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

The Cedar Lake Mining, Inc. - Bull Gap mine site is located in northeastern Blount County northeast of the town of Oneonta, Alabama in Sections 8, 9, 16, 17, 18, 19 and 20, Township12 South, Range 3 East; Section 24, Township 12 South, Range 2 East, as viewed from the Hyatt Gap, Altoona and Oneonta Alabama U.S.G.S. 7.5 minute Quadrangle maps (See attached Mine Site Location Map and Hydro-Geo Map).

Bull Gap mine will occupy approximately 554 acres of which 538 acres will be bonded as mining area and will be disturbed in the mining process. An additional 16 acres will be bonded as incidental acres for the coal stockpile, office area, equipment storage, offsite sediment basins and primary haul roads PR-01, PR-02, PR-03 and PR-04.

The mine site is located within the Locust Fork drainage basin of the Cumberland Plateau physiographic section as shown on page 5 of "Hydrology of Area 22, Eastern Coal Province, Alabama". The Cumberland Plateau section is the southernmost section of the Appalachian Plateau's province of the Appalachian Highland Region. The Cumberland Plateau borders the Highland Rim section to the north, the Valley and Ridge province to the southeast and the Coastal Plane section to the southwest and consists of flat-topped high-elevation plateaus separated by deep, steep-sided valleys. Tops of the plateaus slope gently from the northeast to the southwest. The landforms are the result of differential erosion of the underlying strata with the more resistant rock of the great conglomerate of the Lower Coal Measures of the Appalachian Coal Field forming the ridges and the steep-sided valleys from erosional actions acting upon the softer strata below.

The proposed Bull Gap Mine is located on the Raccoon Mountain section of Blount Mountain and is underlain by the Pottsville Formation of Pennsylvanian age of the Plateau coal field. The sandstone cap rock of the great conglomerate has preserved the Pottsville formation from geologic forces and erosional actions and hence the coal deposits of the Plateau coal field. The strata of the Pottsville Formation are comprised of shales, siltstones, and sandstones with lesser amounts of coal, underclay and conglomerate as described on page 8 of "Hydrology of Area 22, Eastern Coal Province, Alabama". The seams to be mined are the Upper Bynum, Lower Bynum and the Underwood coal beds.

Geology of the immediate area is complex in which the strata are folded and faulted to form northeast/southwest trending anticlines and synclines whose axes are generally parallel to the Appalachian Range and are dipping to the southwest. Anticlinal uplift, which are up-arch folds, has impaired the structural integrity of the overlying conglomerate cap rock thus exposing the softer shales, limestones and dolomites of the older underlying Paleozoic strata and the corresponding erosional weathering has resulted in the formation of the topographic lows of Sequatchie and Murphree valleys. Great forces have acted on the immediate and surrounding areas of Bull Gap mine causing geologic folding generally parallel to the axes of the Appalachian Mountain Range. These folds have resulted both up-arch folding and down-arch folding. These forces caused the uplift of the Sequatchie Valley Anticline and the Murphree Valley Anticline while the corresponding troughs (depressions) of down-arch folds have resulted in the formation of the synclinal structures of Sand Mountain and Blount Mountain that has left the erosion-resistant sandstone cap rock of the Cumberland Plateau in place protecting the coal measures of the Pottsville Formation.

The Blount Mountain Syncline is located on the downthrown side of an unnamed thrust fault that resulted during the formation (uplift) of the Murphree Valley Anticline and has resulted in a much greater thickness of the Blount Mountain coal measures as compared to other coal measures of the Plateau Field. Due to these greater thicknesses, four (4) defined conglomerates are present within the strata layers of the Blount Mountain Syncline while all other coal measures of the Plateau field define only two (2) conglomerates. The fourth (4th) and geologically the youngest conglomerate occurs at the higher elevations of Blount Mountain and the Bynum (Upper and Lower) coal bed occurs just above the fourth conglomerate while the Underwood (Altoona) coal bed lies below this conglomerate. The Woodward coal bed appears periodically within the overlying strata above the Underwood coal seam, just below the Fourth Conglomerate and below the Bynum seams. The Woodward seam is generally thin and erratic in thickness and does not appear to be minable. (The Woodward seam is referred to as the Underwood marker seam in the enclosed Drill Logs.) Below the Underwood coal bed, there are the third, second and first conglomerates and intervening strata with various named and un-named coal beds but due to the depth below existing surface contours and streambeds are not economically minable.

