



Groundwater and Environmental Professionals Since 1891

June 1, 2023

Sent via e-mail

Samantha Lutz
Oil and Gas Operations District
Southwest Regional Office
Pennsylvania Department of Environmental Protection
400 Waterfront Dr
Pittsburgh, PA 15222

RE: PennEnergy Resources, LLC
Southwest Pennsylvania Water Management Plan
for Unconventional Shale Gas Well Development
Economy Borough, Beaver County

Ms. Lutz:

The attached information is being re-submitted on behalf of:

PennEnergy Resources, LLC
Attn: Richard M. Watson

Please find attached a copy of the PennEnergy Resources, LLC Water Management Plan Application for Unconventional Shale Gas Well Development in the Pennsylvania Department of Environmental Protection (PADEP) Southwest Region: Big Sewickley Creek. This copy of the complete revised application is being submitted in response to the comments following the review provided by the PADEP on May 18, 2023 via email. The comments, with responses in italics, are provided below. The responses below are also reflected in the application.

Comment 1:

In the May 2, 2023 response, seven additional discharge measurements, collected from March 2, 2023 to April 13, 2023, were submitted. Each of the discharge and stage measurements provided within that period document a discrepancy in velocity as the downstream gage using the calibration curves derived by PennEnergy is measuring lower flows than the upstream gage. PennEnergy has not provided an adequate explanation for these discrepancies. For example, on April 13, 2023 the upstream gage reading was reported as 1.68 feet and the downstream gage reading was reported as 1.07 feet. This data demonstrates that the downstream gage measurement and correlating stream flow is lower than the

upstream gage measurement and correlating upstream stream flow. On this date, the discharge was stated to be 14 cfs, but according to the staff readings the upstream flow rate was approximately 19.56 cfs and the downstream flow rate was approximately 11.82 cfs.

The channel morphology of Big Sewickley Creek shows evidence of frequent bed load changes, leading to multiple flow paths, which are currently present at the downstream gage location as seen in Photo 5 of the delineation report. A justification of the downstream gage location and any impacts of channel morphology on the accuracy of the gage readings should be provided. In addition, the cross-sectional stream measurement tables provided in Attachment 2 of the Report reveal that a single cross-section, of a single channel, with a single flow path, is being utilized when measuring stream flow. As the channel morphology is different between the upstream and downstream gage, the methodology of measuring and calibrating gage measurements, and the location of the downstream gage may need to be reconsidered. The Installation and Calibration Report included within the WMP Application does not address the discrepancies in the velocities nor does it address the effects the channel instability and/or channel morphology may have on the stream gage(s) calibration.

In order to address the discrepancies in the data presented in the WMP Application, PennEnergy may want to consider that the U.S. Geological Survey (USGS) outlines within their Water Supply Paper 2175 (Rantz et al., 1982) the following criteria when selecting a location for a staff gage:

1. At all stages, the total flow should be confined to a single channel. There should not be subsurface or groundwater flow that bypasses the site.
2. The streambed in the vicinity of the site should not be subject to scour and fill. The streambed should also be free of aquatic plants.
3. The stream channel should have unchanging natural controls. The controls could be bedrock outcrops or stable riffle for low flow conditions.

The data as presented within the Installation and Calibration Report and the current instream conditions at each gage location needs to be reevaluated to ensure accuracy. Please address the following comments in the resubmittal of the WMP Application §78a.69 (b); § 78a.69 (e) (2)

a) Provide a monitoring plan to address accurate data collection to ensure that passby flow requirements can be monitored. Consideration should be given to how the data will be collected, the verification/calibration of the methodology used to collect the data, any impacts that changing stream morphology has on in stream flow measurements. Again, consideration should be given to the USGS criteria cited above.

Big Sewickley Creek has been observed to undergo frequent shifts in channel morphology due to excessive bedload. These changes may have impacts on the accuracy of staff gage measurements as they relate to stream discharge over time. Considering this observation, direct measurements of stream discharge and pool depth are proposed prior to and during any withdrawal. Direct measurements will eliminate any chance of error due to a gage falling out of calibration over time. The "Passby and Pool Depth" section of the Water Source and Use Monitoring Plan (Attachment A) has been revised to include the details of the proposed methodology and frequency of measurement of both the stream discharge and pool depth to ensure passby flows and minimum pool depths are met. References to this revised method of passby monitoring are also included in the Withdrawal Impacts Analysis (Attachment I, sections a. and c.)

b) Provide a calibration schedule for each staff gage. The calibration schedule should reflect that calibrations will occur prior and during active withdrawal periods. Consideration should be given to the USGS recommendations. USGS recommends that staff gage rating curves be calibrated every 6 weeks, and after any major flood event, to ensure that no change has occurred in the stream channel and or discharge rate.

The revised method of passby monitoring does not include staff gages and instead relies on direct measurement of stream discharge and pool depth prior to and during any withdrawal. Therefore a calibration schedule is not necessary.

Comment 2:

The withdrawal location conditions reflected in the April 27, 2023 photographs depict large woody debris that is attached to the bank and is obstructing a major portion of the pool. The existing debris is providing subtle stream bank stability and creating the pool at the withdrawal location. Provide justification that the current intake system can be placed within the pool and that a separation distance can be maintained without the removal of the debris. §105.13 (e); §105.16 (d)

The Operations Plan (Attachment C) has been updated to reflect that pool maintenance at the withdrawal point will consist of removal of unrooted woody debris by hand to prevent clogging of intake structures. Preexisting rooted woody structures are not anticipated to impede the placement of the intake raft and will not be disturbed.

Please feel free to contact me by email or phone at 814-724-4970 with any questions you may have.

Sincerely,

Moody and Associates, Inc.



Paul J. Martin, P.G.

PMartin@moody-s.com