pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF MINING PROGRAMS

HYDROLOGY

08/2021

Background Sampling [§87.43]

Background sampling points must have at least two (2) complete chemical analyses, at monthly intervals collected prior to any form of treatment. Include water quality data for all of the following and designate the ID number and description for each point in the category. (If none, note N/A):

Each stream that receives discharge, runoff or drainage from the operation.

See the attached Background Sampling Report

Streams, springs, seeps and discharges into or out of any wetlands within the permit area and within 1,000 feet of the permit area.

N/A

Each water impoundment, impoundment discharge, and surface or underground mine discharge within the permit area and within 1,000 feet of the permit area.

See the attached Background Sampling Report

Each well developed to determine the characteristics of the groundwater.

N/A

Each private water supply and water supplies abandoned because of degradation or pollution from mining, within the permit area and within 1,000 feet of the permit area.

See the attached Background Sampling Report

Affirm the following:

☒ A *Background Sampling Report* has been submitted for each of the above points.

☒ All the above designated points must are shown on the Operations Map.

Monitoring Program [§§87.116, 87.117]

Describe the proposed surface and groundwater monitoring plan that will be conducted.

A monitoring plan has been developed to accurately measure and record the surface water quantity and quality of discharges from the permit area and the effect of the discharge on receiving waters. In addition, groundwater monitoring will be conducted in a manner approved by the Department to determine the effects of surface mining activities on the recharge capacity of reclaimed lands and on the quantity and quality of groundwater in the permit and adjacent areas. The following points comprise the monitoring program.

Include water quality data for all of the following and designate the ID number and description for each point in the category. (If none, note N/A):

All receiving streams above any proposed or potential mining related Surface or groundwater discharge points:	**SW-1, SW-4, SW-6, SW-7, SW-8**
All receiving streams below any proposed or potential mining related surface or groundwater discharge points:	**SW-2, SW-3, SW-5**
Abandoned underground or surface mine discharges that are hydrologically connected and may be impacted by the proposed mining:	**N/A**
Other representative underground or surface mine discharges within the permit area, or within 1000 feet of the permit area:	**N/A**
Representative wetlands with defined discharge points within the permit area and wetlands within 1000 feet of the permit area that may be impacted by the proposed mining:	**N/A**
Representative springs and seeps within the permit area and within 1000 feet of the permit area:	**0009-S1**
Water supplies that may be impacted by mining:	**N/A**
Representative water supplies within the permit area and within 1000 feet of the permit area:	**0009-W1**
Each monitoring well developed to determine the characteristics of the groundwater:	**N/A**
The aquifer below the lowest coal seam (If existing information is inadequate, monitoring wells must be drilled:	
Treatment pond discharges:	**TP-005, TP-006**
Sedimentation pond discharges:	**SP-001, SP-002, SP-003, SP-004**
Pit water during active mining (identify by coal seam and bonding increment):	**Raw Pit Water**

Include water quality data for all of the following and designate the ID number and description for each point in the category. (If none, note N/A): (cont.)

Points that will adequately represent the groundwater where special handling has occurred: **N/A**

Upgradient and downgradient points related to assessment of beneficially used material for reclamation: **N/A**

Affirm the following:

☒ A *Background Sampling Report* has been submitted for each of the above points.

☒ All the above designated points must are shown on the Operations Map.

Groundwater Information [§87.45]

Describe the groundwater flow system(s) that exists within the permit and adjacent area (including areas proposed for auger mining). Include the depth to groundwater, seasonal fluctuations, and the water table conditions present. Describe the relationship of the flow systems to coal seams to be mined. Identify the groundwater movement of the area and the conditions that control and influence the movement and infiltration. Include the influence of any underground or surface mines. Description should include identification of any aquifer above the lowest coal seam to be mined and the first aquifer below the lowest coal seam to be mined. Include stratigraphic units, depths, and any current use. Reference site specific data and other sources used in arriving at conclusions.

