Cahaba Resources, LLC.

Carter Mine

HYDROLOGIC

RECLAMATION PLAN

submitted by:

Perc Engineering Co., Inc.

P.O. Box 1712

Jasper, AL. 35502-1712

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

I. Steps to Minimize Hydrologic Balance Disturbance:

Surface mining and reclamation activities conducted on the Cahaba Resources, LLC. - Carter Mine 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 all constructed sediment basins at this mine site (where all runoff from the mine area will drain),Groundwater monitoring sites CRCMMW-2, CRCMMW-3, and CRCMMW-4 , and surface water monitoring sites CRCMSW-1 and CRCMSW-2 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 as reported in Part IV-C-1 of the permit application due to a topsoil variance being applied for at this facility. 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, P205, and K20 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, seeding spot areas within the Carter Mine 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.

e. With respect to quantity of the Hydrologic Balance, because mining at this site is not expected to significantly affect the regional aquifer in the area, there should be no significant adverse effect on the Hydrologic Balance from mining within the permit area.

II. Material Damage Outside the Permit Area:

All surface mining and reclamation activities within the Carter Mine 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.

   B) Monitoring Wells - Groundwater monitoring wells will be sealed at the time of abandonment with a concrete cap (1.5'x1.5'x.5').

   C) Mine Openings - none encountered during drilling.

5. Timely regrading for drainage control.

6. On site sediment control to prevent sediment from entering ponds.

7. Timely revegetation of all disturbed areas.

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 or caustic soda to raise a low pH.
2) Potassium permanginate to decrease manganese levels if the pH is too high.
3) A flocculant to decrease total suspended solid concentrations.

In the event alternative methods or chemicals are needed, 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 November of 2014 through April of 2015 reveals that there are 58 residences within a ½ mile radius of the proposed Carter Mine. Of the 58, 48 residences utilize municipal water from Citizens' Water Authority as their only domestic source, 18 residents were not at home, and four residences were vacant. The discrepancy between the total number of residences and the breakdown of those numbers is explained by the fact that information on several residences was given by either neighbors, relatives, or the owners of mobile home parks. **No domestic wells have been identified during the well inventory.**

V.A. Acid and Toxic Drainage:

Due to the fact that all overburden at this site does not occupy similar areas, intervals shown in attachment 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 Carter Mine 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 this method showing both the volume weighted acid-base potential of the area each drill hole represents, but also a summary of the acid-base potential of the entire proposed permit area on a volume weighted basis is attached. The results of the volume weighted acid-base potential of the entire proposed permit area from Geochemical Analysis Site CRCMDH-1 and Groundwater Monitoring Site CRCMMW-3 show that overburden at the Carter Mine contains 0.18 (tons CaCO3/1000 tons overburden) excess neutralization potential. In addition, as stated in Part II-E, there is a concern that the proposed permit area may contain an interval which has periodically caused reclamation problems at other local facilities due to adverse geochemical quality. This strata is a thin interval at the Coker-Pottsville contact which is locally known to exist. This interval is thought to be re-worked Pottsville Formation strata and is a sand channel, or high energy deposit. This interval is thin (generally less than 3 ft. thick), and is discontinuous (meanders). The dominant lithology for this interval is a light grey friable, or unconsolidated sand. It should be noted that none of the lithologic descriptions presented in this report contains such a description, and no geochemical analysis presented in this report has revealed its' existence, however due to the discontinuous (meandering) nature of the interval, it may or may not exist within the proposed permit area. It should be noted that there were several intervals in the Cretaceous strata which were analyzed as being questionable with respect to being acid forming. At this site the term "acid-forming' may not be accurate in this

