Cahaba Resources, LLC.
Carter Mine
Attachment IV-C-2

TOPSOIL VARIANCE APPLICATION

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ABSTRACT

Mining by the surface method has occurred on the Brookwood Coal Group by both pre-law operators and regulated coal companies both currently and in the past in the Peterson - Fleetwood area. In most instances where pre-law operators regraded overburden, it was without regard for existing topsoils. Also, even though in many instances pre-law operators didn't revegetate, natural revegetation occurred on sites within and adjacent to the proposed permit with surprising success. This fact contributed to the Regulatory Authority granting an initial topsoil variance to a regulated mine site adjacent to this proposed site (Black Warrior Minerals - Fleetwood 1 Mine (P-3810). This site has demonstrated revegetation success. utilizing a select mixture of Pottsville overburden. Revegetation success at this site is largely due to a consistent lithology of Pottsville shale and sandstone, which, when mixed during mining, results in a medium which is favorable for both pine tree and ground cover growth. When taking into consideration the fact that the proposed permit area is covered with soils weathered from Cretaceous Sediments (which at other sites have shown a tendency to be highly erodible), the use of a select interval is believed to be the 'best available' for revegetation purposes.

The purpose of this paper is to compare local topsoils versus a select mixture of Pottsville overburden materials to demonstrate the superiority of the Pottsville overburden, and also compare such relevant issues such as similarities in mining

methods, overburden lithologies, and overburden chemistries of the proposed mine site to the Fleetwood 1 Mine to demonstrate the likelihood of replicating prior revegetation success at the Carter Mine.

SITE CONSIDERATIONS

The Black Warrior Minerals, Inc - Carter Mine site is located in southeast quarter of Section 34, Township 20 South, Range 8 West, Tuscaloosa County, Alabama, as seen from the 1983 photorevised Brookwood and Coaling, Alabama U.S.G.S. 7.5 minute Quadrangles. The proposed mine site will occupy approximately 132 acres of which approximately 124 is bonded as mining area .

As shown on the ASMC permit map for this application, the majority of the surface ownership for this permit area is either Randall Crawford (a principal of Cahaba Resources) or Cahaba Resources, LLC.. One of the main objectives of mining this permit (other than coal recovery) is to reclaim the previously disturbed (unreclaimed) portions of the permitted area for the surface owners.

Soils information for the permit and adjacent areas were taken from the "Soil Survey of Tuscaloosa County, Alabama" that was issued in August of 1981. Soil types and boundaries delineated within the proposed permit area and adjacent areas are shown on the attached Topsoil Variance Map as well as the permit area location, previously mined areas, drill holes, & overburden and topsoil sampling locations.

Soils delineated on the Topsoil Variance Map within and adjacent to the permit area are as follows:

Map Symbol	Soil Name
6*	Bama Fine Sandy Loam, 2-6% slopes
25	Palmerdale very shaly loam, 6-45% slopes
35	Smithdale- Flomaton complex, 15-35% slopes
40	Smithdale-Pikeville association, hilly

* Denotes Prime Farmland Soil.

As shown on the attached Topsoil Variance Map, soil 6 is classified as a 'Prime Farmland' soil by the Natural Resources Conservation Service. Also as indicated on the Topsoil Variance Map, soil 6 is NOT INCLUDED in the topsiol variance erquest. Soil 6 is also not classified a Prime Farmland basde on historic land use.

LAND USE

The premining land use for the entire permit area is a mixture of undeveloped timberland and previously disturbed areas. Previously disturbed areas are delineated on the Topsoil Variance Map. The post mining landuse for the acreage within the proposed permit area is undeveloped lands or no current use utilizing perennial grasses as the revegetation species.

TOPSOIL DESCRIPTIONS

The following descriptions are for soils delineated within the Carter Mine as shown above. As stated previously, soils information (including soil descriptions) for the permit and adjacent areas were taken from the "Soil Survey of Tuscaloosa County, Alabama" that was issued in August of 1981. A description for Soil 6 is not shown because it is not included in the Topsoil Variance Application.

25- Palmerdale very shaly loam, 6 to 45 percent slopes

This map unit consists of a deep, somewhat excessively drained acid soil. This soil is the spoil remaining from strip mining operations in areas where coal is overlain by soft sandstone and shale. The surface layer varies in texture depending upon the coal seam removed and whether spoils have been smoothed. The older areas that have not been reclaimed or remained have very steep and complex slopes and have may high walls and deep pits that contain water (fig. 7). The smoothed or reclaimed areas ordinarily have long smooth slopes with high walls, steep back slopes, and approaches to deep pits of water; but they are smoothed and blended in with the natural landscape. Slopes range from 6 to 45 percent. Individual areas range from 60 to 3,700 acres. Typically, the surface layer is grayish brown very shaly loam that is as much as 60 percent shale and sandstone fragments and is about 5 inches thick. The underlying material is grayish brown very shaly sandy loam that is approximately 90 percent fragments.

Palmerdale soil is very low in natural fertility and organic matter content. Reaction ranges from strongly acid to extremely acid throughout. Permeability is moderately rapid, and available water capacity is low. Tilth is poor, but the soil can be worked throughout a wide range in moisture content. The root zone is restricted by large rocks.

Included with this soil in mapping are a few areas of Palmerdale very gravelly loam and areas where large rock fragments cover more than 90 percent of the surface. Also included are Brilliant, Montevallo, Nauvoo, Pikeville, and Smithdale soils. Included soils make up about 15 percent of the area.

Most unreclaimed areas of this Palmerdale soil are dominantly void of vegetation with a few scattered pine and hardwood trees. Reclaimed areas have been planted to grasses and legumes or pines.

This soil is not suited to cultivated crops. The reclaimed areas are fairly suited to pasture and hay. The restricted root zone, low available water capacity, and poor tilth are limitations. Unreclaimed areas are poorly suited to hay and pasture crops. Steep slopes, a restricted root zone, large rocks on the surface, low available water capacity, and poor tilth are limitations. The hazard of erosion is severe if these soils are tilled. Onsite investigation is needed to determine whether or not areas have been reclaimed.

The Palmerdale soil is fairly suited to loblolly pine. The hazard of erosion is severe. The equipment limitation is moderate in most reclaimed areas and severe in unreclaimed areas. The soil is fairly suited to use as woodland wildlife habitat. It is poorly suited to most urban uses because of steep slopes, large rocks on the surface, and low strength.

The Palmerdale soil is in capability subclass VIIs and woodland group 3x.

35-Smithdale-Flomaton complex, 15 to 35 percent slopes

This map unit consists of small areas of Smithdale and Flomaton soils that are so intermingled that it was not practical to map them separately, These deep, well drained, and excessively drained soils are on upper side slopes and ridgetops. Slopes range from 15 to 35 percent. Individual areas range from 10 to 2800 acres.

Smithdale fine sandy loam makes up about 45 percent of each mapped area. Typically, the surface layer is dark brown fine sandy loam about 5 inches thick. The upper part of the subsoil is red loam to a depth of 42 inches. The lower part is yellowish red sandy loam to a depth of 52 inches and sandy clay loam to a depth of 72 inches or more. This soil is low in natural fertility and in organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability and available water capacity are moderate. The root zone is deep and is easily penetrated by plant roots.

Flomaton very gravelly loamy sand makes up about 20 percent of each mapped area. Typically, the surface layer is dark brown very gravelly loamy sand about 5 inches thick. The subsurface layer is brownish yellow and yellow very gravelly loamy sand to a depth of 27 inches. Below that is yellow gravelly loamy sand and layers of yellowish red very gravelly sandy loam to a depth of 72 inches or more.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout the profile. Permeability is rapid, and available water capacity is very low. Included with this complex in mapping are some areas of Bama, Montevallo, and Nauvoo soils. Included soils make up about 35 percent of this map unit. The soils in this complex are mostly used as woodland. Some small areas, however, are used for pasture and hay. The hazard of erosion is severe if cultivated crops are grown.

These soils in this complex are fairly suited to loblolly pine and longleaf pine. The hazard of erosion, equipment limitation, and seedling mortality are moderate. These soils are fairly suited to use as woodland wildlife habitat. These soils are poorly suited to most urban uses. Steep slopes and the large amount of gravel and sand are severe limitations. The slope limitation can be overcome by proper engineering design.

The soils in this complex are in capability subclass VIIe. The Smithdale soil is in woodland group 3o, and the Flomaton soil is in woodland group 4f.

40- Smithdale-Pikeville association, hilly.

This map unit consists of deep, well drained soils on dissected uplands of the Coastal Plain. These soils formed in loamy and gravelly marine sediments. Slopes range from 10 to 35 percent. Individual areas range from 200 to 7,000 acres.

The Smithdale soil and similar soils make up about 40 percent of the unit. Typically, the surface layer is dark brown fine sandy loam about 5 inches thick. The upper part of the subsoil is red loam to a depth of 42 inches. The lower part is yellowish red sandy loam to a depth of 52 inches and sandy clay loam to a depth of 72 inches.

This Smithdale soil is low is natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability and available water capacity are moderate. The root zone is deep and easily penetrated by plant roots.

The Pikeville soil and similar soils make up about 30 percent of the unit. Typically, the surface layer is dark grayish brown sandy loan about 7 inches thick. The subsurface layer is yellowish brown sandy loan to a depth of 13 inches. The upper part of the subsoil is yellowish red sandy loan and sandy clay loam to a depth of 31 inches. The lower part is yellowish red very gravelly sandy clay loam to a depth of 72 inches or more.

