ATTACHMENT II-E

GEOLOGY

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

The Cedar Lake Mining, Inc. - Little Spring Creek East mine site is located in Sections 33 and 34, Township12 South, Range 7 West; Sections 2 and 3, Township 13 South, Range 7 West, Walker County, Alabama, as viewed from the Manchester and Sunlight Alabama U.S.G.S. 7.5 minute Quadrangle maps (See attached Mine Site Location Map and Hydro-Geo Map).

NOTE: This site was originally proposed to occupy 1173 acres but due to economies of scale and at the recommendation of the participants at the Interagency Coordination meeting of January 4, 2011, this site has been reduced to 589 acres. Since substantial geological and hydrological data has been obtained for the larger site, these data are included in this analysis to more closely approximate the geologic and hydrologic conditions on the entire area proposed for current and future mining.

The proposed mine site will occupy approximately 589 acres of which 583 acres will be bonded as mining area and will be disturbed in the mining process. An additional 6 acres will be bonded as incidental acres for the coal stockpile, office area, equipment storage and primary haul roads PR-01 and PR-02. The proposed mine site is located within the Mulberry Fork drainage basin of the Warrior Coal Field and is more specifically within the Warrior Coal Basin of the Cumberland Plateau physiographic section as shown on page 5 of "Hydrology of Area 23, Eastern Coal Province, Alabama".

The proposed mine area is underlain by the Pottsville Formation of Pennsylvanian age. As defined by historical geologic data, the strata of the Pottsville Formation are comprised of shales, siltstones, and sandstones with lesser amounts of coal, underclay and conglomerate. Structurally,

the Warrior Basin is synclinal in nature with the synclinal axis extending from north-central Mississippi in the west to north-central Alabama in the east. The syncline is tilted to the southwest with a regional dip of 30 to 200 feet per mile. Four (4) major structures found within the Warrior Basin that modify the basic dip of the Warrior Syncline are the Warrior, Coalburg and Arkadelphia Synclines and the Sequatchie Anticline. The fold axis of the synclinal trends is parallel to the Appalachian system in a northeast-southwest direction and plunge to the southwest with the regional dip. Faulting is generally found perpendicular to the fold axis of the synclinal trend and tend to be high-angle.

The strata which outcrops in the immediate vicinity of the Little Spring Creek mine includes weathered sandstones, sandstones, interbedded sandstones and shales, shales, and coal associated with the Black Creek Coal Group. According to historical data published in "Depositional Settings of the Pottsville Formation in the Black Warrior Basin", the Black Creek Group lies approximately 100 to 300 feet above the "J" Group and from 40 to 130 feet below the Mary Lee Coal Group with the Black Creek Group occurring within a stratigraphic interval from 45 to 160 feet thick.

The coal seam to be mined at this site is the Black Creek Seam. The Jefferson seam was present as a marker in several exploration drill holes but due to its thinness is not considered minable. When the Jefferson seam was encountered, it only showed approximately two (2") inches to three (3") inches in thickness and was collected with the corresponding overburden interval sample and was not deemed of sufficient thickness to separate as an individual sample. No Lick Creek coal was encountered in any exploration drill holes and is not present at the site.