instance. In general terms, **potentially acid-forming** indicates that the strata or stratum may form acid if exposed to catalysts such as the atmosphere or water (oxygen). The geochemical analysis conducted to determine this potential is the acid-base accounting. Acid is determined by a simple sulfur percentage test. The more sulfur that is present, the more acid may potentially be produced. Neutralization potential (or the base) is determined by titration. The titration test is conducted by taking a known volume of the strata, adding de-ionized water and a known amount of acid of known concentration, heating the mixture to make the base react with the acid, and titrating back to normality with a base of known concentration to measure the amount of acid that was neutralized by the base naturally present in the sample. As shown in Part II-E, all of the intervals mentioned above as being questionable have **negative neutralization potentials** (and low sulfur values). This means that during the neutralization potential test, more base was needed to neutralize the mixture than the amount of acid that was added originally. This means that there was acid naturally present in the sample. Where did this acid come from? No doubt, in aeons past, the cretaceous material at the proposed Carter Mine contained much higher amounts of sulfur. Due to the unconsolidated nature of this formation, rainwater which infiltrated into this strata migrated through the formation rapidly, exposing the acid-forming material to oxygen. This resulted in the formation of acid, and the amount of acid which was formed depleted all the neutralization potential that was present in the strata (if any). The amount of excess acid has since either migrated to the surface with the groundwater or remains to this day in the Cretaceous Formation strata discussed above. What are the ramifications of this information?: 1) Negative acid-base account numbers at the Carter Mine do not reflect the potential for creating acid but

reflect the amount of acid already formed. 2) Since there are very low levels of sulfur currently in the strata, there is no threat of creating acid by exposing this strata to the atmosphere (see maximum potential acidity values in Part II-E. 3) Burying this strata during mining would be expensive and largely ineffective due to a) no significant amounts of low permeability material exist in the overburden with which to prevent infiltration, b) no significant amounts of sulfur exists in these intervals to react to infiltrated rainwater, and c) where they exist, these intervals in the Cretaceous Formation are currently exposed to infiltrated rainwater throughout the Hurricane creek basin. 4) Due to the fact that there are very low levels of sulfur currently in the strata and negative acid-base account numbers at the Carter Mine reflect the amount of acid already formed, if a layer(s) is exposed to the surface after regrading occurs, the layer may be easily neutralized by lime without the possibility of future acid being formed. 5) The ONLY interval in the overburden that will be exposed to the surface (and oxygen) which will change the quality of the runoff (or infiltrated groundwater quality) is the Pottsville interval, which has a net positive acid-base account. The evidence of this statement is in the pH's and Alkalinity / Acidity ratios shown in baseline monitoring at CRCMSW-1. Previous mining on the Carter Seam within and adjacent to the proposed mine site (without the benefit of reclamation) has increased both.

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, a flocculant will be introduced into the basins to decrease total suspended solid concentrations. An alternative to a flocculant 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 or caustic soda to raise a low pH.
2) Potassium permanginate to decrease manganese levels if the pH is too high.
3) A flocculant to decrease total suspended solid concentrations.

In the event alternative methods or chemicals are needed, 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 fact that infiltration thru consolidated, non fractured strata prior to mining is a limiting factor to recharge capacity, fracturing of these intervals during the mining process should offset any limiting factors created by mining, if present, so that post-mining recharge capacity will approximate or exceed pre-mine conditions.