This Pikeville soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid. Permeability and available water capacity are moderate.

Included with these soils in mapping are a few small acres of Bibb, Flomaton, Montevallo, and Nauvoo soils. Included soils make up about 30 percent of this map unit. The soils in this association are mainly used as woodland. They are poorly suited to cultivated crops. Slope and the hazard of erosion are severe limitations.

The soils are fairly suited to pasture and hay because steep slopes restrict the use of equipment in most areas. These soils are well suited to loblolly pine. The equipment limitation and plant competition are the main management concerns.

The soils are well suited to use as woodland wildlife habitat. These soils are fairly suited to most urban uses. Slope is a severe limitation for septic tank absorption fields, dwellings and local roads and streets. Both soils are in capability subclass VIIe.

The Smithdale soil is in woodland group 3o, and the Pikeville soil is in woodland group 3f.

GEOLOGIC DESCRIPTION

Geologic description of the Seaboard permit area was by qualified personnel of PERC Engineering Co., Inc. from several drill holes within and adjacent to the permit area and is as follows:

"Structurally, this site is located within the Warrior Coal Basin. The Warrior Basin is the southern most of a series of Pennsylvanian basins of the Appalachian Plateau. Structurally, the Warrior Basin is formed by a large gentle syncline that extends from north-central Mississippi in the west to north-central Alabama in the east. The syncline is tilted southwestward with a regional dip of 30 to 200 feet per mile. Toward the interior of the Warrior Basin, the regional southwest dip of Pottsville strata is modified by a series of three synclines and two anticlines. Of these, the major structures are the Warrior and Coalburg synclines, and the Sequatchie anticline. The fold axes are parallel to the Appalachian system in a northeast-southwest direction and plunge to the southwest with the regional dip.

The strata which underlies and outcrops in this area is of both the Pottsville Formation of the Pennsylvanian Age and the Coker Formation of the Cretaceous Age. According to 'Ground-water Availability in Tuscaloosa County, Alabama', the Pottsville Formation in this area consists of interbedded dark-gray shale, siltstone, medium-gray sandstone, and coal in cyclic sequences, and the Coker Formation consists of light-colored micaceous very fine to medium sand, cross-bedded sand,

varicolored micaceous clay, and a few thin gravel beds containing quartz and chert pebbles.

Locally, the strata which outcrops in the immediate vicinity of the Carter Mine includes sandstones, shales, and coals associated with the Brookwood Coal Group and is overlain by Cretaceous sands, clays, and pebbles associated with the Coker Formation. According to "Depositional Settings of the Pottsville Formation in the Black Warrior Basin", the Brookwood Coal Group is stratigraphically the highest coal group in the Warrior Coal Basin and lies approximately 150-300 feet above the Utley Group.

The target coal seam at this facility which is present within and adjacent to the proposed permit area is the Carter Seam of the Brookwood Coal Group. The Guide, Brookwood, and Milldale Seams of the Brookwood Group are generally known to overly the Carter, however due to the extensive previous disturbance, the elevation of the Carter Seam, and the prevailing topography within the permit area , these seams were not identified during the drilling program. It is not anticipated that any other seam will be encountered other than the Carter Seam, however, another seam might occur on a very limited basis. However if encountered during mining, it will be recovered.

"Depositional Settings of the Pottsville Formation in the Black Warrior Basin" states that the Carter Seam occurs approximately 20 to 40 feet above the Johnson Seam,

approximately 30 feet below the Milldale Seam , that the Carter ranges in thickness from 5 to 30 inches, and is in much demand as a metallurgical or coking coal.

Approximately half of the proposed permit area has been previously disturbed by pre-law mining of Brookwood Group Coal Seams, although it is not known of any others than the Carter were mined. reported that there are still isolated pockets of the Brookwood Seam.. Exploratory drilling within the proposed permit boundary reveals that the Carter Seam outcrops between approximately 435 and 466 ft. MSL and averages approximately 18 inches thick.

Overburden thickness above the Carter Coal Seam ranges from 0 ft. at the cropline to approximately 51 ft. at the deepest point. Cretaceous material within the proposed permit area ranges from 15 to 42 feet thick and averages approximately 33 ft. thick as shown from available drill hole lithologies. The Coker Formation strata to be disturbed within the proposed permit area can be described as weathered sandy surface material followed by unconsolidated, weathered sand and clay with small amounts of quartz pebbles. The color of this interval ranges from a mdeium red-brown at the surface to light yellow brown at the base of the formation. In areas where the thickness of the Pottsville Formation is not dictated by surface topography, the thickness of the Pottsville strata overlying the Carter Seam within the proposed permit area ranges from approximately 11.5 feet to 16 feet with an average thickness of approximately 13.83 ft. thick as shown from

available drill hole lithologies. The lithology of Pottsville Formation strata overlying the Carter Seam within the proposed permit area is very simple: either a single shale layer ranging from 6.5 to 16 feet thick or (towards the west of the proposed permit) a sandstone interval which overlies the shale layer. The sandstone interval is a fine to medium grained tightly cemented sandstone which is medium to very hard. In some places the groundwater which has migrated through the highly conductive cretaceous sediments has weathered the first few inches of the Pottsville sandstones and shales. This lithology was taken from drill holes within and adjacent to the proposed permit area and these intervals vary in thickness depending upon their location within the proposed permit area.

The elevation of the Pottsville-Cretaceous contact may be seen on the attached Pottsville-Cretaceous Contact Map. The orientation of this contact, which has a profound affect on groundwater movement in the Cretaceaous aquifer, is shown on the map as dipping towards the South and West.

Although no faults are known to exist within this small permit area, it is known from previous permit applications in this area (by both Black Warrior Minerals and The Drummond Company) that there is at least one fault to the west and southwest of this permit. This fault (or faults) has an influence on the structure and orientation of the target coal seam and the overlying strata proposed to be disturbed by coal recovery operations at this site.

According to 'Depositional Settings of the Pottsville Formation in the Black Warrior Basin', investigations have shown that the depositional environment of the coal and enclosing strata has a direct bearing on the character of the coal seams, that the thickness and extent of the seam is largely determined by the relief of the surface on which the coal swamp developed, and that the nature of the sediments which overlie the coal (overburden) have a strong influence on coal quality including sulfur and trace element content. The reference also states that the prevailing theory is that the Pottsville Formation represents a progradational sequence that ranges from Barrier Island deposits near the base of the Formation grading through Lower Delta Plain and transitional deposits *into Upper Delta Plain deposits as you ascend into the upper part of the Formation*. In addition, the reference states that all depositional systems comprise one or more interrelated depositional environments which are in turn represented in the rock record by one or more lithofacies defined by the sedimentologic and biologic processes active within each environment. Based on this information, the fact that the Brookwood Coal Group is the highest coal group in the Pottsville, and on site-specific drill data presented in this report, all indicate that the Brookwood Coal Group was formed in an upper delta plain depositional environment. As shown in 'Depositional Settings of the Pottsville Formation in the Black Warrior Basin', upper delta plain deposits are fluvial in nature, meaning a fresh water depositional environment, and were not deposited in a marine environment (which has been connected to low quality runoff from coal related facilities). The cretaceous deposits, which overlay the Pottsville strata at the mine site, are thought to be the Coker Formation, or more specifically, the lowest

part of the Coker Formation, which has been called the Cottondale Formation. According to 'Geology of the Coastal Plain of Alabama', the Cottondale is present only in the immediate vicinity of Tuscaloosa and the Warrior River, and is an apparent nonmarine sand having only a small amount of gravel at the base. The reference also states that the Cottondale Formation contains no glauconite. Glauconite is defined as essentially a hydrous potassium iron silicate which commonly occurs in sedimentary rocks of marine origin, therefore if there is no glauconite present, the sedimentary material probably did not form in a marine environment. The reference also states that the coarse-grained sand and carbonaceous clay in the formation are believed to have accumulated at or close to a shoreline, perhaps near the mouth of a river. In addition the reference states that the quartz and quartzite discs might indicate prolonged erosion on the swash zone of a beach.

The only deviation from this depositional model 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), is discontinuous (meanders), and has periodically caused reclamation problems at other local facilities due to adverse geochemical quality. 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, however due to the discontinuous (meandering) nature of the interval, may or may not exist within the

proposed permit area.

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 $CaCO_3$/1000 tons overburden) excess neutralization potential. The bottom acreage used for acid-base potential analysis was calculated using the Theissen Polygon Method.

SAMPLING TECHNICS

Information utilized to describe the orientation, lithology, and geochemistry of the Carter Mine and adjacent areas include the following drill holes, geochemical analysis sites, and groundwater monitoring sites: CRCMDH-1, CRCMMW-1, CRCMMW-2, CRCMMW-3, and CRCMMW-4. These sites were drilled in August of 2014 with a rubber tired, air rotary Davey Drill Rig built by the now defunct Davey Drill Company utilizing a 5 and ½ inch drill bit. All of the above mentioned sites were drilled and/or cased specifically for this report. Samples were collected by qualified personnel from PERC Engineering Company, Inc. every 5 feet in depth or change in lithology, cataloged, and stored in gallon sized reclosable storage bags for later inspection and testing. These samples were delivered to the PERC Engineering Laboratory where the lithology of the samples were determined by a qualified professional. See attached lithologic descriptions. In addition, several exploratory drill holes and channel samples were drilled/excavated by the Operator to determine coal seam elevation and extent. See attached Coal Boundary Map and the attached 'Pertinent Information for Selected Exploratory Drill Holes and Channel Samples'.