Blount Mountain is part of the continuation of Sand Mountain and the Plateau coal field that extends from Pinson, Alabama to the northeast into Georgia and Tennessee. Bull Gap mine is located on that part of Blount Mountain known locally as Raccoon Mountain that occupies the southwestern prong of the Plateau coal field that has been isolated from the main body of the field by the Murphree Valley Anticline. Bull Gap Hollow separates Raccoon Mountain and Altoona Mountain both of which are local structures whose strata have been uplifted higher than the regular contours of the tableland of Blount Mountain.

Blount Mountain encompasses the area between Bristow Cove or Murphree Valley on the northwest and Big Wills Valley and Greasy Cove on the southeast and begins at the headwaters of Canoe Creek near Pinson, Jefferson County, Alabama in Section 12, Township 15 South, Range 1 West and gradually conforms to become part of Sand Mountain at Greasy Cove near Howelton, Etowah County, Alabama in Section 25, Township 11 South, Range 4 East.

Straight Mountain runs parallel and due northwest of Blount Mountain and extends from Pinson, Alabama to the northeast and ending due southwest of Mountainboro, Alabama with the terminus of Bristow Cove. Murphree Valley is the northeastern continuation of Opossum Valley through Blount County and lies immediately northwest of Straight Mountain becoming Bristow Cove from the location where Locust Fork crosses Murphree Valley in Etowah County at Walnut Grove, Alabama just north/northeast of Altoona, Alabama and terminates southwest of Mountainboro, Alabama. At the terminus of Bristow Cove, the tableland of Sand Mountain commences and continues from this point to the northeast into Tennessee and Georgia as previously discussed.

Straight Mountain represents near vertical strata that has isolated the Blount Mountain Syncline on the northwest side and has protected the coal measures from excessive erosional and/or geologic forces that resulted in the formation of Murphree Valley. With the folding actions that formed the Murphree Valley Anticline, a major thrust fault has occurred along the longitudinal axis of the anticline that has resulted in a least a two hundred (200) foot vertical downward displacement on the southeastern side of the anticlinal axis. With this fault action, the strata of Straight Mountain were severely deformed and turned upward to form a generally continuous narrow ridge with a few breaches to Murphree Valley along its longitudinal axis. A hinge fault occurred generally parallel to the axes of both the Murphree Valley Anticline and the Blount

Mountain Syncline that resulted in structural impairment of fourth (4th) conglomerate at the location of this fault. Differential erosion has occurred on the exposed softer strata of the Pottsville Formations and has resulted in the formation of Hale Creek along the exposed valley.

The main geologic structural feature impacting surface coal mining operations at the Bull Gap Mine is the Blount Mountain Syncline. This structure is basically a canoe shaped trough three (3) to six (6) miles in width between the southwest to northeast trending escarpments of Blount Mountain. The greatest depth of overlying measures trend to this northwestern side of the syncline. The axis of Blount Mountain Syncline runs typically parallel to the axis of the Murphree Valley Anticline but has formed more closely along the northwestern side of the structure due to past geologic interactions with Straight Mountain. The northwestern limb of the syncline runs but a short distance from the axis to be exposed by the erosional actions of Hale Creek. Minable outcrops have been exposed and have been historically mined at the site. The Southeastern limb of the syncline gains elevation up to its outcrop along the southeastern escarpment of Blount Mountain and dips approximately 4° near the center of the mountain and increases to approximately 10° to 12° near the escarpment. Dips on the northwest limb are low due to the weathering and subsequent exposure of the strata of the syncline. Because of the tremendous geologic forces generated by the formation of the Murphree Valley Anticline, both Raccoon Mountain and Altoona Mountain strata, while part of the Blount Mountain Syncline, have both been upthrust and tilted and are higher in elevation than the general surface elevation trends along Blount Mountain. The synclinal structure of Raccoon Mountain follows the same trends of Blount Mountain Syncline with its southeastern side elevated approximately two hundred (200) feet above its northwestern side and dips to the northwest along its limb and southwest along its axis up to a local down trending hinge fault approximately perpendicular to