Within the proposed permit area the Black Creek Seam outcrops between approximately 487 feet elevation and 503 feet elevation MSL and averages approximately 17.28 inches (1.44 feet) in thickness (See Hydro-Geo Map and/or Permit Map for location of coal outcrop). Overburden thickness above the Black Creek Seam ranges from 0 feet at the cropline to a maximum of approximately 137.62 feet and averages 70.31 feet over the entire proposed mine site (Little Spring Creek East and Little Spring Creek West tracts). A typical geologic strata column to be mined within the permit area (in descending order) is as follows: topsoils and subsoils in the A, B & C soil horizons approximately 1 foot thick, weathered surface materials approximately 4 feet thick, underlain by an interval of soft friable large grained weathered sandstones with clay lenses, approximately 20 feet in thickness, underlain by an interval of alternating sandstones and shales, approximately 20 feet in thickness, underlain by an interval of dark gray shale with varying intermittent sandstone streaks, approximately 30 feet in thickness. This shale unit is underlain by the Black Creek Coal Seam. The Black Creek Seam is underlain by a hard shale bottom that is a minimum of 5 feet in thickness. It should also be noted that OB-4 encountered a hard sandstone medium gray in color with intermittent shale streaks that was not present in OB-2 and OB-3. OB-1 did encounter a 5 foot layer of hard gray sandstone at the 25'-30' interval that was similar to the strata encountered in OB-4 (See drawing entitled Overburden Columns for lithology of overburden sample holes). To more accurately describe the lithology of the proposed permit area, four (4) geologic fence diagrams (cross-sections) have been developed at strategic locations. The locations of these geologic cross-sections of the mine area are shown on the Hydro-Geo Map and are designated as Geologic Section A-A', Geologic Section B-B', Geologic Section C-C' and Geologic Section D-D' and are generated by the digital geologic model as described in the following text.

The lithology description was developed as a composite of the six (6) overburden sample drill holes drilled by Haley Brothers Coal, Inc. using a Chicago Pneumatic CP-650 utilizing a 6-3/4 inch drill bit and under the supervision of TASK Engineering Management Inc. and by 17 exploratory rotary drill holes drilled by and under the supervision of Haley Brothers Coal, Inc utilizing the same equipment. (See drawings entitled Overburden Columns for geologic columns of these six (6) overburden samples and Drillhole Columns - Sheet 1 of 2, Sheet 2 of 2 for geologic columns of the 17 exploratory drill holes.)

Incorporating these exploration drillhole data, overburden sample drillhole data and surface contour data, a digital model of the entire proposed mine site (Little Spring Creek East and Little Spring Creek West) has been developed using Carlson Mining 2010 with AutoCad 2010 computer software. The methodology of this software constructs a geologic model of the mine site by constructing a surface grid file on 20' X 20' spacing to determine the top limits of the said geologic model. Strata grid files are then developed to correspond to the same 20' X 20' grid spacing for the bottom elevation of each strata layer from the top limit elevation surface grid to the bottom elevation grid of the Black Creek Coal seam. (Note that all drillhole and/or overburden column drawings are shown in the drawings with the legend and descriptions of the corresponding strata grid files.) These surface and strata grid files are correlated from the top (ground surface) to the bottom (bottom of coal) and are defined by a Pre-Calculated Grid file which constitutes the geologic model for the site. All grid files other that the surface (top) grid are based on the drillhole data developed from exploration drilling at the site.

Once the geologic model has been constructed, geologic fence diagrams, cross-sections and volumetric calculations can be constructed as required on a practically instantaneous basis. (See OB-1/MW-1, OB-2/MW-2, OB-3/MW-3 ,OB-4/MW-4, OB-5 and OB-6 for detailed drawings showing the overburden sequences/lithology of the overburden sample holes as well as specific data on the wellhead appliances installed in each overburden sample/monitoring well hole.) Overburden lithology remains constant across the extent of the proposed mine site delineated as Little Spring Creek East as well as the proposed future mine site delineated as Little Spring Creek West. See enclosed drawings of these exploratory drill columns for geologic details of the overburden and exploratory drill holes shown by Drillhole Columns - Sheet 1 of 2, Sheet 2 of 2 and Overburden Columns. The following table lists the historical drillhole data and personnel in charge of drilling operations corresponding to the graphical exploration drill columns depicted below in Exhibit 2.1.

Outcroppings within the extended site (Little Spring Creek East and Little Spring Creek West) are consistent with the upper Pottsville Formation of the Warrior Coal Field and are composed chiefly of alternating beds of gray sandstones, conglomerate, siltstone and shale with beds of coal and underclay. The maximum thickness of the formation in the western part of the area is about 4,500 feet, and in the eastern part it is about 9,000 feet (Culbertson 1964). Except for conglomeratic sandstone at the base of the formation, few lithologic horizons can be correlated regionally according to the "Hydrologic Assessment, Eastern Coal Province Area 23, Alabama".