The regional groundwater flow in the permit area is in a down dip direction toward the northwest controlled the geologic structure. The outcropping coal seams in the area dip into the hillsides recharging the regional groundwater system. The local groundwater system is dominated by steep hillside topography which controls the groundwater movement toward the valleys and streams.

The major feature controlling groundwater in the permit area is the past deep mining on the Lower Kittanning and Upper Kittanning coal seams. These deep mines have created a manmade flow system that allows groundwater to easily pass through the mine workings along the mine floor following the entries in the down dip direction.

The lack of seeps or discharges from the past surface mining and deep mining suggest that the proposed surface mining will not have any impact to the groundwater quality or quantity from current conditions.

The Lower Kittanning (LK) coal seam aquifer is the first aquifer located directly below the Middle Kittanning coal seam. The LK aquifer is dominated by deep mining of the Eureka No. 36 Mine. Groundwater enters the mine voids and travels down dip. The Eureka No. 36 Mine is interconnected to the Maryland No. 1 Mine that discharges at the historically known St. Michael Discharge. Rosebud Mining Company maintains a treatment plant at the discharge to facilitate mining in the Upper Freeport and Upper Kittanning Mine 78. Water quality of the discharge consists of suppressed pH and elevated iron levels.

The Middle Kittanning to Upper Freeport coal seam aquifers don't appear to produce any water given that the coal seams dip into the hillside and the past deep mining impacts to the general area.

Describe the quality of water in areas unaffected by mining. Discuss how this relates to the groundwater flow system(s). Identify quality of springs, seeps, wells, etc. that represent "background" water quality.

Areas unaffected by mining are located within the watershed of Tributary 45258 to Paint Creek and the upper reaches of Unnamed Tributary No. 2 to Paint Creek. Sampling points SW3 and SW4 show the water quality of Tributary 45258 upstream and downstream. The water quality is generally has neutral pH with low metal and sulfate concentrations. Sampling points SW5, SW6, SW7 and SW8 show the water quality of Unnamed Tributary No. 2 to Paint Creek. The water quality of the upstream reaches typically has neutral pH with low metal and sulfate concentrations. There are higher sulfate levels in the downstream section most likely due to the treatment pond discharge of the Mine 78 deep mine. While the sulfate concentrations may be elevated, osmotic pressure is measured to ensure protection of aquatic life.

Describe the effects which any previous mining has had on the quantity and quality of the groundwater in the area. Identify the source, coal and rock unit involved and the reasons for the effect. Discuss the relationship between all existing, completed or abandoned mine workings identified in the Geology section and all discharges, seeps, springs, wells, etc. that are hydrologically affected by this mining. Reference site specific data included with this application and other sources used in arriving at conclusions.

Previous mining of the Lower Kittanning coal seam apparently has caused any springs that may have been above these horizons to be captured by the deep mines, and directed down dip toward the synclinal axis to the North West. Reduced quantity appears to be the major effect as a result of the Lower Kittanning coal seam deep mining. Since the area has been dewatered by the mining and drainage is to the St. Michael discharge/treatment system, no onsite water quality impacts are observed.

If the proposed surface mining activities will occur within 500 feet of any point of either an active or abandoned underground mine, describe potential hydrologic impacts of the proposed activities resulting from dewatering of any mine pools and an analysis of the potential creation of deep mine pools.

Mining will occur within 500' of the active Mine 78 located in the Upper Kittanning coal seam and Eureka No. 36 Mine in the Lower Kittanning coal seam. Mine 78 is currently active and a final mine pool has not yet developed in the mine workings. The proposed mining will not impact Mine 78 since the area has already been dewatered by the Lower Kittanning mining and Mine 78 is not anticipated to completely flood.

Since the Eureka No. 36 Mine is currently being dewatered and will continue into the future via the St. Michael trust fund, no impacted from the mining operation to the mine pool is anticipated.

Identify other activities that have impacted groundwater quality (such as oil and gas wells, agriculture, etc.). Reference sources used in arriving at conclusions.

No other activities have impacted the groundwater quality.