Geochemical analysis sites drilled to describe coal and overburden geochemistry specifically for this report include Geochemical Analysis Site CRCMDH-1 and Groundwater Monitoring Site CRCMMW-3. Chemical analysis, including pH and neutralization potential was conducted on overburden samples from the above

mentioned sites at the PERC Engineering Laboratory according to ASTM guidelines (See attached analysis). Total sulfur analysis was conducted at Mineral Labs, Inc..(See attached analysis).

Two samples of soil type 35 were collected along with one sample of soil 40, and three samples of a select mixture of Pottsville overburden at locations shown on the attached Topsoil Variance Map by PERC Engineering in February of 2015. Each soil sample was selected as the most representative of the area in both texture and vegetative cover (which reflects chemical suitability). Samples were taken by digging a cylindrical to slightly conical shaped hole 6-8 inches deep with a spade. All contents of this section are included in the sample. Soil samples taken lack vegetative and other organic cover so they will more accurately reflect topsoil that is cleaned of vegetative cover and stockpiled for soil redistribution. Sieve analysis was conducted on oven-dried samples by PERC Engineering Co., Inc. to determine coarse fragment and soil percentages. Results of this analysis is in Appendix 2. The minus 2mm (or soil) fraction of all samples were then sent to Auburn University Soil Testing Laboratory for the following analyses: Soil fertility, pH, recommendations for post mining revegetation, % sand, silt, and clay, available water capacity, and ppm of nitrate nitrogen in the soil. Results of this analysis are given in Appendix 3. Note: available water capacity (AWC) conducted by Auburn University Testing Laboratory is determined on only the soil (-2mm) fraction of the sample obtained in the field. To obtain the "Total" available water capacity, the AWC will be added to the available water capacities of the larger coarse fragments

as shown in Appendix 4. Senders sample designations listed in Appendix 3 are as follows:

8360 - Soil 35-1	8363 - Overburden #1
8361 - Soil 35-2	8364 - Overburden #2
8362 - Soil 35-1	8365 - Overburden #3

OVERBURDEN VS TOPSOIL COMPARISON

Cumulative results from Appendix 2 & 3 are as follows:

	SOIL (AVE.):	OVERBURDEN (AVE.):
pH (median)	4.67	5.03
	Fertility ratings for P, K, & Mg:	
Phosphorus	14	89
Potassium	68	175
Magnesium	51	524
	Recommendations for Limestone, N, P_2O5, K_2O:	
Limestone (Tons/Acre)	1.00	1.33
N (Lbs./Acre)	60	60
P_2O5 (Lbs./Acre)	80	47
K_2O (Lbs./Acre)	67	27
Percent Sulfur	0.017	0.033
Maximum Potential Acidity*	0.531	1.031

	SOIL (AVE.):	OVERBURDEN (AVE.):
Neutralizing Potential*	0.500	9.000
Acid-Base Account*	-0.031	+7.969
Percent Organic Matter	0.77	4.23
Nitrate Nitrogen	3.63	7.63
Sand Percentage	52.71	30.63
Silt Percentage	24.79	46.67
Clay Percentage	22.50	22.70
Available Water Capacity (In. H_2O/In. Soil)	0.113	0.153
Course Fragment Percentage	27.45	31.93
Soil Percentage	72.55	68.07
"Total" Available H_2O Capacity (in. H_2O/in. soil)	0.1006	0.1270
Soil Erodibility (K)	0.25	0.20

*Tons CaCo3 Equivalent/1000 tons material

A discussion of the above comparison resulting from physical and chemical analysis conducted on topsoil and overburden samples taken at locations indicated on the attached Topsoil Variance Map is as follows:

The pH of the overburden samples and the native soil samples were analyzed as being very similar. The pH of both the native topsoil samples and the select interval overburden samples were classified as being "very strongly acid" by a classification system developed by the USDA Soil Conservation Service, although the select overburden samples were closer to the optimum pH for the intended post mining revegetation. The amount of lime required to raise the pH of the topsoil to 6.5 was anaylzed as being less than that of the select Pottsville overburden. The Auburn Soil Testing Laboratory recommends 660 lbs. per acre more lime on Pottsville overburden than on native topsoils .

Overburden samples collected for the Carter Mine was shown to be more fertile than the native topsoils collected at the proposed site. Overburden was rated higher in all three macronutrient categories: phosphorus, potassium and magnesium. As a result, Auburn University's Soil Testing Laboratory reported that the native topsoils require an average of 73lbs/acre more additional nutrients than the overburden.

The acid-base accounts of the native topsoils were negative (-0.031 tons $CaCO_3$) while the acid-base account of the select overburden was positive (+7.969 tons

$CaCO_3$). This result agrees with the Geology section of this report, which stated that the Pottsville overburden contains excess neutralization potential.

In addition, the overburden samples contained the more organic matter and nitrate nitrogen than the native topsoils .

Textural analysis, performed by the PERC Engineering Laboratory revealed that the native topsoil samples contained more soil and less coarse fragments than the Pottsville overburden samples, as expected. Typically, as soil percentage increases, so does available water capacity, and one would imagine that the native topsoil samples would be superior in this parameter. However, in this case, the native soils at the Carter Mine area are largely formed from cretaceous sediments. Therefore they are high in sand content (52.71% average) and the resulting available water capacity for the soil sized particles are also relatively low (0.1130 in/in. average). Therefore, when the Total available water capacity is calculated as shown in Appendix 4, the resulting value is also relatively low (0.1005 in/in.). This is not true for the Pottsville overburden samples. Even though the amount of soil per sample is less in these samples, the texture of the soil within the Pottsville overburden sample is better for available water capacity because the overburden at the Carter Mine contains a majority of shale and as well as some sandstone as shown from Appendix 1. As shown in the Topsoil vs. Overburden Comparison table, Pottsville overburden soil had less sand, more silt, and more clay than the native topsoil samples. This resulted in the overburden samples having a higher Total available

water capacity (0.1270 in./in.) and as such is more suitable for post mining revegetation than the native topsoils.

Available water capacity of the top six inches is especially important for post reclamation revegetation due to the fact that shale layers which are normally present in the overburden, and inhibit the downward migration of soil water and groundwater, are not present after mining takes place. This removal of aquitards due to the fracturing of strata contributes to a depletion of soil water in post reclamation soils and subsoils. Available water capacity is very important in considering the suitability of the respective media for post mining revegetation, especially when taking into consideration that during periods of low or no rainfall, the amount of soil moisture in the root zone of the plants has a direct affect on whether or not the plant survives. The mixed Pottsville overburden is superior in this parameter and as such is more suitable for post mining revegetation than the native topsoils. In addition, the mixed Pottsville overburden will continue to weather and increase the amount of soil in the media, which in turn will continue to increase the total available water capacity of this media, whereas the native cretaceous topsoils, for the purposes stated in this report, are completely weathered.

Also, as is typical for comparisons between topsoils and overburden materials, regraded topsoils exhibit a greater tendency to erode than regraded overburden, especially in steeper slope areas. This is due to the fact that 'new' overburden

typically contains more coarse fragments (as shown above) which resists rainfall impact and erosion due to overland flow. Many of these coarse fragments will eventually break down into soil sized material, adding to the soil percentage, while 'protecting' the mixture from erosion in the early stages of reclamation.

In addition, another potential problem associated with soils from Cretaceous parent material is the physical characteristics of the Cretaceous soils. Coker soils and underlying subsoils have high erodibility factors, which mean these materials erode easily. When Cretaceous silts, sands, and clays erode, they leave behind an abundance of pebbles. These pebbles become very hot when exposed to sunlight during the growing season. This heat decreases germination rates in reclamation species. A lack of germination increases the potential for erosion, which increases the amount of pebbles on the surface. Many prior surface mining permits in Tuscaloosa County have documented the problems associated with reclaiming disturbed areas utilizing soils derived from cretaceous sediments.

The above information suggests that a select interval of mixed Pottsville overburden at the Carter Mine is more suitable for post mining revegetation than native (cretaceous) topsoils.

PROPOSED VARIANCE AREA VS. ADJACENT SITE SIMILARITIES

As stated previously, the Regulatory Authority granted an initial topsoil variance to a regulated mine site adjacent to this proposed site (Black Warrior Minerals - Fleetwood 1 Mine / P-3810)). This site has demonstrated revegetation success utilizing a select mixture of Pottsville overburden on approximately 463 acres of mining area to date. Revegetation success at the Fleetwood site was largely due to a consistent lithology of Pottsville shale and sandstone, which, when mixed during mining, results in a medium which is favorable for both pine tree and ground cover growth. The Fleetwood mine site is located near to the proposed Carter Mine, had the same dominant soil types as the proposed mine site has, recovered coal from the same geologic intervals as the proposed mine site will, had higher maximum highwall heights as the proposed mine site will have, and has approximately the same post mining slopes as the proposed mine site will have.. This adjacent site has exhibited adequate revegetation and particle size performance to warrant Phase III (total) bond releases on Increment numbers 1, 3, 4, and 6 by the Regulatory Authority. Lithologies from both the Fleetwood site and the Seaboard site show the presence of sandstone but also significant amounts of shale. The geochemistries of the two sites are also very similar. The average acid-base account from geochemical analysis sites at the Fleetwood Mine indicated an average of 3.97 (tons $CaCO_3$/1000 tons overburden) excess neutralization potential whereas the average acid-base account of the Carter site contains an average of 0.18 (tons $CaCO_3$/1000 tons overburden) excess

neutralization potential. When taking the above into consideration, the use of a heterogeneous mixture is believed to be the 'best available' for revegetation purposes.