EXHIBIT 2.1		
Drill Hole ID	Drilling Supervisor	Drill Date
MW-1/OB-1	JERRY W. WILLIAMS	04/09/2009
MW-2/OB-2	JERRY W. WILLIAMS	04/09/2009
MW-3/OB-3	JERRY W. WILLIAMS	04/16/2009
MW-4/OB-4	JERRY W. WILLIAMS	04/16/2009
OB-5	JERRY W. WILLIAMS	07/27/2011
OB-6	JERRY W. WILLIAMS	07/27/2011
DH-238	ZACHARY HALEY	09/05/2008
DH-240	ZACHARY HALEY	09/06/2008
DH-244	ZACHARY HALEY	09/12/2008
DH-246	ZACHARY HALEY	09/17/2008
DH-247	ZACHARY HALEY	09/17/2008
DH-248	ZACHARY HALEY	09/18/2008
DH-249	ZACHARY HALEY	09/19/2008
DH-273	ZACHARY HALEY	01/29/2009
DH-283	ZACHARY HALEY	04/07/2009
DH-286	ZACHARY HALEY	04/30/2009
DH-287	ZACHARY HALEY	07/16/2009
DH-288	ZACHARY HALEY	07/17/2009
DH-290	ZACHARY HALEY	07/17/2009
DH-291	ZACHARY HALEY	07/17/2009
DH-293	ZACHARY HALEY	07/20/2009
DH-294	ZACHARY HALEY	07/20/2009
DH-295	ZACHARY HALEY	07/21/2009

Several local faults were discovered during exploratory drilling operations and are depicted on the Hydro-Geo Map. These faults, according to standard geological terms, are classified as normal displacement faults with varying deflections. Fault #1 extends diagonally across the minable area approximately 8,800 feet at an angle of N 53° 28' 34" W and the displacement varies from 23.19 feet to 22.44 feet up on the northeast side of the fault. Fault #2 extends south, southwest from the terminus of Fault #1 a distance of approximately 4000 feet at an angle of N 49° 03'41" E with displacements varying from 9.69 feet down to 25.06 feet down on the southeast side of the fault. Fault #3 intersects Fault #2 at an angle of 76° 00' 04" and extends approximately 1350 feet to intersect Fault #6 at an angle of S 54° 56' 15" E with displacements of 16.07 feet down to 17.81 feet down on the NE side of the fault. Fault #4 extends from Fault #6 approximately 550 feet and intersects Fault #5 at an angle of N 74° 02' 45" W with a displacement of 22.84 feet down. Fault #5 extends from the terminus of Fault #4 to the southwest at an angle on N 44° 25' 29" E with a displacement down from 22.84 feet to 34.43 feet down on the NW side. The length of Fault #5 was not determined due to lack of drilling because the relative displacements of the faulting on the southeast area of the permit resulted in the Black Creek Coal Seam elevation to be lower than Little Spring Creek at Fault #5 and with no outcrop at Fault #4. Fault #6 was determined to extend in a northeasterly direction at an approximate angle of N 19° 49' 27" E with no coal seams encountered on the E/SE side of the fault. Drilling on the E/SE side of the fault encountered massive medium gray sandstone with no coal seams indicated.

As stated in the "Hydrologic Assessment, Eastern Coal Province Area 23, Alabama", regional geologic strata trend northwestward and dip southwestward 30 to 200 ft/mi (feet per mile) but regional dip and strike can be modified by locally occurring faults.

Due to the extensive local faulting strike and dip of the Black Creek Coal Seam was determined to be N 27° 42' 47" W Strike and S 12° 19' 17" W Dip reflecting local trends rather than the regional basin trends.

The total sulfur percentages of the coal seam to be mined at this proposed site is listed below. These totals are based on core samples taken during the exploration drilling process.

Seam	Percent Sulfur (Dry)
Black Creek	1.44

The Geology sections of this permit application were prepared by Jerry W. Williams who is licensed by the State of Alabama as a Professional Engineer. I certify that the information in this section is correct and accurate to the best of my knowledge and belief.

