PROBABLE HYDROLOGIC CONSEQUENCES DETERMINATION (880-X-8E-.06(1)(F))

1. PHC OF SURFACE MINING ACTIVITIES

As stated in the groundwater section, the well inventory revealed that there are 56 occupied dwellings within the half-mile radius of Camp Cherry Austin Mine. Six (6) residents (ID # 8, 9, 10, 11, 12, 13, and 14) have wells. House ID # 8 and 13 do not use their well. House ID # 9, 10, 11, 12, and 14 utilizes their well for the primary water source. Only House ID # 14 elected to have a sample taken. The primary water source for all other residents within the half- mile radius of Camp Cherry Austin Mine is obtained from Citizens Water Service, Inc. There are no known seeps, springs, or underground discharges located within the permit area. The movement of the regional groundwater (deep water) and the dip of the local strata is to the southeast.

Groundwater and surface water quality within and adjacent to the permit area is of a degraded quality due to poor handling of acid forming materials during the reclamation process of the previous mining in the area. It is believed that the implementation of the Acid Forming Material Handling Plan to properly handle the zones of acid forming material will improve the water quality within and adjacent to this mine site.

Overburden material given in Part II-E of this permit application shows that significant changes in the pH of groundwater are not likely to occur. The overburden analyses show that the neutralization potential and potential acidity of the overburden material result in near neutral to slightly basic acid base accounts. There are some zones within the spoil material that are considered acid forming material. No significant changes in the groundwater system in this mine area are anticipated.

The operation plan also proposes the removal of a maximum 30,000 tons per month of sandstone rock during the mining process. The sandstone spoil material to be removed from the pit will be loaded into trucks and hauled to a processing and stockpile area within the permit area. The finished product sandstone will be hauled off site. Removal of sandstone from the active pit area occurs in the normal procedure of surface coal mining and will not delay the mining or reclamation process. Some sandstone will be taken below the Carter coal seam.

The sandstone spoil material is not considered mine waste. The overburden analysis shows the sandstone to be non-toxic and non-acid forming and should present no problems to the area water quality if it leaves the mine site. See Part II-E for drill logs and drill log locations showing the strata of the permit area. The overall average indicates that there is an excess of 751 tons/acres of CaCO3 in the overburden at this mine based on the overburden holes. Acid base account will be run on the sandstone and spoil material biannually and submitted to the Hydro-Geologist at ASMC to insure the innocuous environmental character of the material. Should sample analysis determine a problem, off-site hauling will cease immediately and ASMC will be consulted to re-evaluate the Operation Plan concerning removal of commercial sandstone and heterogeneous spoil.

The current proposal is for the mine operator to remove the sandstone and spoil during the mining process and load the material into trucks to be hauled to a processing and stockpile area onsite.

There is an estimated 23,180,000 bank cubic yards of overburden material to be mined at Camp Cherry Austin Mine. Assuming a swell factor of 30% the swell cubic yards is 30,134,000.

Southland Resources, Inc. will move approximately 800,000 bank cubic yards per month at Camp Cherry Austin Mine. Using the 30% swell factor the total swell cubic yards moved per month is 1,040,000. With an average density of 2,550 lbs. / swelled cubic yard, the total tons moved each month by Southland Resources is approximately 1,326,000. Assuming Southland removes no more than 30,000 tons per month off-site the percentage of material removed off-site is only 2.3% of the total tons moved. The average overburden depth at Camp Cherry Austin Mine is approximately 95 feet. Removing 30,000 tons of rock/spoil per month for the life of mine would be equivalent to removing 2.2 feet of the total overburden depth. Removing this amount of sandstone material from the Camp Cherry Austin pit will have no effect on the reclamation of the area.

The small percentage (2.3%) of neutralizing sandstone material to be removed from the site should not have an overall effect of the neutralization of the site.

Before and after mining groundwater movement will be controlled by the topography and dip of the strata. After mining groundwater movement within the permit area will be controlled by the dip of the pit floor, which is to the southeast. During mining groundwater movement will be controlled by the dip of the pit floor. Seeps and springs area not anticipated at this site. However, if seeps and springs were to occur the excess neutralization potential in the strata overlying the coal seam should prevent the formation of acid-forming seeps.

Onsite groundwater quality is expected to decrease slightly in the form of increased mineralization and a lower pH due to groundwater being in direct contact with unweathered material. Groundwater quantity is expected to increase significantly due to the additional fracturing of layers of shale and creating voids by mining. After mining, groundwater movement near the permit boundary will be towards the mine site from areas adjacent to the permit area

with higher topography. Infiltration, permeability and storage within the permit area should begin to decrease as regrading and revegetation along with weathering takes place.

After years of weathering, compaction and chemical breakdown of the overburden it will begin to act as a soil again. With time the groundwater storage should approximate pre-mining conditions. Groundwater resources outside the actual mine site are not likely to be significantly affected, if they exist.