its axis and commencing at 33°59'40.20"N, 86°21'40.31"W at Basin 001E. (See Hydro-Geo Map and/or Permit Map for location of Basin 001E that defines the low-point and axis of the described hinge fault.) Due to the tilt and dip of the structure, the lowest point of coal outcroppings have occurred here at the axis of the hinge fault. The Underwood Coal Seam, which is the lowest stratigraphical minable seam on the property, increases in elevation both to the northeast and to the southwest from this point along the axis of the syncline with all overlying strata and coal seams following the corresponding trend.

In addition to this fault, several normal displacement faults have resulted in minimum displacements, typically twenty (20) feet or less along the axis of the syncline. These faults typically occur along the southeastern limb of Blount (Raccoon) Mountain Syncline in conjunction with the higher dips of the strata along the southeastern escarpment of Blount Mountain. With the increasing elevation of the coal seams to the southwest as a result of the perpendicular fold previously discussed, the corresponding decrease in overburden depth results in much lower cover above the coal seams of the Pottsville Formation.

Geological conditions have been the prime influence of past mining operations and methods at the site of Bull Gap mine. Extensive underground mining operations have been conducted on the Underwood seam and both area mining and contour mining methods have been used to surface mine the coal deposits of both the Underwood and both Bynum seams. As previously stated, the Upper Bynum and Lower Bynum seams outcrop at the higher elevations of Raccoon Mountain while the formation of Hale Creek has exposed a long section of outcrop of the Underwood seam on the northwest side of the syncline. With its thickness and generally level orientation, the Underwood has been historically underground mined as early as the 1870's. As surface mining technology developed, surface coal mining has been conducted at Raccoon Mountain beginning

in the mid-1950's and continued on a periodic basis up to the early 1990's. Raccoon Mountain has been completely encircled by contour surface coal mining operations that have exposed all three (3) minable seams up to where the depth of cover has made mining un-economical or the surface mining has exposed underground mine works. The Upper Bynum is non-continuous across the extent of the proposed Bull Gap Mine. As stated previously, the site of Bull Gap mine consists of a syncline elevated approximately two hundred (200) feet on the southeast side with its axis running from the southeast to the northwest approximately five hundred feet from the outcrops of the Underwood seam exposed parallel to Hale Creek. The Upper Bynum seam thickness plays out to approximately one (1) inch along the northeast axis of the syncline and is as thick as thirty-four (34) inches where it is present along the southwest axis of the syncline. The Lower Bynum and the Underwood seams are consistent and other than small local variations maintain minable seam thicknesses.

Within the proposed permit area neither of the three (3) seams outcrop due to past surface coal mining operations. The Underwood seam follows the trends of the host strata but occurs at a low elevation of 960 feet MSL to a high elevation of 1120 feet MSL and averages approximately 32.78 inches (2.73 feet) in thickness with an overlying low highwall of sixty-four (64) feet in Increment #1 to a maximum highwall of two hundred twenty-seven (227) feet in Increment #3. Due to the tilt of the syncline of Blount Mountain the Upper Bynum occurs at a low elevation of 1047 feet MSL to a high elevation of 1152 in drillhole BG-09 and averages approximately 26.86 inches (2.24 feet) in thickness. Likewise the Lower Bynum conforms to the tilt of the Blount Mountain Syncline and occurs at a low elevation of 1020 feet MSL to a high elevation of 1117 in drillhole BG-09 and averages approximately 13.44 inches (1.12 feet) in thickness.

