GEOLOGY (880-X-8E-.06(2))

1. Geologic Description of the Permit and Adjacent Area

The Cahaba Resources, LLC. – Rockcastle Mine No.1 is located in Section 19, Township 20 South, Range 6 West and Section 24, Township 20 South, Range 7 West, Tuscaloosa County, Alabama as seen from the Abernant 7.5 minute U.S.G.S. Quadrangle map (see attached Mine Site Location Map and Hydro/Geo Map). The proposed mine site will consist of surface mining methods. The mine site will occupy approximately two hundred and four (204) acres of which one hundred ninety-five (195) will be mining acres.

This mine site is located near the southern boundary of the Warrior Basin of the Appalachian Plateaus Physiographic Province Geologic Map of Alabama dated 1989. The mine site is primarily underlain by the Pottsville Formation of Pennsylvanian age that is characterized as the following: Interbedded dark-gray shale, siltstone, medium-gray sandstone, and lesser amounts of coal, fireclay and conglomerate. A search of records at the Department of Industrial Relation revealed mapping of shallow underground mines. The abandoned Yolande Coal and Coke Co. – No. 2 Mine, The Thomas Furnace Co. – Weller Mine, and New Connellsville Coal and Coke Co. – Connellsville Mines underground mines lay below portions of the permit area in the Blue Creek Coal Seam. The abandoned Yolande Coal and Coke Co. – No. 3 Mine underground mine lay below portions of the permit area in the Jagger Coal Seam.

This proposed mine site is located southwest of the Coalburg Syncline and northwest of the Birmingham Anticline. See the attached Regional Geologic Structure Map copied from Alabama Land and Mineral Corp.'s, Area 6 Mine, P-3699.

The coal seams to be mined at this site by Cahaba Resources, LLC are the New Castle, Mary Lee, Blue Creek, and Jagger Seams. There is one (1) fault believed to exist within the permit boundary and faults outside the permit boundary to the east and west. The fault within the permit between Inc. 1 and Inc. 2 has a displacement of about 150 feet with the down block on the east side of the fault. See attached Hydro-Geo Map for location.

A majority of the permit area has been previously mined by pre-law surface mining activities. There are also abandoned underground mines within the Blue Creek and Jagger seams.

2. Geochemistry:

The rocks outcropping within the permit area belong to the upper Pottsville Formation. According to "Groundwater Availability in Tuscaloosa County" by Jonathan A. Hunter and Paul H. Moser published by Geological Survey of Alabama in 1990 the upper Pottsville formation consists of inter-bedded dark-gray shale, siltstone, medium gray sandstone and coal in cyclic sequences. All drill holes available at this site showed similar cyclic sequences of dark-gray shale, siltstone, medium gray sandstone and coal.

Cahaba Resources, LLC drilled four (4) exploration holes in 2018. The owner of the surface and mineral had other drilling performed in 2006 and 2009. These drill holes were located on a map in his report and used along with the Cahaba drilling to describe the lithology within the permit and surrounding area. No cuttings or cores were remaining of the 2006 and 2009 drill holes. The four holes drilled by Cahaba were rotary drilled. Cuttings for drill holes to be analyzed were

logged and collected and stored in gallon size sip-lock type bags at McGehee Engineering's lab for further inspection and analyses. The cuttings were sampled in minimum five foot increments and at each lithologic change. All drill holes were drilled, logged, and samples collected by the driller. For the lithologic description of the drill holes see the attached Drill Logs and Detail Drill Logs Columns. The locations of drill holes and overburden holes are shown on the attached map entitled Hydro-Geo Map. All analyses were performed by McGehee Engineering Corp.'s lab.

The following chart shows the thickness-weighted averages for each overburden hole.

Drill Hole ID	Percent Sulfur	Neutralization Potential	Acid-Base Account	Tons/Acre Excess CaCO3
CR-1	0.0080	9.1180	8.8686	1717
CR-2	0.0000	8.5292	8.5292	520
CR-5	0.0238	13.6838	12.9414	4907
CR-6	0.0129	8.6000	8.1980	1776

According to the overall average Acid Base Accounts of the overburden sampled, there is no portion of the overburden that could be considered acid forming material other than the interval from 100'-105' in drill hole CR-5 that is within the Mary Lee Seam. This interval probably had contamination from the Mary Lee Coal seam. The data collected from these drill holes is believed to exist throughout the entire permit area. See attached Overburden Analysis Spreadsheet. The thickness-weighted averages indicate that there is more alkaline material than

acid forming material contained in the overburden at this mine with an average tons/acres of CaCO3 of 2,230.

3. Sulfur Content of Coal:

The total sulfur percentages of the coal seams to be mined at this site are listed below. The total sulfur percentages of each coal seam are based on averages of many coal samples.

Seam	Percent Sulfur (raw Dry)
New Castle	1.52
Mary Lee	1.46
Blue Creek	0.76
Jagger	1.31

4. Coal Seam(s) Information:

Based on drilling results there are four (4) mineable coal seams at this mine site: the New Castle, Mary Lee, Blue Creek, Jagger, coal seams. For coal seam information, see the following table:

SEAM	THICKNESS	OVERBURDEN	STRIKE/DIP
NEW CASTLE	2’	100’	N 56^{O} 40’ E/ N 24^{O} W
MARY LEE	4’	130’	N 65^{O} 41’ E/ N 26^{O} W
BLUE CREEK	7.5’	138’	N 40^{O} 59’ E/ N 19^{O} W
JAGGER	3.5’	1.64’	N 35^{O} 09’ E/ N24^{O} W

5. Coal Cropline(s) Location:

For a map showing the outcrop location with respect to the proposed permit area; see the attached Hydro/Geo Map.

