

HYDROLOGIC RECLAMATION PLAN

(880-X-8H-.06(1)(g))

for

**REED MINERALS, INC.
NO. 5 MINE**

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

1.1 Steps to Minimize Hydrologic Balance Disturbance:

All surface mining and reclamation activities 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 the sediment basins, surface water monitoring sites, groundwater monitoring site, etc., as required by the Regulatory Authorities will be performed in accordance with the approved Hydrologic Monitoring Plan.
- b. Physical and chemical treatment of sediment basin as necessary to comply with State and Federal Water Quality Laws.
- c. Upon completion of mining, and regrading, topsoil, subsoil, and 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.
 1. The chemical analyses will consist of the following parameters: pH, % Sulfur, Phosphorus, Potassium, Magnesium, Calcium, Maximum Potential Acidity, Neutralizing Potential, Cation Exchange Capacity, 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 are not limited to, seeding spot areas 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 minimum of 1 1/2 tons per acre and a maximum of 3 tons per acre of hay will be used as mulch.

1.2 Material Damage Outside the Permit Area:

All surface mining and reclamation activities will be conducted to minimize and prevent material damage to the hydrologic balance outside the permit area. Several ways in which this will be accomplished are, but not limited to the following:

1. Observing all setbacks and offsets.
2. Mining within the permit and study boundaries.
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 - Old works (abandoned underground mines) which may be encountered during the mining operation will be eliminated by the following process: Prior to the backfilling or shooting of the final highwall all mine openings will be sealed with a clay material having a permeability ranging between 0.00001 and 0.001 cm/sec. This clay material will be compacted in twelve (12) inch lifts to ninety-five (95%) percent of the standard proctor density, a minimum of five (5) feet above the bottom of the opening.

[SEE ATTACHMENT III-A-6-3](#)
5. Timely regrading and contouring for drainage control.
6. Lowwalls in some areas to route water to sediment ponds.
7. Pumping from pits to ponds to increase detention time.
8. On site sediment control to prevent sediment from entering ponds.
9. Timely revegetation of all disturbed areas.
10. 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.

1.3 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 prevent potential water quality problems by properly handling and disposing of any acid or toxic forming materials prior to drainage being contaminated. To assure water quality standards, periodic performance monitoring will be conducted as approved in the Hydrologic Monitoring Plan. In the event that water quality is not within the State and Federal Water Quality Standards, chemical treatment will be introduced to bring the water quality to allowable limits as follows:

- a) Lime, caustic soda or equivalent additive to raise a low pH.
- b) Potassium permanganate to decrease manganese levels.
- c) Potassium permanganate to decrease iron levels.
- d) Aerating the water to lower the Iron content.
- e) Alum to decrease total suspended solid concentrations.

1.4 Rights of Present Water Users:

A well inventory was conducted by McGehee Engineering Corp. in April and May of 2012. Door to door interviews were conducted on occupied dwelling within one half mile of the permit boundary to determine if domestic wells were present. The inventory revealed five (5) active wells within the half-mile radius of the mine. Of the five (5) wells, only one (1) is used for a primary source of water. Four (4) wells are either used as a secondary source for outdoor purposes or are not used at all. House Id 46 utilizes their well as their primary drinking source. House Ids 36, 47A, 50, 51, and 52 utilize their wells as a secondary use for outdoor purposes. [See Well Inventory](#) and [Hydro-Geo Map](#).

1.5a Acid and Toxic Drainage:

During the preparation of the Determination of the Probable Hydrologic Consequences for the proposed permit area and adjacent areas as determined based on baseline hydrologic, geologic and other site specific information collected for this permit application there were no zones of acid forming material encountered other than the coal seams, therefore, the only preventive or remedial measure necessary are in the handling of the coal stockpiles and immediate pit area. Coal Stockpiles will be created by constructing a pad made of compacted clay or shale of acceptable permeability of desired thickness to carry the weight of loading and transportation equipment. Coal stockpiles will be graded or shaped and constructed on a mild slope in a manner to provide adequate drainage and minimize contamination of water. Coal stockpiles will be located in such a manner whereas excess drainage may be diverted from coal stockpile areas. When the coal stockpile become no longer necessary it will be reclaimed by removing the coal which makes up the pad by truck, covering the pad area with four (4) feet of the best available non-toxic, non-combustible material and revegetating in accordance with the approved Reclamation Plan (Part IV-C-5). The pit bottom will be approximately one-hundred (100') wide

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and consist of gray sandstone. See Part III-A-1 and Operation Plan Map for the cut layouts and direction of mining. According to drilling, there is no major potential acid forming material within the permit boundary. The only potential areas of acid forming material are coal stockpiles. The reclamation for coal stockpiles is outlined above.