Surface water within the permit area consists of runoff in direct response to rainfall. There are no perennial streams or springs located within the permit boundary.

The PHC Site for this mine site will be Station SW-1 on Brush Creek. The PHC Station SW-1 has a drainage area of 1.96 square miles.

Water quality projections can be found in the regression spreadsheets. With proper handling of acid forming materials and reclamation activities it is expected that in stream water quality will improve from the existing conditions.

The $\log_{10}$ values of these parameters, except for pH (which is already in $\log_{10}$ form) were plotted vs. the corresponding $\log_{10}$ value of the flow rate in csm using Excel. This data was linear regressed using the "least squares" method. Values for the square of the multiple correlation coefficient (R2), the intercept (a) also referred to as the constant and the slope (b) also referred to as the x coefficient are shown on the Regression Workbook SW-1. The regression line equation, [y = (b)x + (a)] or [y = (x coefficient)x + (constant)] is used to predict surface water quality in the receiving streams at specific flow rates before mining. These specific flow rates are at the 7Q2, average, and 2 year floods. The method of calculating the 7Q2 flowrate in the

receiving stream is shown in "Low-Flow Characteristics of Alabama Streams", Geological Survey of Alabama, Bulletin 117. Calculating average flow in the receiving stream is shown in "A Method of Estimating Average Streamflow and Headwater Limits in U. S. Army Corps of Engineers, Mobile District, Alabama and Adjacent States", U.S. Geological Survey, Water-Resources Investigations, Open-File Report 81-59. The method of calculating the 2 year flow rate in the receiving stream is shown in "Magnitude and frequency of Floods in Alabama", Water-Resources Investigations Report 84-411.

The baseline data collected from the streams and wells for this site show the water quality to be poor. It is believed that with the proper handling of acid forming material within the overburden and existing spoil material as outlined in the Acid Forming Material Handling Plan that the water quality could be improved. Baseline Surface water quality at specific flow rates are given in the table entitled Surface Water Projections. This table shows that not all parameters are within EPA limitations which includes pH, Fe, and Mn. The pre-mine values of these parameters are below the EPA limitations. The post mining projected values do show a predicted improvement of these parameters.

The NPDES maximum and average limitations as set forth by ADEM for the Camp Cherry Austin Mine are as follows: The pH limit is between 6.0 – 8.5 s.u.; TSS maximum limit is 70 mg/l and the average is 35 mg/l; Fe maximum limit is 6.0 mg/l and the average is 3.0 mg/l; Mn maximum limit is 4.0 mg/l and the average is 2.0 mg/l. See the tables entitled Water Quality Projections for the expected discharges from this mine site.

Based on information revealed in the Geochemistry and Groundwater sections of this application impacts to the receiving streams will be minimal. The parameters most likely to be affected by this mining operation will be the pH, iron, manganese, and total suspended solids. With the

removal of vegetation surface water runoff will increase. Sediment levels in surface water runoff will increase due to the vegetation being removed. Removal of vegetation will allow surface runoff to transport fine grained sediment into the receiving streams. The sediment levels in surface water runoff will be controlled by sediment basins. The long term effects of mining at this site on surface water quality and quantity in Brush Creek and Rocky Branch will be negligible. It can be concluded that based on the information from the regressions and water quality from the adjacent previously mined areas little impact, if any should occur to the groundwater and surface water regime as a result of this mining operation. This data can be found on the attached regression spreadsheets for the different parameters.

2. FINDINGS

The following are findings of the Determination of the Probable Hydrologic Consequences for the proposed permit area and adjacent area as determined based on baseline hydrologic, geologic and other site specific information for this permit application:

A. ADVERSE IMPACTS TO THE HYDROLOGIC BALANCE

Within the proposed permit area, minor amounts of water were encountered above and in the Brookwood/Milldale/Carter Coal Seams and below these coal seams. Groundwater within the permit area appears to be contained in a poorly connected fracture system of the alternating sequences of sandstone and shales in the Pottsville Formation or within isolated areas where Cretaceous Tuscaloosa Group occurs. Both of these systems form isolated perched water tables with little areal extent.

The adjacent areas as a whole with respect to groundwater will not be adversely affected by this mining operation due to the fact that this mine is mining existing highwalls and a majority of the

area has been surface mined. Topsoil will be removed, and the overburden will be used as a substitute material.

B. ACID-FORMING OR TOXIC-FORMING MATERIALS

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 is not enough neutralization potential in the overburden to neutralize any acid forming material that might be encountered. There are some zones of acid forming material that will be handled in accordance with the Acid Forming Material Handling Plan.