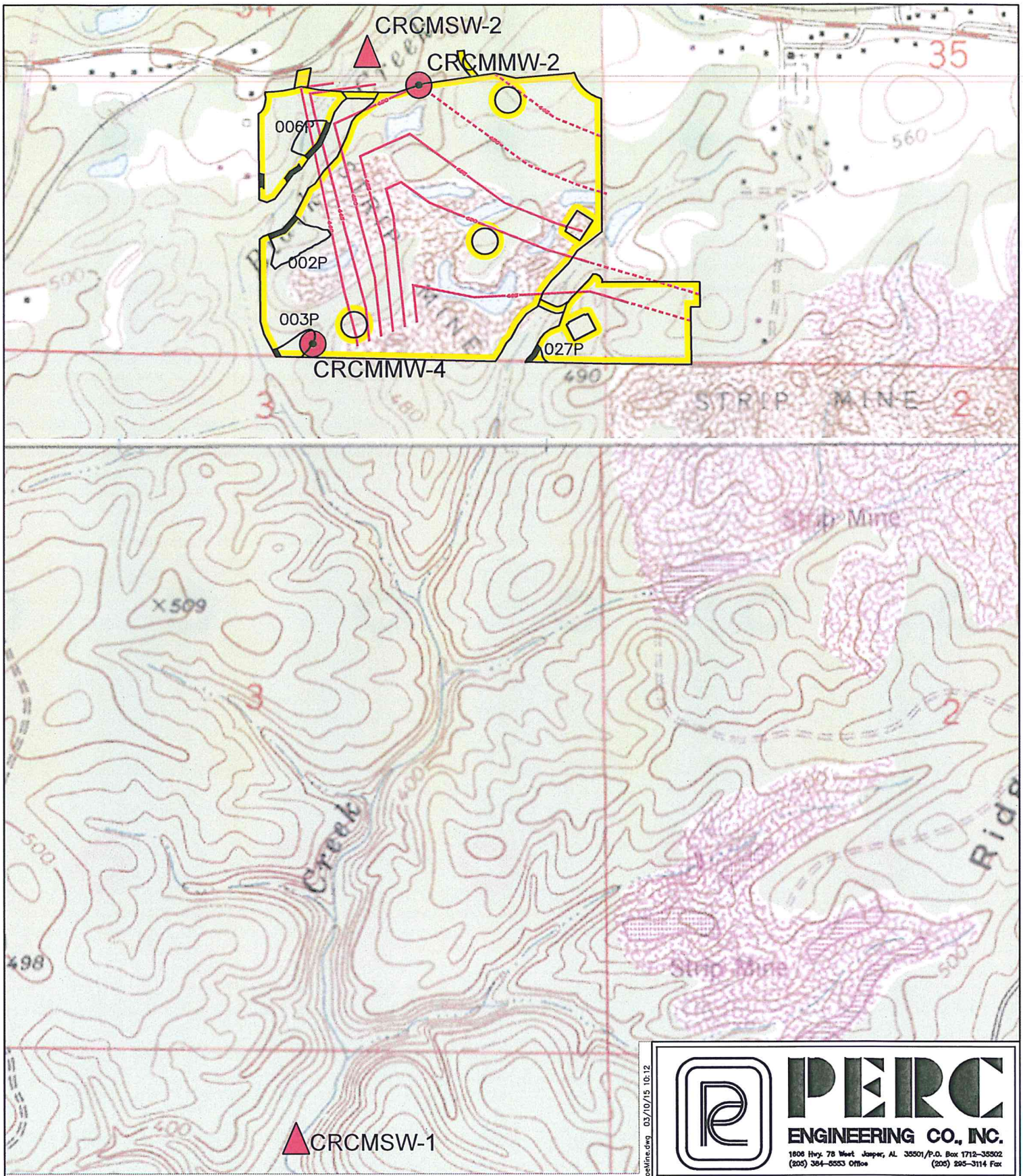
V.F. Rights of Present Water Users:

However, in the event that it is shown that mining by Cahaba Resources, LLC. has diminished the quality or quantity of surrounding well(s), one of the following methods of replacing the domestic supplies will be implemented: 1) an existing well that penetrates unaffected aquifers but hat has insufficient casing to prevent impact

from this operation will be cased to an unaffected aquifer or, 2) a new well will be drilled and cased into an aquifer unaffected by this operation or, 3) the residence will be connected to the nearest municipal water supply, or 4) 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.



MAP LEGEND

	PERMIT BOUNDARY
CRCMDH-1	GEOCHEMICAL ANALYSIS SITE
CRCMMW-3	GROUNDWATER MONITORING SITE
CRCMSW-1	SURFACE WATER MONITORING SITE
004P	SEDIMENT BASIN
	STRUCTURE CONTOUR LINE

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CAHABA RESOURCES, LLC
CARTER MINE
HYDROLOGIC RECLAMATION PLAN MAP

.DWG NAME:	CR Carter Mine	DATE:	04/02/2015
DRAWN BY:	S.A.E.	SCALE:	1"=1000'
APPROVED BY:	T.S.T.	JOB NUMBER:	13-04066-001

CERTIFICATION STATEMENT:

The preceding Hydrologic Reclamation Plan for Cahaba Resources, LLC. at the Carter Mine was prepared by, or under the direction of, a professional engineer and I certify that it is true and correct to the best of my knowledge and belief.

_____ Date:_____

TIMOTHY S. THOMAS
PROFESSIONAL ENGINEER
REGISTRATION NO. 18830