RESULTS AND CONCLUSIONS

The conclusion of all the data represented in this report is that the Pottsville overburden is physically and chemically superior to the topsoil in a majority of the parameters tested and is therefore the preferred medium in which to conduct revegetation operations, and is also very similar to material used for revegetation at an adjacent site where reclamation success has been documented.

The selected Pottsville overburden at the Carter Mine was observed to be superior to the native topsoils in the following parameters: pH, fertility, neutralization potential, acid-base account, percent organic matter and nitrate nitrogen content, soil texture, available water capacity of the soil sized material, total available water capacity, and soil erodibility. The only parameters in which the native soils were superior to the selected Pottsville overburden was: percent sulfur (and the resulting maximum potential acidity),, liming rate, and percent soil in the collected sample (and as stated earlier, the mixed Pottsville overburden will continue to weather and increase the amount of soil in that media.

The fact that the topsoil variance area is proposed adjacent to an area with

documented revegetation success, with the same seams targeted, where the overburden at the proposed site has been demonstrated as being physically similar and chemically superior, suggests that the reclamation success at the Carter Mine will be as successful as at the adjacent Fleetwood Mine, and as stated above, tha Fleetwood has 4 different mining increments with Phase III (or total) bond release.

REDISTRIBUTION PLAN

The mining method used at the Carter Mine is a Truck & Loader operation. Overburden will be rough graded by Caterpillar type dozers. Once overburden has been rough graded, farm-type tractors will be used to disc the overburden to its final contour, decrease compaction, and increase the mechanical breakage of the surface layer. Rocks 24" in diameter that remain upon the surface, if any, will be collected and buried. At this time the following criteria will be used to evaluate the textural quality of the graded overburden:

a) Rocks of a size greater than 10" shall not exceed 10% by weight of the substitute material.

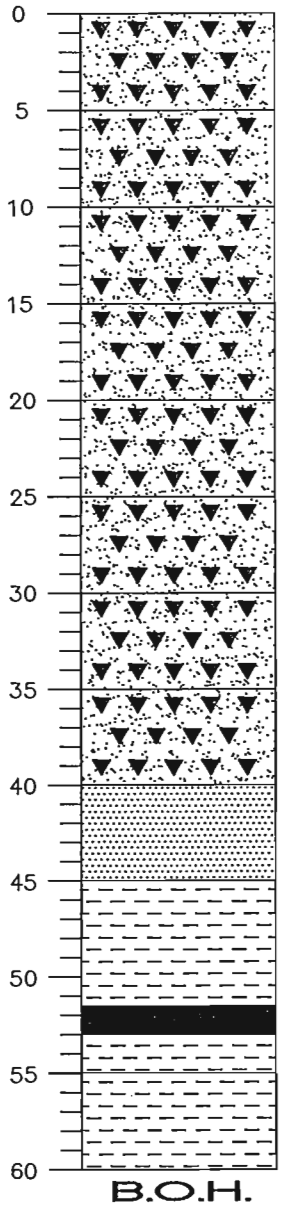
b) The substitute material shall not contain more than 15% by weight of materials between 10 and 3 inches in size.

c) The substitute material shall not contain more than 50% by weight of materials between 3 and .75 inches in size.

d) At least 30% by weight of the substitute material shall be of a size less than 2 millimeters.

If this criteria is not met, Cahaba Resources, LLC. shall redisc the overburden and resample. If increasing the mechanical breakage will not enhance the texture of the graded overburden to a satisfactory level, additional soil sized material will be hauled and spread on site or rocks will be recovered from the surface and buried until the above criteria is achieved.

The final texture samples taken shall be sent to the Auburn University Soil Laboratory (or other approved agricultural lab) where the following tests shall be conducted: %sand, silt, & clay, textural classification, pH, total sulfur, acid-base account, fertility ratings for phosphorus, potassium, and magnesium, and amendment recommendations for post mining revegetation for limestone, nitrogen, P_2O and K_2O. Results of this analysis will be used to determine the amount of soil amendments, if any, to be applied to the plant medium. Results of all analyses shall be supplied to the Regulatory Authority for review. Any toxic forming materials encountered will be removed or covered with 4 feet of non-toxic non-acid forming material. Approved seed mixtures will be planted and hay used as mulch will be blown upon the seeded overburden according to ASMC guidelines. The above reclamation procedures will be conducted by track equipment, where feasible, and all traffic except pond monitoring vehicles and reseeding equipment shall be prohibited from reclaimed areas to reduce compaction. The preceding report suggests that the post mining productivity of the Carter Mine will be enhanced by the utilization of overburden for a plant growth medium in conjunction with the above stated reclamation procedures.



INTERVAL:	DESCRIPTION:
0 – 5'	Surface Material, unconsolidated, sandy clay, few small pebbles, medium brown
5 – 10'	Unconsolidated, sand & clay, few to some small quartz pebbles, medium red–brown
10 – 15'	Unconsolidated, sand & clay, some to many small quartz pebbles, medium yellow–brown
15 – 20'	Unconsolidated, sand & clay, many pebbles, medium yellow–brown
20 – 25'	Unconsolidated, sand & clay, many pebbles, medium yellow–brown
25 – 30'	Unconsolidated, sand & clay, many pebbles, medium yellow–brown, H2O @ 26'
30 – 35'	Unconsolidated, sand & clay, many pebbles, medium yellow–brown
35 – 40'	Unconsolidated, sand & clay, many pebbles, medium yellow–brown
40 – 43'	Sandstone, fine to medium grained, medium to very hard, light to medium gray
43 – 45'	Sandstone, fine to medium grained, medium to very hard, light to medium gray
45 – 51.5'	Shale, silty to sandy, medium hard, medium grey
51.5 – 53'	Coal, Carter Seam (18 inches)
53 – 55'	Shale, sandy, soft to medium hard, medium to dark grey
55 – 60'	Shale, sandy, soft to medium hard, medium to dark grey

SURFACE ELEVATION: 488 FT. MSL
B.O.H. – BOTTOM OF HOLE

PERC ENGINEERING CO., INC.
1906 Highway 78 West Jasper, Alabama 35501
P.O. Box 1712 Jasper, Alabama 35502
(205) 384-8353 Office (205) 384-8481 Fax

CAHABA RESOURCES
CARTER MINE
LITHOLOGIC DESCRIPTION FOR GEOCHEMICAL ANALYSIS SITE CRCMDH-1

DRAWN BY: S.W.L. DWG. NAME: CRCMLITH	DATE: 12–10–14
APPROVED BY: TST	SCALE: 1" = 10' vertical

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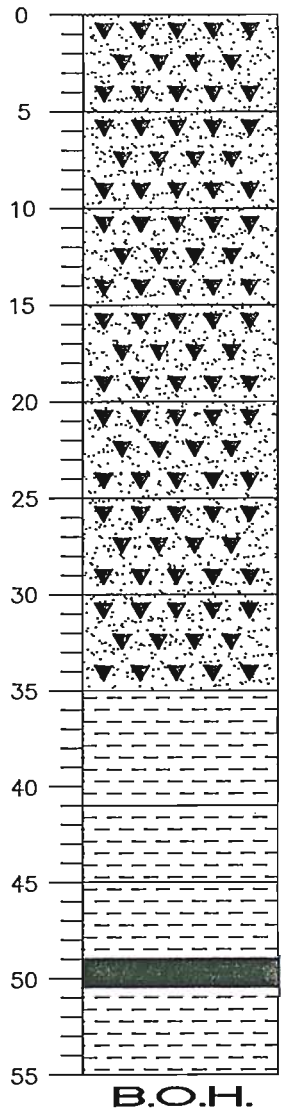

INTERVAL:	DESCRIPTION:
0 – 5'	Surface Material, unconsolidated, sandy clay, medium red–brown
5 – 10'	Unconsolidated, sand & clay, very few to no pebbles, medium red–brown.
10 – 15'	Unconsolidated, sand & clay, very few to small pebbles, medium red–brown.
15 – 20'	Unconsolidated, sand & clay, few small quartz pebbles, light to medium red–brown.
20 – 25'	Unconsolidated, sand & clay, few small quartz pebbles, light to medium red–brown.
25 – 30'	Unconsolidated, sand & clay, few to some small quartz pebbles, light to medium red–brown.
30 – 35'	Unconsolidated, sand & clay, some quartz pebbles, medium to light yellow–brown.
35 – 41'	Shale, soft, medium to dark grey
41 – 45'	Shale, soft, medium to dark grey
45 – 49'	Shale, soft, medium to dark grey
49 – 50.5'	Coal, Carter Seam (18 inches)
50.5 – 55'	Shale, soft, medium to dark grey

SURFACE ELEVATION: 517 FT. MSL
B.O.H. – BOTTOM OF HOLE

PEIRC ENGINEERING CO., INC.
1806 Highway 78 West Jasper, Alabama 35501
P.O. Box 1712 Jasper, Alabama 35502
(205) 384-3553 Office (205) 384-8481 Fax

