

HYDROLOGIC RECLAMATION PLAN

For

Shannon, LLC.

Shannon Mine No. 4

Hydrologic Reclamation Plan (880-X-8H-.06(1)(g)):

I. Steps to Minimize Hydrologic Balance Disturbance:

Surface mining and reclamation activities conducted on the Shannon, LLC. - Shannon Mine No. 4 area will be conducted to minimize disturbance to the hydrologic balance. Several ways in which this will be accomplished are, but not limited to the following:

- a. Monitoring and Reporting of sediment basins, surface water monitoring sites, and groundwater monitoring sites as required by the Regulatory Authorities will be performed in accordance with the approved Hydrologic Monitoring Plan.
- b. Physical and chemical treatment of the outfalls at this mine site as necessary to comply with State and Federal Water Quality Laws.
- c. Upon completion of mining, and regrading, overburden materials will be sampled systematically and sent to the Auburn University Testing Laboratory, for analyses to determine type and amount of soil amendments necessary to maintain vegetative growth. This sampling system should be adequate (see below).

1. The chemical analyses will consist of the followings parameters:
pH, % Sulfur, Phosphorus, Potassium, Magnesium, Calcium, Maximum Potential Acidity, Neutralizing Potential, NO₃-N, and Recommendations for the amounts of Limestone, Nitrogen, P₂O₅, and K₂O to be added to the soil.
 2. The physical analyses will consist of the following parameters:
Sieve Analysis, % Sand, % Silt, % Clay, Textural Classification, and Available Water Capacity.
- d. Husbandry practices will include, but not limited to, seeding spot areas within the Shannon Mine No. 4 to increase cover and the addition of proper nutrients. Suitable mulch shall be used on all regraded and topsoiled areas to control erosion, promote germination of seeds and increase the moisture retention capacity of the soil. A maximum of 3 tons per acre of hay will be used as mulch.

II. Material Damage Outside the Permit Area:

All surface mining and reclamation activities within the Shannon Mine No. 4 will be conducted to minimize and prevent material damage to the hydrologic balance. Several ways in which this will be accomplished are, but not limited to the following:

1. Observing the 300 ft. setbacks from occupied dwellings, unless acceptable waivers are submitted and approved by ASMC.
2. Mining within the permit boundary.

3. Observing and complying with all State and Federal Water Quality Limits.
4. Mine openings within the permit area (other than blast holes) will be eliminated in the following methods:
 - A) Exploration Holes - Exploration holes will be backfilled with the drill cuttings and capped with two (2) feet of clay.

[See Attachment III-A-6-1](#)
 - B) Monitoring Wells - Groundwater monitoring wells will be sealed at the time of abandonment with a concrete cap (1.5'x1.5'x.5').

[See Attachment III-A-6-2](#)
 - C) Mine Openings - The openings will be sealed by constructing concrete block walls and by utilizing other available material, in accordance with the requirements of M.S.H.A. The earthen material used in the sealing process will consist of non-toxic, nonacid, and noncombustible material compacted to 95% of the standard proctor. Upon completion of the sealing of the openings the pit will be filled to a minimum height of 2' above the openings and regraded to a maximum slope of 2.5H to 1V

[See Attachment III-A-6-3](#)
5. Timely regrading and contouring for drainage control.
6. On site sediment control to prevent sediment from entering ponds.
7. Timely revegetation of all disturbed areas.
8. Silt fences, hay filter dams, dust control on roads, lush vegetation, diversion ditches, and other prudent practices will be utilized in controlling runoff from haulroads crossing property entering the mine site. Cut and fill slopes created by road construction shall be grassed to insure stabilization and prevent erosion.