Jerry W. Williams,
Alabama Reg. No. 12739

CHEMICAL ANALYSIS OF OVERBURDEN

Per the requirements of Section 880-X-8E-.06(2) chemical analysis of the geologic strata to be disturbed in the mining process were conducted. Methodology is described as follows:

(1) Six (6) overburden drill holes have been drilled at the proposed mine site to document the chemical properties of the overburden materials and for acid base accounting purposes. These drill holes were drilled with a Chicago Pneumatic CP-650 rotary air drill and the overburden cuttings generated by the process were collected in five (5) foot intervals, logged, labeled and prepared for laboratory analysis. The cuttings were sampled in minimum five (5) foot increments and at each change of the lithology of the overburden materials. In some instances due to drilling constraints and to maintain continuity the five (5) foot interval may not be maintained but these instances are rare and generally the required sample intervals have been maintained. The geologic properties of the overburden strata are noted in the geologic logs listed in Exhibit 2.2 and a graphical representation of the lithology at each overburden testing site is depicted by the drawing entitled Overburden Columns.

(2) Samples collected in the field were then packed in chronological order, packed and shipped for analysis to Standard Laboratories, Inc. located in Whitesburg, Kentucky. Chemical analysis was performed on each lithologic unit by a laboratory test for the total sulfur of that unit. Using industry standard methodology the total sulfur is converted to potential acidity by multiplying total sulfur percent by 31.25. The results of these analyses determine potential acidity and are reported in tons of calcium carbonate equivalent per 1000 tons of material. Any overburden with a potential acidity less than zero (0) tons calcium carbonate equivalent per 1000 tons of overburden material is

considered acid or toxic-forming. The final laboratory reports from Standard Laboratories, Inc reported Acid Base Accounts of each strata interval. This Acid Base Account reported Potential Acidity, Paste pH, Total Sulfur (Dry Basis), Neutralization Potential and Net Potential Surplus/Deficiency (+/-) Results of all chemical analysis for each strata sampled are listed by drill hole in Exhibit 2.3.

(3) Neutralization potential is the ability of strata units to neutralize acid material and is reported in tons of calcium carbonated equivalent per 1000 tons of material. The results of overburden analyses for this parameter are listed in Exhibit 2.3.

(4) Acid-base account is a mathematical determination developed by calculating the neutralization potential minus potential acidity. This parameter is the results of these calculations reported as a deficiency (-) or excess (+) for each geologic column interval.

(5) Areas of influence for each overburden sample location was determined by drawing straight lines from each hole location and drawing perpendicular lines from the center point of the overburden hole lines. These perpendiculars were extended to the permit boundary in each direction to construct Theisson Polygons around each overburden hole. See Theisson Polygon Map for areas of influence. Supporting calculated areas of influence in acres are listed in the following table:

THEISSON AREAS OF INFLUENCE

Overburden Hole ID	Area of Influence (Acres)
MW-1/OB-1	62.0
MW-2/OB-2	365.0
MW-3/OB-3	297.0
MW-4/OB-4	110.0
OB-5	145.0
OB-6	150.0

(6) From the chemical data determined by Standard Laboratories, Inc. the composite results of all overburden intervals have been tabulated using the industry standard spreadsheet program designed by the Pennsylvania Department of Environmental Resources, Bureau of Mining and Reclamation.

(7) According to the results of the overburden analysis spreadsheets each overburden hole and corresponding area of influence shows an excess of native alkaline materials to neutralize any acid forming strata. See Exhibit 2.4 for spreadsheet outputs for each overburden hole. The following table shows the mass-weighted averages for each overburden hole.

Drill Hole ID	Percent Sulfur	Neutralization Potential	Acid-Base Account	Tons/Acre Excess CaCO3
MW-1/OB-1	0.0076	9.0006	8.7632	832
MW-2/OB-2	0.0828	4.8328	2.2688	631
MW-3/OB-3	0.0520	5.2500	3.6261	819
MW-4/OB-4	0.0621	9.2536	7.3120	1696
OB-5	0.0306	19.3148	18.3576	4287
OB-6	0.0304	7.4337	6.3727	830