CAHABA RESOURCES
CARTER MINE
LITHOLOGIC DESCRIPTION FOR GROUNDWATER MONITORING SITE CRCMMW-3

DRAWN BY: S.W.L. DWG. NAME: CRCMLITH	DATE: 12–10–14
APPROVED BY: TST	SCALE: 1" = 10' vertical

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Mineral Labs
Phone : (205)-497-3308

Perc Engineering

Lab I.D. #	Date Sampled	Location	Sample ID	% Sulfur
145000767	2/9/2015	CRCMDH-1	0-5'	0.0025%
145000768	2/9/2015	CRCMDH-1	5'-10'	0.0050%
145000769	2/9/2015	CRCMDH-1	10'-15'	0.0023%
145000770	2/9/2015	CRCMDH-1	15'-20'	0.0094%
145000771	2/9/2015	CRCMDH-1	20'-25'	0.0003%
145000772	2/9/2015	CRCMDH-1	25'-30'	0.020%
145000773	2/9/2015	CRCMDH-1	30'-35'	0.040%
145000774	2/9/2015	CRCMDH-1	35'-40'	0.040%
145000775	2/9/2015	CRCMDH-1	40'-43'	0.079%
145000776	2/9/2015	CRCMDH-1	43'-45'	0.100%
145000777	2/9/2015	CRCMDH-1	45'-50'	0.092%
145000778	2/9/2015	CRCMDH-1	50'-51.5'	0.039%
145000779	2/9/2015	CRCMDH-1	51.5'-53'	1.212%
145000780	2/9/2015	CRCMDH-1	53'-58'	0.018%

Cahaba / Carter

Mineral Labs
Phone : (205)-497-3308

Perc Engineering

Lab I.D. #	Date Sampled	Location	Sample ID	% Sulfur
145000755	2/9/2015	CRCMMW-3	0-5'	0.0014%
145000756	2/9/2015	CRCMMW-3	5'-10'	0.0019%
145000757	2/9/2015	CRCMMW-3	10' - 15'	0.0012%
145000758	2/9/2015	CRCMMW-3	15' -20'	0.0015%
145000759	2/9/2015	CRCMMW-3	20'-25'	0.0014%
145000760	2/9/2015	CRCMMW-3	25'-30'	0.000%
145000761	2/9/2015	CRCMMW-3	30'-35	0.000%
145000762	2/9/2015	CRCMMW-3	35'-40'	0.043%
145000763	2/9/2015	CRCMMW-3	40'-45'	0.037%
145000764	2/9/2015	CRCMMW-3	45'-49'	0.047%
145000765	2/9/2015	CRCMMW-3	49'-50.5'	1.022%
145000766	2/9/2015	CRCMMW-3	50.5'-55'	0.019%

Cahaba / Corr

APPENDIX 1

PERC ENGINEERING CO., INC.

Telephone: (205) 384-5553
Facsimile: (205) 295-3114 - Main Building
(205) 295-3115 - Water Lab
Web Address: www.percengineering.com

COMPANY NAME: Cahaba Resorces

MINE NAME: Carter Mine

DRILL HOLE: CRCMDH1

COLLECTED BY: JC

DATE COLLECTED: 8-7-14

ANALYZED BY: JC,SR,JK,JR

DATE ANALYZED: 2-17-15

All analysis is performed according to EPA standards.

INTERVAL		PASTE pH	% SULFUR	MAX. POT. *ACIDITY	NEUT. *POT	A-B *ACCOUNT	ACID FORMING
0.00	5.00	3.730	0.0025	0.078	-1.750	-1.828	N
5.00	10.00	3.450	0.0050	0.156	-2.750	-2.906	N
10.00	15.00	3.640	0.0023	0.072	-2.500	-2.572	N
15.00	20.00	3.670	0.0094	0.294	-1.750	-2.044	N
20.00	25.00	3.670	0.0003	0.009	-1.750	-1.759	N
25.00	30.00	3.950	0.0200	0.625	-1.250	-1.875	N
30.00	35.00	3.870	0.0400	1.250	-1.250	-2.500	N
35.00	40.00	3.850	0.0400	1.250	-1.000	-2.250	N
40.00	43.00	4.400	0.0790	2.469	4.750	2.281	N
43.00	45.00	4.590	0.1000	3.125	5.750	2.625	N
45.00	50.00	5.090	0.0920	2.875	10.000	7.125	N
50.00	51.50	4.650	0.0390	1.219	2.750	1.531	N
51.50	53.00 Coal		1.2120	37.875 Coal		COAL	***
53.00	58.00	4.960	0.0180	0.563	2.000	1.438	N
**AVERAGE		3.837	0.0291	0.909	0.352	-0.557	N

*Calculated in tons CaCo3 per 1000 tons of material.
**Averages do not include coal seam to be mined or intervals below lowest seam.
***Not analyzed

APPENDIX 1

PERC ENGINEERING CO., INC.

Telephone: (205) 384-5553
Facsimile: (205) 295-3114 - Main Building
(205) 295-3115 - Water Lab
Web Address: www.percengineering.com

COMPANY NAME: Cahaba Resorces

MINE NAME: Carter Mine

DRILL HOLE: CRCMMW3

COLLECTED BY: JC

DATE COLLECTED: 8-7-14

ANALYZED BY: JC,SR,JK,JR

DATE ANALYZED: 2-17-15

All analysis is performed according to EPA standards.

INTERVAL		PASTE pH	% SULFUR	MAX. POT. *ACIDITY	NEUT. *POT	A-B *ACCOUNT	ACID FORMING
0.00	5.00	3.820	0.0014	0.044	-2.750	-2.794	N
5.00	10.00	3.610	0.0019	0.059	-3.250	-3.309	N
10.00	15.00	3.800	0.0012	0.038	-2.500	-2.538	N
15.00	20.00	3.580	0.0015	0.047	-2.250	-2.297	N
20.00	25.00	3.480	0.0014	0.044	-0.500	-0.544	N
25.00	30.00	3.610	0.0001	0.003	-3.000	-3.003	N
30.00	35.00	3.840	0.0001	0.003	-1.500	-1.503	N
35.00	40.00	2.870	0.0430	1.344	0.001	-1.343	N
40.00	45.00	3.120	0.0370	1.156	-0.250	-1.406	N
45.00	49.00	4.480	0.0470	1.469	3.750	2.281	N
49.00	50.50 Coal		1.0220	31.938 Coal		COAL	***
50.50	55.00	4.170	0.0190	0.594	0.250	-0.344	N
**AVERAGE		3.457	0.0133	0.416	-1.194	-1.609	N

*Calculated in tons CaCo3 per 1000 tons of material.
**Averages do not include coal seam to be mined or intervals below lowest seam.
***Not analyzed

OVERBURDEN ANALYSIS SPREADSHEET

OPERATOR: CAHABA RESOURCES, LLC.
PERMIT NO: CARTER MINE DRILL HOLE: CRCMMW-3
COUNTY:

THRESHOLD VALUES:	SULFUR 0	NP 0.00	FIZZ 0

NUMBER OF INTERVALS: 11

1)A15..A 21
2)A15..A 22

CLAY	CL	3450	
SHALE	SH	3700	
SILTSTONE	ST	3750	ALK ADD(tns/ac CaCO3):
SANDSTONE	SS	3670	COAL SEAMS:
LIMESTONE	LS	3670	STATE PLANE ZONE:
COAL	CO	1800	FEET (NORTH/SOUTH):
CARBONOLITH	CB	2580	FEET (EAST/WEST):
OTHER	OT	3670	SURFACE ELEV. (FT):

BOTTOM DEPTH (FT)	THICKNESS FEET	ROCK TYPE	FIZZ RATING	SULFUR %	NP	DEFICIENCY /EXCESS	ACREAGE	UNIT WT TONS/AC-FT	FRACTION SPOILED	TONS MPA	TONS NP	NET NP (TONS)	TONS OF OVERBURDEN
5.00	5.00	OT	0	0.0014	-2.75	-2.79	1.00	3670	1.00	0.00	0.00	-0.00	18350
10.00	5.00	CL	0	0.0019	-3.25	-3.31	5.35	3450	1.00	5.48	0.00	-5.48	92262
15.00	5.00	CL	0	0.0012	-2.50	-2.54	8.25	3450	1.00	5.34	0.00	-5.34	142270
20.00	5.00	CL	0	0.0015	-2.25	-2.30	11.15	3450	1.00	9.01	0.00	-9.01	192270
25.00	5.00	CL	0	0.0014	-0.50	-0.54	14.05	3450	1.00	10.60	0.00	-10.60	242286
30.00	5.00	CL	0	0.0001	-3.00	-3.00	16.94	3450	1.00	0.91	0.00	-0.91	292294
35.00	5.00	CL	0	0.0001	-1.50	-1.50	19.84	3450	1.00	1.07	0.00	-1.07	342301
40.00	5.00	SH	0	0.0430	0.00	-1.34	22.74	3700	1.00	565.37	0.42	-564.95	420738
45.00	5.00	SH	0	0.0370	-0.25	-1.41	25.64	3700	1.00	548.49	0.00	-548.49	474369
49.00	4.00	SH	0	0.0470	0.73	2.28	28.25	3700	1.00	614.10	1567.91	953.81	418110
50.50	1.50	CO	0	1.0220	0.00	-31.94	30.28	1800	1.00	2611.08	0.00	-2611.08	81756