III. Applicable State and Federal Water Quality Laws:

To meet the applicable State and Federal effluent limitation standards as set forth by the Environmental Protection Agency and the Alabama Department of Environmental Management, the applicant shall minimize potential water quality problems by properly handling and disposing of any acid or toxic forming materials and treating contaminated drainage. To assure water quality standards, periodic performance monitoring will be conducted as approved in the Hydrologic Monitoring Plan. Sediment basins will be utilized as collection sites for surface water treatment when runoff from the mine site requires it. In the event quality problems should arise, the following procedures will be used

- 1) Lime, caustic soda or equivalent additive to raise a low pH.
- 2) Potassium permanganate to decrease manganese levels if the pH is too high.
- 3) Potassium permanganate to decrease iron levels.
- 4) Alum to decrease total suspended solid concentrations.
- 5) Prior to the introduction of any chemicals other than the ones listed above, the Regulatory Authority will be notified and new methods or chemicals will be approved prior to use.

IV. Rights of Present Water Users:

As stated in Part II-F, a well inventory conducted by PERC Engineering Co., Inc. in June of 2011, revealed that there were sixty (64) structures (62 residences and an office and a church) within a ½ mile radius of the proposed permit area. See the Well Inventory Map for the location of groundwater users in relation to the proposed mine site. Of the sixty-two (62) residences, three (3) residences have groundwater wells. SM4-17 and SM4-20 use their wells as secondary purposes, SM4-36 & SM4-37 use the same well as their primary source of groundwater, and SM4-39 uses their well as a primary source of groundwater. One (1) residence SM4-14 has a well but does not use it as a source of water.

See [Well Inventory Summary](#) and [Well Inventory Map](#)

V.A. Acid and Toxic Drainage:

Information provided in the [Weighted Average Overburden Analysis sheets](#) for this site revealed that only one interval in DH-1727 at a depth of 380.0' - 385.0' was tested as being potentially acid-forming other than intervals located below the coal seams in DH-1726 and DH-1727 which were contaminated with coal. With timely reclamation, excess neutralization potential of the overburden material, and the location of these intervals within the stratigraphic column these intervals should not pose a problem.

Due to the fact that all overburden at this site does not occupy similar areas, intervals shown in the attached results of geochemical analysis which are located

in the upper portions of the drill logs occupy a smaller volume than intervals which are located closer to the bottom, consequently, their acid-base accounts do not contribute as substantially to the overall chemistry of the overburden. In an attempt to more accurately describe the acid-base potential of the overburden at the Shannon Mine No. 4 site, a spreadsheet which was developed at the Pennsylvania Dept. of Environmental Resources, Bureau of Mining and Reclamation was employed. This spreadsheet not only takes into account the volume occupied by each interval tested, but also the amount of coal lost into the spoil. The results of the [Volumetric Overburden Analysis](#) method from overburden geochemistry sites [DH-12575](#), [DH-12608](#), [DH-14092](#), [DH-14095](#), [DH-1725](#), [DH-1726](#), and [DH-1727](#) are favorable: overburden at the Shannon Mine No. 4 contain an average of 18.77 (tons CaCO₃/1000 tons overburden) excess neutralization potential.

The only preventative and remedial measures necessary in the handling of coal stockpiles and tailings from the pit. Coal stockpiles will be located within the permitted and bonded area such that drainage from the area will be routed through one or more of the sediment basins that are to be constructed. In general an area will be graded to a relatively level state. Upon completion of the subgrade, a relatively impervious pad or liner will be constructed to a minimum thickness of 12 inches. The pad or liner will be made of a clayey material possessing a maximum permeability coefficient of 1×10^{-6} centimeters per second. The material will be placed in 6 inch compacted lifts to 95 percent of the standard proctor density. A pad will be constructed of coal material over the relatively impervious pad or liner with material created by cleaning the coal in the pit. Small terraces and/or temporary diversions will be used as necessary to minimize surface runoff across the stockpile areas. After the stockpile area has served its useful purpose the pad material that can not meet market specifications will be buried within the permit area no closer than 30 feet from any remaining highwalls and 100 feet from any drainage courses and a minimum of 10 feet above the bottom of the lowest coal seam being mined and will be placed under a minimum of four (4) feet of the best available non-acid and non-toxic forming and non-combustible material. The pad area will be covered with four (4) of the best available non-acid and non-toxic forming and non-combustible material and revegetating in accordance with the approved Reclamation Plan (Part IV-V-5).