With the extents of underground mining, the proposed operations at Bull Gap Mine will focus on the recovery of the Underwood seam in Increment Nos. 1, 3 and 4. Increment No 5 will focus on the recovery of the Upper Bynum and Lower Bynum while Increment No. 2 will be designated as fill area to reclaim existing highwall areas where no recoverable coal is present. No typical geologic strata column exists within the permit area. In Increment No. 1, the Upper Bynum has been removed by area surface mining methods so a strata column (in descending order) would be as follows: weathered subsoils approximately two (2) feet in thickness, massive gray sandstones of varying thickness, the Lower Bynum seam with fireclay bottom, massive gray sandstones with shale streaks with hematite and pebble intrusions (Fourth (4th) Conglomerate) approximately fifty (50) feet in thickness, the Altoona Marker seam (Woodward seam), dark gray shales with sandstone streaks approximately twenty (20) feet in thickness, the Underwood seam with a hard fireclay and/or sandstone bottom. In Increment No. 5, the Underwood seam has been removed by underground mining operations and only the Upper Bynum and the Lower Bynum are in-place so the strata column (in descending order) would be as follows: topsoils, subsoils and weathered red clays approximately five (5) feet in thickness, red-brown loose grained sandstone trending to brown sandstones with shale slips approximately ten (10) feet in thickness, massive hard gray sandstones with periodic shale layers approximately sixty (60) feet in thickness, the Upper Bynum seam, dark gray shales with intermittent layers of hard gray sandstones approximately thirty (30) feet, the Lower Bynum seam, fireclay and/or sandstone bottom. Both the Upper Bynum and the Lower Bynum seams lie immediately above the Fourth (4th) Conglomerate and the Underwood seam lies immediately under the Fourth (4th) Conglomerate. (See drawing entitled Overburden & Drillhole 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' as shown on drawing entitled Geologic Fence Diagrams and are generated by the digital geologic model as described in the following text.

The lithology description was developed as a composite of the four (4) overburden sample drill holes drilled by MS&R Equipment Company Inc. using a Simco 7000 utilizing a 4-3/4 inch drill bit and by fifteen (15) exploratory rotary drill holes drilled by and under the supervision of Cedar Lake Mining, Inc utilizing the same equipment. (See drawings entitled Overburden & Drillhole Columns for geologic columns of these four (4) overburden samples and Overburden & Drillhole Columns for geologic columns of the fifteen (15) 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 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 Underwood 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

Underwood 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. (See OB-01/MW-01, OB-02/MW-02, OB-03/MW-03 and OB-04/MW-04 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. See enclosed drawings of these exploratory drill columns for geologic details of the overburden and exploratory drill holes shown by Overburden & Drillhole Columns. (See Drill Logs for drilling data.) 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.

EXHIBIT 2.1		
Drill Hole ID	Drilling Supervisor	Drill Date
MW-01(OB-01)	MS&R Personnel	10/20/2008
MW-02(OB-02)	MS&R Personnel	10/23/2008
MW-03(OB-03)	Jerry W. Williams	03/11/2009
MW-04(OB-04)	MS&R Personnel	10/24/2008
BG-002	MS&R Personnel	10/20/2008
BG-003	MS&R Personnel	10/22/2008
BG-004	MS&R Personnel	10/24/2008
BG-005	MS&R Personnel	10/24/2008
BG-006	MS&R Personnel	11/17/2008
BG-007	MS&R Personnel	11/17/2008
BG-008	MS&R Personnel	11/18/2008
BG-009	MS&R Personnel	11/18/2008
BG-010	MS&R Personnel	11/24/2009
BG-011	MS&R Personnel	03/27/2009
BG-012	MS&R Personnel	04/01/2009
BG-013	MS&R Personnel	04/07/2009
BG-014	MS&R Personnel	04/07/2009
BG-015	MS&R Personnel	04/08/2009

According to the "Hydrologic Assessment, Eastern Coal Province Area 22, Alabama", the regional dip of the Pottsville formation is to the southwest but due to the complex geological structures that have been subjected to folding and faulting, the local strike is approximately North 50 degrees West and the strata dips to the southwest at about 2.5 degrees.

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)
Upper Bynum	2.36
Lower Bynum	2.70
Underwood	1.86

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) Four (4) 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 Simco 7000 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 & Drillhole 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 not 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) Due to the extent of previous mining and lack of reclamation, areas of influence were not considered for this permit. Overburden sample holes have been placed in each area and/or Increment to be mined.

(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	0.0352	13.5166	12.4180	1964
MW-2/OB-2	0.0483	9.2730	7.7644	1282
MW-3/OB-3	0.0941	6.4563	3.5170	139
MW-4/OB-4	0.0868	5.5594	2.8457	124

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