TOTAL OVERBURDEN VOL.(ACRE-FT):	783	TOTAL (TONS):	4372.25	1568.33	-2803.92	2717013
PERCENT SANDSTONE:	0%	TOTAL (TONS/THOUSAND):	1.61	0.58	-1.03	
NP/MPA RATIO:	0.36				
TONS/ACRE REQUIRED (1:1):	93 DEFICIENCY				

ABA SUMMARY VALUES USING % SULFUR * 62.5 = MPA:

NP/MPA RATIO:	0.18	TOTAL (TONS):	8744.50	1568.33	-7176.16
TONS/ACRE REQUIRED (1:1):	237 DEFICIENCY	TOTAL (TONS/THOUSAND):	3.22	0.58	-2.64

OVERBURDEN ANALYSIS SPREADSHEET

OPERATOR: CAHABA RESOURCES, LLC.
PERMIT NO: CARTER MINE DRILL HOLE: CRCMDH-1
COUNTY:

THRESHOLD VALUES:	SULFUR	NP	FIZZ
	0	0.00	0

NUMBER OF INTERVALS: 13

1)A15..A 23
2)A15..A 24

CLAY	CL	3450	
SHALE	SH	3700	
SILTSTONE	ST	3750	ALK ADD(tns/ac CaCO3):
SANDSTONE	SS	3670	COAL SEAMS:
LIMESTONE	LS	3670	STATE PLANE ZONE:
COAL	CO	1800	FEET (NORTH/SOUTH):
CARBONOLITH	CB	2500	FEET (EAST/WEST):
OTHER	OT	3670	SURFACE ELEV. (FT):

BOTTOM DEPTH (FT)	THICKNESS FEET	ROCK TYPE	FIZZ RATING	SULFUR %	NP	DEFICIENCY /EXCESS	ACREAGE	UNIT WT TONS/AC-FT	FRACTION SPOILED	TONS MPA	TONS NP	NET NP (TONS)	TONS OF OVERBURDE
5.00	5.00	OT	0	0.0025	-1.75	-1.83	1.00	3670	1.00	1.43	0.00	-1.43	18350
10.00	5.00	CL	0	0.0050	-2.75	-2.91	5.47	3450	1.00	14.73	0.00	-14.73	94289
15.00	5.00	CL	0	0.0023	-2.50	-2.57	8.44	3450	1.00	10.47	0.00	-10.47	145649
20.00	5.00	CL	0	0.0094	-1.75	-2.04	11.42	3450	1.00	57.87	0.00	-57.87	197008
25.00	5.00	CL	0	0.0003	-1.75	-1.76	14.40	3450	1.00	2.33	0.00	-2.33	248367
30.00	5.00	CL	0	0.0260	-1.25	-1.88	17.38	3450	1.00	187.33	0.00	-187.33	299727
35.00	5.00	CL	0	0.0400	-1.25	-2.50	20.35	3450	1.00	438.86	0.00	-438.86	351086
40.00	5.00	CL	0	0.0400	-1.00	-2.25	23.33	3450	1.00	503.06	0.00	-503.06	402446
43.00	3.00	SS	0	0.0790	4.75	2.28	25.71	3670	1.00	698.88	1344.68	645.80	283098
45.00	2.00	SS	0	0.1000	5.75	2.63	27.20	3670	1.00	620.92	1148.01	524.09	199654
50.00	5.00	SH	0	0.0920	10.00	7.13	29.28	3700	1.00	1557.59	5417.71	3860.12	541771
51.50	1.50	SH	0	0.0390	2.75	1.53	31.22	3700	1.00	211.10	476.50	265.32	173272
53.00	1.50	CO	0	1.2100	0.00	-37.81	32.56	1800	0.00	265.93	0.00	-265.93	7033
										4573.57	8386.89	3813.32	2961741

TOTAL OVERBURDEN VOL.(ACRE-FT): 838
PERCENT SANDSTONE: 16%
NP/MPA RATIO: 1.83
TONS/ACRE REQUIRED (1:1): 117 EXCESS

TOTAL (TONS): 4573.57 8386.89 3813.32
TOTAL (TONS/THOUSAND): 1.54 2.83 1.29

ABA SUMMARY VALUES USING % SULFUR * 62.5 = MPA:

NP/MPA RATIO: 0.92
TONS/ACRE REQUIRED (1:1): 23 DEFICIENCY

TOTAL (TONS): 9147.15 8386.89 -760.26
TOTAL (TONS/THOUSAND): 3.09 2.83 -0.26

OVERBURDEN ANALYSIS - MINE SITE ABA SUMMARY

PERMIT NO:CARTER MINE OPERATOR: CAHABA RESOURCES, LLC.
COUNTY: TUSCALOOSA TOWNSHIP:

ENTER NUMBER OF DRILL HOLES: 2 (enter, A)% A) ENTER 12

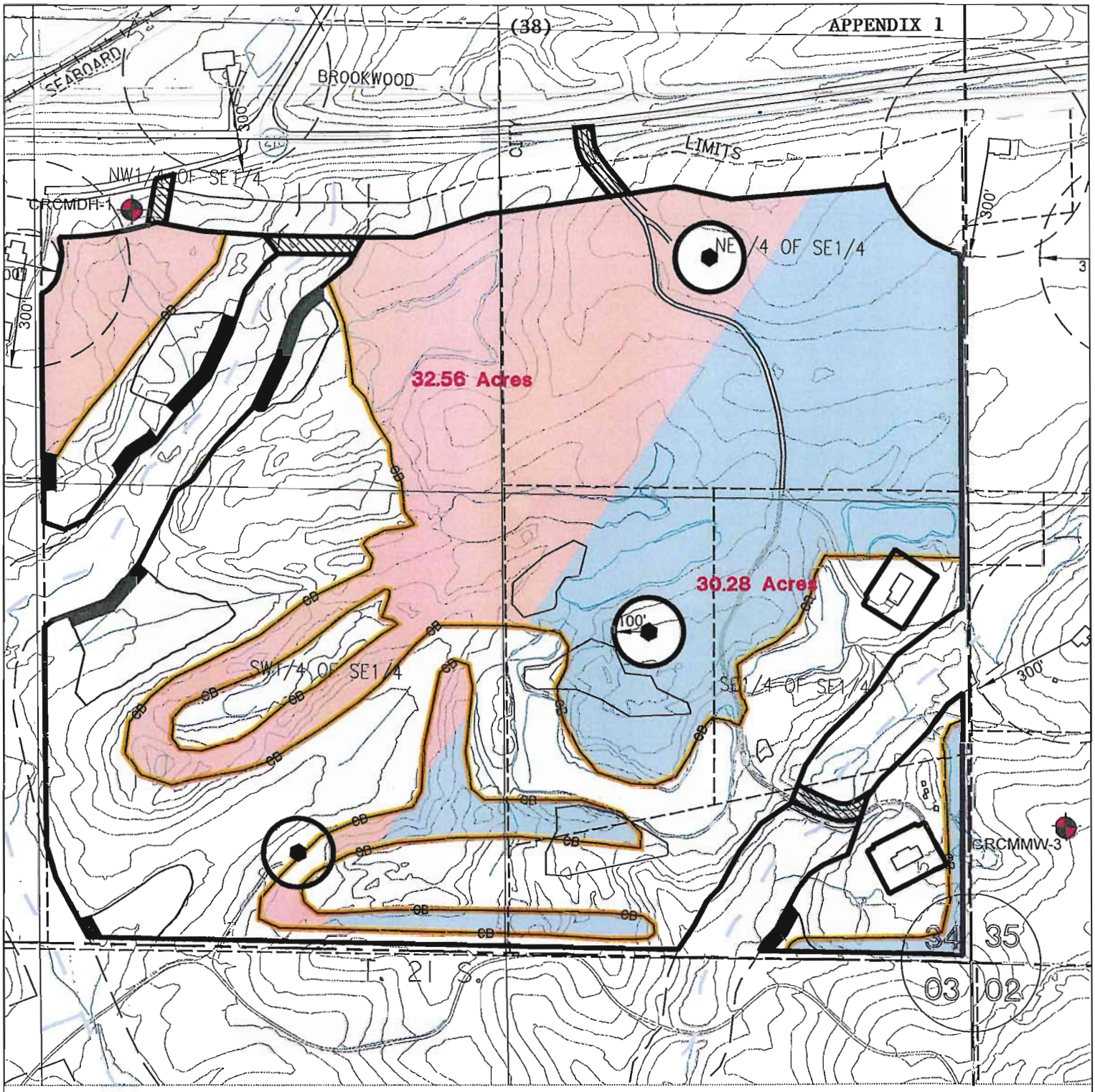
DRILL HOLE	BOTTOM ACREAGE	ALK.ADD. TONS/AC	TOTAL TONS MPA*	TOTAL TONS NP	TOTAL TONS NET NP	TOTAL TONS OVERBURDEN	PERCENT SANDSTONE
CRCMMW-3	30.28	0	4372.25	1568.33	-2803.92	2717013	
CRCMDH-1	32.56	0	4573.57	8386.89	3813.32	2961741	
	62.84	0.00	8946	9955	1009	5678754	0%

*Tons MPA using %S X 31.25 from OBCALC

ACID BASE ACCOUNTING SUMMARY PARAMETERS

	WITHOUT ALKALINE ADDITION			WITH ALKALINE ADDITION		
MPA = SULFUR X 31.25:	MPA	NP	NET NP	MPA	NP	NET NP
TOTAL TONS:	8946	9955	1009	8946	9955	1009
ABA PARAMETERS (TONS/THOUSAND):	1.58	1.75	0.18	1.58	1.75	0.18
NP/MPA RATIO:	1.11			1.11		
TONS/ACRE CaCO3 REQUIRED (1:1):	16 EXCESS			16 EXCESS		