V.B. Contribution of TSS to Streamflow:

Total Suspended Solids within the permit area will be controlled by utilizing sediment basins to control runoff. These sediment basins will be designed to retain all settleable solids, skim and retain all floating solids and provide adequate detention volume and time to minimize the contribution of total suspended solids into the receiving streams. In the event that a problem arises with the TSS in the discharge of the sediment basins, Alum will be introduced into the basins to decrease total suspended solid concentrations. An alternative to Alum could be

the construction of a floating silt fence to cause the solid to floc and settle to the bottom.

V.C. Water Treatment Facilities:

The sediment basins will be the primary treatment facility to which chemical treatment may be introduced as needed to maintain effluent limits set forth by the Regulatory Authority. Sediment basins will be constructed downstream of the permit area to control drainage and collect sediment from the disturbed area during surface mining and during the reclamation phase. In the event quality problems should arise, the following procedures will be used :

- 1) Lime, caustic soda or equivalent additive to raise a low pH.
- 2) Potassium permanganate to decrease manganese levels if the pH is too high.
- 3) Potassium permanganate to decrease iron levels.
- 4) Alum to decrease total suspended solid concentrations.
- 5) Prior to the introduction of any chemicals other than the ones listed above, the Regulatory Authority will be notified and new methods or chemicals will be approved prior to use.

V.D. Drainage Control:

Sediment basins will be constructed during mining operations to control drainage and collect sediment from the disturbed area during the construction phase and during the reclamation and restabilization phase. All surface and groundwater runoff will be controlled through these basins whose design are shown in Part III-B of the application. The basins will be constructed, prior to any disturbance in its drainage area, under the supervision of a qualified Registered Professional Engineer or be a qualified person under his direct supervision. Upon completion of construction the basins will then be certified to the Regulatory Authority as having been constructed by bringing desirable material in and compacting it in lifts until the construction specifications are met. Drainage structures will be installed as per design plans with any necessary erosion control and/or stabilization procedures such as riprap, concrete, drop structures, energy dissipaters, etc. being implemented as deemed necessary by the project engineer. Upon completion of construction the entire disturbed area will be revegetated in accordance with the approved Reclamation Plan (IV-C-5). Silt fences, hay filter dams, dust control on roads, lush vegetation, diversions ditches and other prudent practices will be utilized in controlling runoff.

V.E. Restore Approximate Recharge Capacity:

Due to the unconsolidated nature of the post mine strata and the voids present after mining, groundwater movement will be controlled by gravity, therefore groundwater levels in the post mine aquifer will be lower on average than an unaffected aquifer of identical thickness and extent, and lateral groundwater

movement in the post mine aquifer will be much greater than prior to mining therefore, groundwater availability will increase. As stated previously, baseflow to surrounding streams will increase due to the above stated reasons, therefore surface water availability will not be adversely affected.

V.F. Rights of Present Water Users:

In the event that it is discovered that a groundwater user(s) exists within the 1/2 mile radius, and it is shown that mining by Shannon, LLC. has diminished the quality or quantity of that well(s), one of the following methods of replacing the resident's domestic supply will be implemented: 1) an alternative source of groundwater for either shallow groundwater wells or wells with inadequate casing would involve drilling a new well in which the casing would penetrate an aquitard, such as shale below the lowest target coal seam, and the well would also terminate below the aquitard in water-producing strata, such as sandstone, or 2) connect the residence to an existing municipal water supply, or 3) other methods which replace the groundwater users supply and is agreeable to both the user and the operator will be considered an alternative.

V.G. Potential Adverse Consequences from PHC:

None anticipated.

CERTIFICATION STATEMENT:

The proceeding Hydrologic Reclamation Plan for Shannon, LLC. at the Shannon Mine No. 4 site was prepared by me or under my supervision and I hereby certify that it is true and correct to the best of my knowledge or belief.

W. Keith Madison, P.G.
Alabama Reg. No. 0122

Date:_____