The preventive or remedial measures necessary are in the handling of the acid forming material, 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 acid forming material will be handled in accordance with the Acid Forming Material Handling Plan. The pit bottom consists of alternating sequences of clay and sandstone (See Geologic Cross-Sections and drill logs). At this mine site if acid forming material is encountered it will be buried in the pit, a minimum of ten (10') feet away from the highwall, a minimum of ten (10') feet up from the pit

floor, and a minimum of fifty (50') feet away from a major drain and covered with a minimum of four (4') feet of the best available non-toxic, non-combustible material.

C. CONTAMINATION, DIMINUTION OR INTERRUPTION OF WATER SOURCE

There were no domestic, agricultural, or industrial uses of surface water within the proposed permit area or adjacent area.

D. SEDIMENT YIELD

An estimate of the amount of sediment yield from the proposed permit area before, during and after mining was calculated using the Universal Soil Loss Equation (A = R K LS CP) as obtained from chapter five (5), pages 311-341, of **Applied Hydrology and Sedimentology For Disturbed Areas** by B. J. Barfield, R. C. Warner, and C. T. Haan. All "k" values for each soil type within the permit area were taken from the soil survey book from the appropriate county. All length slope factors were taken from slope lengths and slope steepness within the permit area.

The Universal Soil Loss Equation is dependent on the erosive power of rainfall, the soil erodibility, slope and slope length, degree of soil cover and conservation practices. The Universal Soil Loss Equation is based on the assumption that all sediment eroded away will enter the receiving stream. This equation does not take into account that some of the sediment will be deposited before entering the receiving stream. Also, sediment basins are constructed on the outer perimeter of the permit area to control runoff and sediment leaving the permit area. The Sediment Basins have an average trap efficiency of 92.72 this trap efficiency will be calculated into the soil loss equation to get a more representative number for the actual amount of sediment leaving the permit area. Universal Soil Loss Equation (A = R K LS CP)* Basin Trap Efficiency.

SOIL LOSS FOR INCREMENT 1

Basin Trap Efficiency 93.0%

Time Period	R	K	LS	Cp	A
Before Mining	350	0.24	13	0.500	546.0
During Mining	350	0.24	13	0.900	68.8
2 Months after Reveg	350	0.30	13	0.140	13.4
12 Months After Reveg	350	0.30	13	0.050	4.8
5 Years After Reveg	350	0.30	13	0.009	12.3

E. ACIDITY, TSS, TDS, FE, MN, PH

1. Acidity

The results of the overburden analysis presented in the Geochemistry part of this permit application indicate that the overburden's Neutralization Potential is higher than the Maximum Potential Acidity. There are some zones of acid forming material that will be handled according to the Acid Forming Material Handling Plan.

2. TSS, TDS, Fe, Mn, and pH:

The parameters most likely to be affected in the groundwater system onsite will be higher iron, manganese, and dissolved solids during active mining. Exposure of the overburden to oxidation during mining will release some of the neutralizing agents present in the spoil. The parameters most likely to be affected in surface water system onsite are a decrease in pH, an increase in iron, manganese, and total suspended solids. Total suspended solids will be controlled by using ten (10) sediment control structures. The pit configuration will minimize the impact on runoff quantity. All runoff will drain to the basins naturally. Once reclamation is complete surface water runoff should continue to flow to the basins naturally. 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 suspended solids and dissolved solids into the receiving streams. Timely re-contouring and revegetation of the disturbed area will minimize contamination to the surface and groundwater systems.

F. FLOODING AND STREAMFLOW ALTERATIONS

During mining, sediment basins/rock filters 002, 003, 004, 010, 012, 013, 018, 019, 020, and 021 will be constructed in the outer perimeter of the proposed mine site. These sediment basins/rock filters will have storm detentions to absorb the increase of surface run-off, if it should occur. This

mining operation will not alter the drainage area of the Brush Creek or Rocky Branch. Therefore, the quantity of flow of the streams should not be adversely effected on or offsite.

G. GROUNDWATER AND SURFACE WATER AVAILABILITY

A well inventory was conducted by McGehee Engineering Corp. in December of 2019. 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 that there are 56 occupied dwellings within the half-mile radius of Camp Cherry Austin Mine. Six (6) residents (ID # 8, 9, 10, 11, 12, 13, and 14) have wells. House ID # 8 and 13 do not use their well. House ID # 9, 10, 11, 12, and 14 utilizes their well for the primary water source. Only House ID # 14 elected to have a sample taken. The primary water source for all other residents within the half-mile radius of Camp Cherry Austin Mine is obtained from Citizens Water Service, Inc. See Well Inventory and Hydro-Geo Map.

Probable Hydrologic Consequences Certification Statement:

I, Bradley K. Simmons, a Registered Professional Engineer, hereby certify that the Determination for Probable Hydrologic Consequences included in this application was prepared by McGehee Engineering Corp., under my direct supervision, and that the information included therein is correct and accurate to the best of my knowledge and belief.

McGehee Engineering Corp.

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Bradley K. Simmons, P.E. Date
Alabama Reg. No. 33277