Surface Water Information [§87.46]

Identify each stream receiving drainage from the proposed operation. Discuss the existing quality, and in particular, water quality from areas unaffected by mining. Identify stream uses (such as boating, trout fishing, water supply, etc.)

Stream Name	Classification	Use	General Water Quality
Paint Creek	**CWF**	**None**	**Net acidic with suppressed pH values Elevated metals and slightly elevated sulfate levels See sampling point SW2**
Tributary 45258 Paint Creek	**CWF**	**None**	**Net alkaline with neutral pH values Low metals with low sulfate levels See sampling point SW3**
Unnamed Tributary Paint Creek	**CWF**	**None**	**Net alkaline water with neutral pH values Low metals with elevated sulfate levels See sampling point SW5**

Identify the effects which any previous mining has had on the quantity and quality of the surface waters in this area. Identify the source of effects, the, coal and rock units involved, and reasons for the effect. Reference site specific data that support the conclusions.

Paint Creek has been impacted by mining on the Brookville up through the Upper Kittanning coal seam. The Lower Kittanning deep mines and surface mines on the other seams that were advanced updip have created the greatest impacts on the watershed. Most of these mines and their discharges were created pre-act. The surface mines associated with the Cooney Brothers Coal Co. Murphy Hill operations were permitted post-act but before acid base accounting techniques and alkaline addition were used to control post mining discharges. The Murphy Hill mines were also advanced updip allowing for post mining water to more readily flow toward the toe of the spoil. Furthermore, the mining practices utilized in the Murphy Hill operations did not include special handling plans for placement of potentially acidic material. It is believed based on the water quality of the effluent from the Murphy Hill operations that all of the spoil was used in the backfill, including pit cleanings and any other potentially acidic material. Finally, Cooney Brothers Coal is treating most of the effluent that they were responsible for creating in their Murphy Hill operations. Therefore, the pre-act mines and their discharges and not the Murphy Hill discharges are primarily responsible for causing or contributing to the degradation of Paint Creek.

Public Water Information [§87.47, §87.119]

Provide the name, type, and specific location of all current public (community and non-community) surface water supplies that have intakes on the receiving stream within 10 miles downstream of the proposed permit area, and public water supplies in or within one half mile of the proposed permit area; and public water supply wells for which any part of the permit area is within the well head protection area.

Not applicable, there are no public water supply intakes with 10 miles downstream or within ½ mile of the proposed permit area.

Upload a separate map through the web interface showing the locations of these supplies and the well head protection zones. This information will be kept confidential.

Hydrologic Assessment of Water Supplies [§87.47, §87.119]

Assess the impacts of the proposed mining on each water supply within 1,000 feet of the permit application boundary as well as any other water supply which may be affected by mining. Identify each water supply source (or groups of water supplies) that may be contaminated, diminished or interrupted by the mining operation.

Since the properties nearby the mining area either have access to public water or have water supplies located below the Clarion coal outcrop, it is anticipated that no water supplies will be impacted by the proposed mining operations.

0004W1, 006W1, 0009W1

These wells are located below the outcrop of the Middle Kittanning coal seam and should not be impacted by the proposed mining since they draw water from deeper aquifers.

0009S1

The flow of the spring is controlled by shallow groundwater flow which in turn is controlled by topography and the amount of rainfall in the recharge zone. This statement is supported by the flow measurements taken during the dry period and that the spring will "go dry" during dry periods. Stratigraphic groundwater flow would typically be more consistent.

Provide a narrative describing well testing done for this site and documentation of results of all tests.

Since no wells or springs are to be impacted, no pump test were conducted, only water quality samples taken.

Include the following as attachments to the narrative:

- Pump test logs specific capacity data for each well tested.
- Raw data (water levels at specific times, pumping rate, etc.), and time/drawdown and time/recovery curves on single log paper.

Identify the means to restore or replace supplies that may be affected by mining. Include a demonstration that the quantity of the replacement water supply will be sufficient to meet the needs of the water supply use (e.g., pump tests for specific capacity).

Extension of nearby public waterlines is an option to restore water supplies that may be impacted by mining. Also, wells located below the Clarion coal outcrop provide evidence that potable water is present below the coals seams that are proposed to be mined or have been deep mined by previous operations.