Any material such as oil, grease, rags etc. that may present a fire hazard will be properly disposed of in an approved landfill. Any non-coal waste will be disposed of at approved off-site landfills, which meet all applicable local, state and federal requirements.

1.5b Contribution of TSS to Streamflow:

Total Suspended Solids will be controlled using ten (10) proposed sediment basins. 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 basin 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.

1.5c Water Treatment Facilities:

Sediment basins will be the primary treatment facilities from which chemical treatment may be introduced as needed to maintain effluent limits set forth by the Regulatory Authority. Sedimentation basins will be constructed during mining operations to control drainage and collect sediment from the disturbed areas during the actual mining phase and during the reclamation and restabilization phase. If chemical treatment is necessary to bring the water quality to allowable limits the following may be utilized:

- a) Lime, caustic soda or equivalent additive to raise a low pH.
- b) Potassium permanganate to decrease manganese levels.
- c) Potassium permanganate to decrease iron levels.
- d) Aerating the water to lower the Iron content.
- e) Alum to decrease total suspended solid concentrations.
- f) Prior to the introduction of any chemicals other than these listed above, the operator will acquire approval from the Regulatory Authority.

1.5d Drainage Control:

Sedimentation basins will be constructed during mining operations to control drainage and collect sediment from the disturbed area during the actual mining phase and during the reclamation and restabilization phase.

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All water from the proposed mine site will drain to sediment basins 003, 005, 006, 011, 013, 014, 015, 016, 018, 023 during mining. All basins will be constructed, prior to any disturbance in its respective drainage area, under the supervision of a qualified Registered Professional Engineer or by a qualified person under his direct supervision. Upon completion of construction the basin will then be certified to the Regulatory Authority as having been constructed in accordance with the approved design plan. Areas where embankments are to be built will be cleared and grubbed with the topsoil removed and stockpiled (if required). The basins will be 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, diversion ditches and other prudent practices will be utilized in controlling runoff.

1.5e Restore Approximate Recharge Capacity:

The major aquifer within the permit area is a sandstone unit below the coal seam. Groundwater within the permit area should return to the approximate elevation of the water prior to mining. Surface run-off will be minimized in the following manners:

1. The post-mine slopes will be flatter than pre-mine slopes. This is for the post-mining land use of undeveloped/no current use.

1.5f Rights of Present Water Users:

A well inventory was conducted by McGehee Engineering Corp. in April and May of 2012. Door to door interviews were conducted on occupied dwelling within one half mile of the permit boundary to determine if domestic wells were present. The inventory revealed five (5) active wells within the half-mile radius of the mine. Of the five (5) wells, only one (1) is used for a primary source of water. Four (4) wells are either used as a secondary source for outdoor purposes or are not used at all. House Id 46 utilizes their well as their primary drinking source. House Ids 36, 47A, 50, 51, and 52 utilize their wells as a secondary use for outdoor purposes. [See Well Inventory](#) and [Hydro-Geo Map](#).

1.5g Potential Adverse Consequences from PHC:

Based on the data collected and the projections made with this study, there were no potential adverse consequences determined in the PHC.

Hydrologic Reclamation Plan Certification Statement:

I, Robert W. Usher, a Registered Professional Engineer, hereby certify that the Hydrologic Reclamation Plan included in this application was prepared by McGehee Engineering Corp, under my direct supervision, and that the information included therein is correct and accurate tot he best of my knowledge and belief.

McGehee Engineering Corp.

Robert W. Usher, P.E.
AL Reg. No. 15917

Date