APPENDIX 1



MAP LEGEND

- AREA INFLUENCED BY CRCMDH-1
- AREA INFLUENCED BY CRCMMW-3
- PROPOSED PERMIT BOUNDARY
- CRCMDH-1, CRCMMW-3 — GEOCHEMICAL ANALYSIS SITES
- CB — COAL BOUNDARY LINE

N

PERC ENGINEERING CO., INC.
1806 Hwy. 78 West Jasper, AL 35501/P.O. Box 1712-35502
(205) 384-5553 Office (205) 295-3114 Fax

CAHABA RESOURCES, LLC
CARTER MINE
THEISSON POLYGON MAP

DWG NAME:	CR Carter Mine	DATE:	04/01/2015
DRAWN BY:	S.A.E.	SCALE:	1"=400'
APPROVED BY:	T.S.T.	JOB NUMBER:	13-04066-001

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COMPANY NAME: Cahaba Resources, LLC

MINE NAME: Carter Mine

SOIL / OVERBURDEN: Soil 35-1

SAMPLE WEIGHT: 3203.5 (GRAMS)

DATE SAMPLED: 1/30/2015

DATE ANALYZED: 2/4/2015

ANALYZED BY: JRK

LAB ID: 8360

TOPSOIL VARIANCE SIEVE ANALYSIS

SIEVE NUMBER	WT. SIEVE + SAMPLE (GRAMS)	WT. SIEVE (GRAMS)	WT. SAMPLE RETAINED (GRAMS)	PERCENT RETAINED	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1"	127.8	100.0	27.8	0.87	0.87	99.13
1/2"	407.5	100.0	307.5	9.60	10.47	89.53
1/4"	374.7	100.0	274.7	8.57	19.04	80.96
3/16"	155.3	100.0	55.3	1.73	20.77	79.23
2 MM	147.1	100.0	47.1	1.47	22.24	77.76
SOIL	2591.1	100.0	2491.1	77.76	100.00	0.00

% OF SAMPLE THAT IS COARSE FRAGMENTS : 22.24

% OF SAMPLE THAT IS SOIL : 77.76

COMPANY NAME: Cahaba Resources, LLC

MINE NAME: Carter Mine

SOIL / OVERBURDEN: Soil 35-2

SAMPLE WEIGHT: 4408.6 (GRAMS)

DATE SAMPLED: 1/30/2015

DATE ANALYZED: 2/4/2015

ANALYZED BY: JRK

LAB ID: 8361

TOPSOIL VARIANCE SIEVE ANALYSIS

SIEVE NUMBER	WT. SIEVE + SAMPLE (GRAMS)	WT. SIEVE (GRAMS)	WT. SAMPLE RETAINED (GRAMS)	PERCENT RETAINED	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1"	135.7	100.0	35.7	0.81	0.81	99.19
1/2"	366.7	100.0	266.7	6.05	6.86	93.14
1/4"	309.2	100.0	209.2	4.75	11.61	88.39
3/16"	151.6	100.0	51.6	1.17	12.78	87.22
2 MM	150.0	100.0	50.0	1.13	13.91	86.09
SOIL	3895.4	100.0	3795.4	86.09	100.00	0.00

% OF SAMPLE THAT IS COARSE FRAGMENTS : 13.91

% OF SAMPLE THAT IS SOIL : 86.09

COMPANY NAME: Cahaba Resources, LLC

MINE NAME: Carter Mine

SOIL / OVERBURDEN: Soil 40

SAMPLE WEIGHT: 3574.1 (GRAMS)

DATE SAMPLED: 1/30/2015

DATE ANALYZED: 2/4/2015

ANALYZED BY: JRK

LAB ID: 8362

TOPSOIL VARIANCE SIEVE ANALYSIS

SIEVE NUMBER	WT. SIEVE + SAMPLE (GRAMS)	WT. SIEVE (GRAMS)	WT. SAMPLE RETAINED (GRAMS)	PERCENT RETAINED	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1"	147.6	100.0	47.6	1.33	1.33	98.67
1/2"	552.6	100.0	452.6	12.66	13.99	86.01
1/4"	709.6	100.0	609.6	17.06	31.05	68.95
3/16"	287.7	100.0	187.7	5.25	36.30	63.70
2 MM	375.1	100.0	275.1	7.70	44.00	56.00
SOIL	2101.5	100.0	2001.5	56.00	100.00	0.00

% OF SAMPLE THAT IS COARSE FRAGMENTS : 44.00

% OF SAMPLE THAT IS SOIL : 56.00

COMPANY NAME: Cahaba Resources, LLC

MINE NAME: Carter Mine

SOIL / OVERBURDEN: OB-1

SAMPLE WEIGHT: 2964.0 (GRAMS)

DATE SAMPLED: 1/30/2015

DATE ANALYZED: 2/4/2015

ANALYZED BY: JRK

LAB ID: 8363

TOPSOIL VARIANCE SIEVE ANALYSIS

SIEVE NUMBER	WT. SIEVE + SAMPLE (GRAMS)	WT. SIEVE (GRAMS)	WT. SAMPLE RETAINED (GRAMS)	PERCENT RETAINED	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1"	177.9	100.0	77.9	2.63	2.63	97.37
1/2"	304.0	100.0	204.0	6.88	9.51	90.49
1/4"	333.8	100.0	232.8	7.89	17.40	82.60
3/16"	183.6	100.0	83.6	2.82	20.22	79.78
2 MM	255.8	100.0	155.8	5.26	25.48	74.52
SOIL	2308.9	100.0	2208.9	74.52	100.00	0.00

% OF SAMPLE THAT IS COARSE FRAGMENTS : 25.48

% OF SAMPLE THAT IS SOIL : 74.52

COMPANY NAME: Cahaba Resources, LLC

DATE SAMPLED: 1/30/2015

MINE NAME: Carter Mine

DATE ANALYZED: 2/4/2015

SOIL / OVERBURDEN: OB-2

ANALYZED BY: JRK

SAMPLE WEIGHT: 3710.7 (GRAMS)

LAB ID: 8364

TOPSOIL VARIANCE SIEVE ANALYSIS

SIEVE NUMBER	WT. SIEVE + SAMPLE (GRAMS)	WT. SIEVE (GRAMS)	WT. SAMPLE RETAINED (GRAMS)	PERCENT RETAINED	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1"	187.2	100.0	87.2	2.35	2.35	97.65
1/2"	617.7	100.0	517.7	13.95	16.30	83.70
1/4"	660.7	100.0	560.7	15.11	31.41	68.59
3/16"	223.9	100.0	123.9	3.34	34.75	65.25
2 MM	318.1	100.0	218.1	5.88	40.63	59.37
SOIL	2303.1	100.0	2203.1	59.37	100.00	0.00

% OF SAMPLE THAT IS COARSE FRAGMENTS : 40.63

% OF SAMPLE THAT IS SOIL : 59.37

COMPANY NAME: Cahaba Resources, LLC

DATE SAMPLED: 1/30/2015

MINE NAME: Carter Mine

DATE ANALYZED: 2/4/2015

SOIL / OVERBURDEN: OB-3

ANALYZED BY: JRK

SAMPLE WEIGHT: 2266.7 (GRAMS)

LAB ID: 8365

TOPSOIL VARIANCE SIEVE ANALYSIS

SIEVE NUMBER	WT. SIEVE + SAMPLE (GRAMS)	WT. SIEVE (GRAMS)	WT. SAMPLE RETAINED (GRAMS)	PERCENT RETAINED	CUMULATIVE PERCENT RETAINED	PERCENT PASSING
1"	129.6	100.0	29.6	1.31	1.31	98.69
1/2"	266.9	100.0	166.9	7.36	8.67	91.33
1/4"	330.8	100.0	230.8	10.18	18.85	81.15
3/16"	178.0	100.0	78.0	3.44	22.29	77.71
2 MM	267.0	100.0	167.0	7.37	29.66	70.34
1694.4	1694.4	100.0	1594.4	70.34	100.00	0.00

% OF SAMPLE THAT IS COARSE FRAGMENTS : 29.66

% OF SAMPLE THAT IS SOIL : 70.34

APPENDIX 3

Report on Soil Test

Auburn University Soil Testing Laboratory

Auburn University, AL 36849-5411

Perc Engineering Corp Inc

P O Box 1712

Jasper, AL 35502

County:Tuscaloosa

District:3

					SOIL TEST RESULTS					RECOMMENDATIONS			
LAB No.	Test Date	Sample Designation	Crop	Soil Group*	pH**	Phosphorus P***	Potassium K***	Magnesium Mg***	Calcium Ca***	LIME-STONE	N	P_2O_5	K_2O
						Pounds/Acre				Tons/Acre	Pounds/Acre		
10688	02/20/15	Cahaba Res Carter Mn PO 19384 8360 See Comment 1 See Comment 2	Revegetation	4	4.4	VL 9	L 104	H 100	M 249	1.0	60	90	50
10689	02/20/15	8361 See Comment 2 See Comment 3	Revegetation	4	5.0	VL 5	VL 35	L 32	M 215	1.0	60	90	80
10690	02/20/15	8362 See Comment 2 See Comment 3	Revegetation	4	4.6	L 27	L 65	L 20	M 177	1.0	60	60	70
10691	02/20/15	8363 See Comment 1 See Comment 2	Revegetation	4	4.8	VL 16	L 117	H 299	H 527	1.0	60	80	40
10692	02/20/15	8364 See Comment 1 See Comment 2	Revegetation	4	5.1	L 28	M 151	H 555	H 970	1.0	60	60	40
10693	02/20/15	8365 See Comment 1 See Comment 2	Revegetation	4	5.2	VH 222	H 256	H 717	H 2226	2.0	60	0	0

Comment No.1: Soil acidity (low pH) can be corrected with either dolomitic or calcitic lime.