Provide the existing operation and maintenance costs for each water supply that may be contaminated, diminished or interrupted by the mining operation and the projected operation and maintenance costs for the proposed replacement supply. Use the Cost Comparisons and Bond Calculation for Existing and Replacement Supplies form 5600-FM-BMP0451 for an example cost calculation sheet.

Not applicable.

If the operation and maintenance costs for the proposed replacement water supply will be more than for the existing water supply, identify the provisions for compensating the water supply owner for the increased costs or provide the Consent to Lesser Water Supply Agreement Form 5600-FM-BMP0110 for the increased operation/maintenance costs.

Not applicable.

Probable Hydrologic Consequences [§87.101, §87.102]

Describe the probable hydrologic consequences of the proposed mining activities (including auger mining) on the surface and groundwater systems of the permit area and adjacent area both during and after the operation. Consider surface and groundwater hydrogeologic data (including seasonal variations in flow and quality), overburden analysis data, mining (and coal refuse disposal if proposed) and reclamation methods to be employed, existing water uses, effects of previous mining on water quality and quantity, background (baseline) water conditions and other impact factors. If previous mining on adjacent sites has produced acid mine drainage, discuss the relevant factors that would allow this site to be mined successfully. Reference site specific data and other sources used in arriving at conclusions.

No water was found to be associated with the Upper Freeport, Lower Freeport, Upper Kittanning or Middle Kittanning coal seams in the permit area. Sesaonal variations would not be a factor to the high surface elevations and high coal structure elevations. Field evidence (stream locations) support this statement.

The Berwind Coal Co. Eureka No. 36 Mine in the Lower Kittanning coal seam underlies the permit area. This mine is part of a vast complex of interconnected abandoned Lower Kittanning deep mines. The Lower Kittanning mined aquifer previously flowed down dip away from the site until it eventually discharged in St. Michael via an abandoned shaft at an elevation of 1603. In 2013 Rosebud constructed a treatment plant at the discharge location. The mine pool complex is now pumped and treated at this location through the Mine 78 deep mine permit.

The Lower Kittanning deep mines and surface mines on the other coal seams in the Allegheny Group that were advanced updip have created the greatest negative impacts on the watershed. Most of these mines and their discharges were created pre-act. The surface mines associated with the Cooney Brothers Coal Co. Murphy Hill operations were permitted post-act but before acid base accounting techniques and lime addition were used to control post mining discharges. It is believed based on the water quality of the Murphy Hill effluent that Cooney Brothers Coal Co. did not implement a mining plan where the coal pit cleanings and other highly acidic material in the overburden were special handled. All material that would be special handled in a modern mining plan was simply placed in the backfill exposing it to oxygen and water both during and after mining. Furthermore, because the Murphy Hill operations were mined updip the post mining water table is discharging at the crop after coming in contact with the highly acidic material in the spoil.

The proposed mining will differ from the Murphy Hill post mining effects because the proposed mining will use modern mining practices (i.e. a special handling plan along with alkaline addition). Furthermore, because of the geologic setting where mining will take place (i.e. downdip mining) the post mining water table will pool at the highwall and migrate down dip away from the receiving stream. The special handling and alkaline addition rates outlined for all coal seams to be mined in Module 7.4b will ensure alkaline post mining ground water quality. Water supply impacts are not an issue, based on the text and data outlined above. The site will be reclaimed to Department standards. Reclamation of the old abandoned high wall on the site is also proposed.

Therefore, no significant effects are foreseen on the hydrologic system in the permit area or adjacent areas either during or after mining and reclamation activities are complete. Ponds will be used to control sedimentation and treatment ponds will control the water, if any collects, that is associated with the mining pit(s). Minor effects that may occur include: a lowering of the groundwater table in the immediate mining area, reduced runoff and rapid recharge to the reclaimed pit floors due to high hydraulic conductivity in the backfill. These minor effects will not change or add to the degradation of the Paint Creek watershed.