permit effective date. EPA will conduct an annual review of the Permittee's operation. The final permit will contain essentially the same conditions of this draft permit unless information is supplied to EPA which would warrant alternative conditions or actions on this permit application.

Additional Information: The Administrative Record for the draft permit is available for public inspection. All information submitted by the Permittee in support of the draft permit, unless deemed confidential, is included in the Administrative Record for the permit and is available to the public for review. Copies of permit applications, the draft permit, the statement of basis, and the administrative record index are available for review and inspection on EPA's website at https://www.epa.gov/va/epa-public-notices-virginia. Please direct any questions, comments and requests for additional information to the contact listed below. The public may request a hearing for this draft permit. **Requests to hold this public hearing must be received by July 2, 2020.** When requesting a public hearing, please state the nature of issues you propose to raise. EPA expressly reserves the right not to hold a hearing unless a significant degree of public interest is evidenced on the proposed injection operation. **The Administrative Record for this action will remain open for public comment until July 9, 2020**

Submit comments or requests for a hearing or additional information to:

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