* 1. Sandy soil (CEC < 4.6 $cmol_c kg^{-1}$)

* 2. Loams and Light clays (CEC = 4.6-9.0 $cmol_c kg^{-1}$)

* 3. Clays and soils high in organic matter (CEC > 9.0 $cmol_c kg^{-1}$)

* 4. Clays of the Blackbelt (CEC > 9.0 $cmol_c kg^{-1}$)

** 7.4 or higher - Alkaline - - - - - - - - - - - - - - 6.6-7.3 - Neutral - - - - - - - - - - - - - 6.5 or lower - Acid - - - - - - - - - - - - -5.5 or lower - Strong Acid

*** Extractable nutrients in pounds per acre

If soil group = 1, 2 or 3, Method of Analysis = Mehlich-1. If soil group = 4, Method of Analysis = Miss/Lancaster.

Approved by: Gobena Huluka

Print Date: March 18, 2015

APPENDIX 3

Report on Soil Test

Auburn University Soil Testing Laboratory

Auburn University, AL 36849-5411

Perc Engineering Corp Inc

P O Box 1712

Jasper, AL 35502

County:Tuscaloosa

District:3

Comment No.2: For perennial winter grass pasture, apply N, P, and K as recommended by September 1. Repeat N application in February. If grass is to be cut for hay, in February apply up to 40 pounds N and 35 pounds K2O per ton of anticipated hay yield.

Comment No.3: Both soil acidity and low magnesium can be corrected by applying dolomitic lime at the recommended rate.

The number of samples processed in this report is: 6

For further information call your county agent: (205) 349-4630

* 1. Sandy soil (CEC < 4.6 $cmol_c kg^{-1}$)
* 2. Loams and Light clays (CEC = 4.6-9.0 $cmol_c kg^{-1}$)
* 3. Clays and soils high in organic matter (CEC > 9.0 $cmol_c kg^{-1}$)
* 4. Clays of the Blackbelt (CEC > 9.0 $cmol_c kg^{-1}$)

** 7.4 or higher - Alkaline - - - - - - - - - - - - - - 6.6-7.3 - Neutral - - - - - - - - - - - - - 6.5 or lower - Acid - - - - - - - - - - - - -5.5 or lower - Strong Acid

*** Extractable nutrients in pounds per acre

If soil group = 1, 2 or 3, Method of Analysis = Mehlich-1. If soil group = 4, Method of Analysis = Miss/Lancaster.

Approved by: Joseph Hulula

Print Date: March 18, 2015

Mine Analysis Report
Auburn University
Soil Testing Lab

Perc Engineering Co.,Inc.
PO Box 1712
Jasper,Al. 35502

ALFA Agricultural Service & Research Building
961 S. Donahue Dr.
Auburn University, Auburn, AL 36849-5411
Phone (334)844-3958
Soillab@auburn.edu

Mine Name : Cahaba Resources LLC Carter Mine/Topsoil Variance Special Analysis #: 15.G0055-G0060 PO #: 19384

						Particle Size				
		S	OM	NO_3-N	Neutralizing Potential	%	%	%		H_2O avail.
Lab I.D.	Sample I.D.	%	%	ppm	Tons $CaCO_3$/1000Tons material	Sand	Silt	Clay	Textural Class	cm/cm
10668	8360	0.016	0.4	3.4	<1.0	56.88	10.63	32.50	Sandy Clay Loam	0.09
10669	8361	0.012	1.1	4.2	<1.0	66.88	16.25	16.88	Sandy Loam	0.10
10670	8362	0.022	0.8	3.3	<1.0	34.38	47.50	18.13	Loam	0.15
10671	8363	0.027	1.7	5.3	<1.0	27.50	51.88	20.63	Silt Loam	0.16
10672	8364	0.028	3.4	9.5	3.5	32.50	42.50	25.00	Loam	0.15
10673	8365	0.044	7.6	8.1	23.0	31.88	45.63	22.50	Loam	0.15

Determination of the "Total Available Water Capacity."
Note: Soil & Overburden percentages taken from Appendix 2

SOILS (AVE) :

SAMPLE NUMBER	PERCENT OF SAMPLE			
	1"	½"	1/4"	2mm
Soil 35-1	0.87	9.60	8.57	3.20
Soil 35-2	0.81	6.05	6.96	2.30
Soil 40-1	1.33	12.66	17.06	12.95
AVE:	1.00	9.44	10.86	6.15

1.00% x .0389 in./in. = .0004
9.44% x .0492 in./in. = .0046
10.86% x .0603 in./in. = .0065
6.15% x .1149 in./in. = .0071

< 2mm average from Appendix 2: 72.55
Average available water capacity of < 2mm from Appendix 3 = .0.1130

72.55% x .1130 in./in. = .0820

Ave. TAWC for soils = .1006 in./in.

OVERBURDEN (AVE.):

SAMPLE NUMBER	PERCENT OF SAMPLE			
	1"	½"	1/4"	2mm
OB-1	2.63	6.88	7.89	8.08
OB-2	2.35	13.95	15.11	9.22
OB-3	1.31	7.36	10.18	10.81
AVE:	2.10	9.40	11.06	9.37

2.10% x .0389 in./in. = .0008
9.40% x .0492 in./in. = .0046
11.06% x .0603 in./in. = .0067
9.37% x .1149 in./in. = .0108

< 2mm average from Appendix 2 = 68.07

Average available water capacity of < 2mm from Appendix 3 = 0.1530

68.07% x 0.1530 in./in. = .1041

Ave. TAWC for overburden = .1270 in./in.

*Available water capacity values (in./in.) were obtained from Table 1 "A Method of Comparing Soil Materials for Plant Available Water" which was supplied by the Regulatory Authority.

Exhibit 3: Picture of old highwall at the existing site showing lithology of overburden.

Exhibit 4: Picture of native soil sampling site showing amount of coarse fragments and lack of 'A' Horizon.

Exhibit 1: Picture of Overburden Sampling site showing texture of overburden.

Exhibit 2: Another picture of Overburden Sampling site showing texture of overburden.

CERTIFICATION STATEMENT:

All geologic information presented in this topsoil variance application was prepared by or under the supervision of a qualified geologic professional and I hereby certify that it is true and correct to the best of my knowledge or belief.

Date: 05-07-2015

TIMOTHY S. THOMAS

PROFESSIONAL ENGINEER

LICENSE NO. 18830

OVERBURDEN RESTABILIZATION PLAN

All overburden shall be backfilled, compacted, and graded so that the post mining slope shall approximate the pre-mining slope (See Attachment IV-B-3) and in a timely manner (See Part IV-B-2). Overburden will be rough graded by Caterpillar type dozers. Once overburden has been rough graded, farm-type tractors will be used to disc the overburden to its final contour, decrease compaction, and increase the mechanical breakage of the surface layer. Rocks 24" in diameter that remain upon the surface, if any, will be collected and buried. At this time the following criteria will be used to evaluate the textural quality of the graded overburden:

a) Rocks of a size greater than 10" shall not exceed 10% by weight of the substitute material.

b) The substitute material shall not contain more than 15% by weight of materials between 10 and 3 inches in size.

c) The substitute material shall not contain more than 50% by weight of materials between 3 and .75 inches in size.

d) At least 30% by weight of the substitute material shall be of a size less than 2 millimeters.

If this criteria is not met, Cahaba Resources, LLC. shall redisc the overburden and resample. If increasing the mechanical breakage will not enhance the graded overburden to a satisfactory level, rocks will be collected from the surface and buried and/or additional soil sized material will be hauled and spread on site until the above criteria is achieved.

C. Revegetation

(1) Outline procedures for soil testing required to determine type and amount of soil amendments to be applied and to evaluate results of topsoil handling and replacement. (780.18, 816.25)

Once the texture criteria for final graded overburden has been met as outlined on Attachment IV-C-2, the final texture samples taken shall be sent to the Auburn University Soil Testing Laboratory where the following tests shall be conducted: % sand, silt, & clay, textural classification, pH, total sulfur, acid-base account, fertility ratings for phosphorus, potassium, and magnesium, and amendment recommendations for post mining revegetation for limestone, nitrogen, P_2O_5 and K_2O. Results of this analysis will be used to determine the amount of soil amendments, if any, to be applied to the plant medium and will be submitted to the Regulatory Authority for review.

Sampling frequency shall be 1 sample/20 acres. Overburden sampling for these areas shall be identical to the guidelines set forth in the "Sampling Technics" section of Attachment IV-C-2.

(2) Are selected overburden materials to be used as a supplement or substitute for topsoil?
(X) Yes ( ) No

If, yes, provide results of analysis, trials, and tests required under Section 816.22(e). (779.21)

See Topsoil Variance Application (Attachment IV-C-2)