6. Geologic Description Support Data:

For maps or cross-sections used to support the geologic description see the attached map(s) entitled Geologic Section A-A'.

7. Drill Hole Locations and Elevations:

For elevations and locations of drill holes and other sample sites, see attached Hydro/Geo Map and Lithologic Description Drawings.

8. Sampling and Analytical Data:

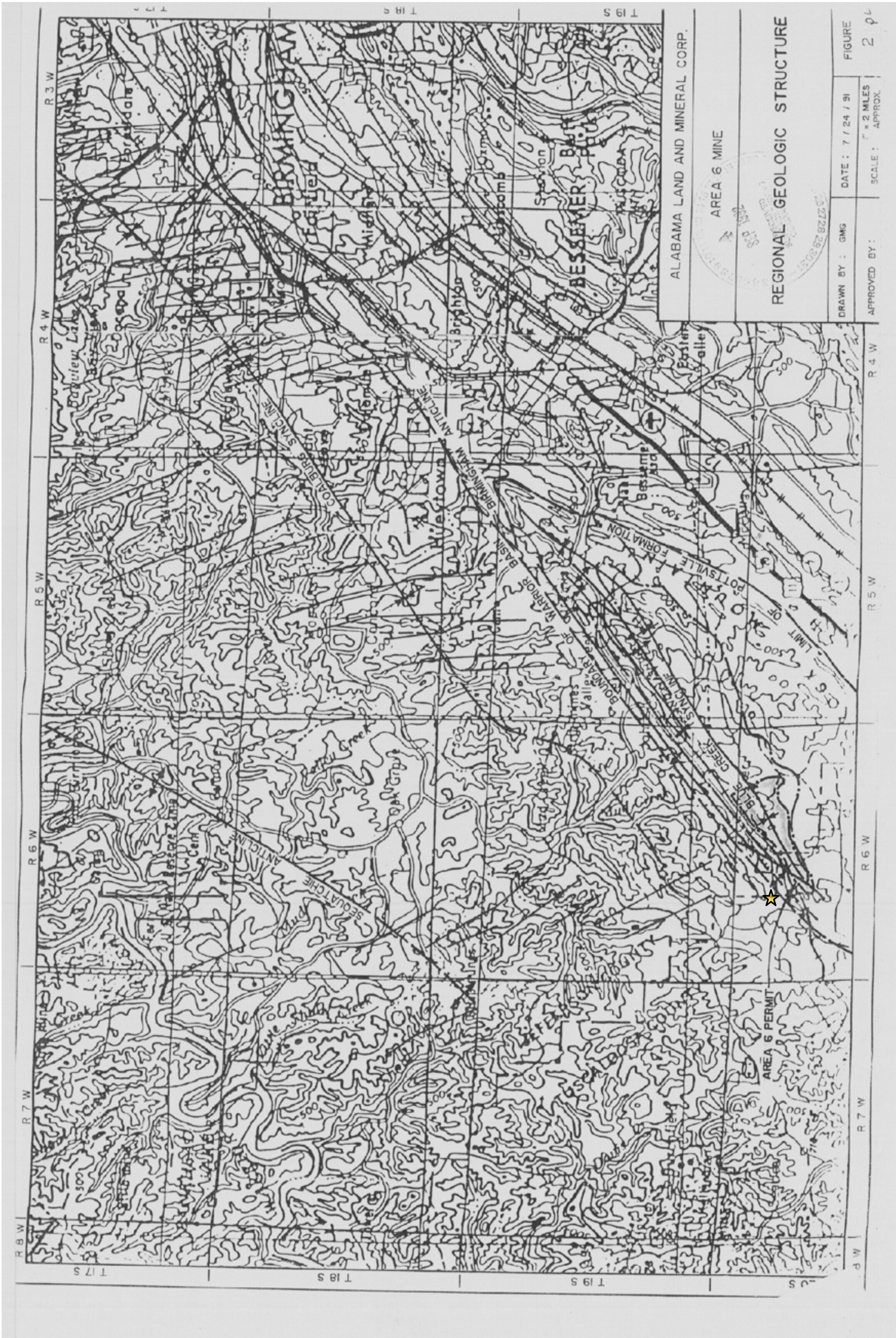
As stated above, samples for the drill holes were taken every five (5) feet or change in lithology. Each overburden sample was described and analyzed. Chemical analysis, including Paste pH, Total Sulfur, and Neutralization Potential were conducted by personnel of McGehee Engineering's lab in accordance with Field and Laboratory Methods Applicable to Overburden and Minesoils developed, USEPA, Environment Protection Technology Series, EPA-600/2-78-054 dated March 1978 guidelines.

9. Required Additional Overburden Testing:

No additional overburden testing is proposed at this time.

CAHABA RESOURCES, LLC
ROCKCASTLE MINE NO. 1, P-3999
ATTACHEMENT II-E

REGIONAL GEOLOGIC STRUCTURES MAP



10. Certification Statement

I, Bradley K. Simmons, hereby certify that the information contained in Attachment II-E, and all maps, plans, and cross-sections included in the answers to Parts II-E, of this application were either prepared under my direct supervision or prepared and certified by other professional engineers or geologists, and that the information included herein is correct and accurate to the best of my knowledge and belief.

McGehee Engineering Corp.

Bradley K. Simmons, P.E. Date

Alabama Reg. No. 33277