CANE CREEK, LLC
FLAT TOP MINE, P-3882, R-5
ATTACHMENT IV-C-2

TOPSOIL VARIANCE MODIFICATION APPLICATION

Prepared by:

MCGEHEE ENGINEERING CORP.
P. O. Box 3431
450 19th Street West
Jasper, Alabama 35502-3431
Telephone: (205) 221-0686

INTRODUCTION

Section 880-X-10C-(5)(a) of the Rules and Regulations of the State of Alabama Surface Mining Commission states "*Selected overburden materials may be substituted for or used as a supplement to topsoil if the person who conducts surface mining activities can demonstrate to the State Regulatory Authority that the resulting soil medium is equal to or more suitable for sustaining revegetation than the existing topsoil, and the substitute material is the best available in the permit area to support revegetation".*

ASMC guidelines concerning topsoil variance proposals were updated in March of 2006 by William E Kitchens prior to the issuance of the Flat Top Permit. Page three of the updated Topsoil Variance Proposal Guidelines states *" Soils which have been classified by the USDA as Prime Farmland soils, or any other soils which have been described as being suitable for the growing of crops, including hay, are not eligible for the replacement by a substitute material."* This portion of the updated guidelines is not congruent with regulation 880-X-10C-(5)(a). Rule 880-X-10C-(5)(a) allows for qualified overburden material to be substituted for <u>any</u> topsoil, while the updated guidelines except prime farmland soils and soils that are suitable for crop production including hay.

There are only two soil types that are present within the Flat Top permit including the Palmerdale complex and the Montevallo-Nauvoo Association (Steep). A topsoil variance request was submitted to ASMC during the initial permit application back in 2006 requesting that selected overburden materials be substituted for both the Palmerdale Complex and the Montevallo-Nauvoo Association (Steep). In the topsoil variance request, the data verified that the selected overburden substitute material was better than the existing soils of Montevallo-Nauvoo Association.

The purpose of this request is to review and better define the findings and limitations of the 2006 original topsoil variance approval.

CANE CREEK, LLC requests in this topsoil waiver modification request that the topsoil to be saved be limited to areas on the ridgetops that are 10 percent or less in slope and that the depth of the topsoil to be reapplied be kept to a minimum of 6 inches.

PREVIOUS TOPSOIL VARIANCE APPROVAL

A Topsoil Variance was approved for the Flat Top Mine when the permit was issued on all of the Palmerdale Complex and the majority of the Montevallo-Nauvoo Association Steep. Item 2 of the findings and limitations in the topsoil variance approval letter dated 6-21-2006 states as follow:

" The remainder of the proposed permit is identified on the Jefferson CO. Soils Map as Montevallo-Nauvoo Complex. This undifferentiated complex of several soil types consists primarily of Montevallo soils on slopes of 15% and greater; and Nauvoo, and to a lesser extent, Townley soils on ridgetops of less than 15% slopes. The contour map shows some 60 to 80 acres of relatively low slope ridgetops lying above the 520 foot contour. In the absence of more definite mapping, these ridgetops should be considered to contain Nauvoo and Townley soils.

The Montevallo soils are not suited to cultivation, however, the Nauvoo and Townley soils are suited to cultivation and hay production. The soil samples taken from the ridgetops (TS-1 and TS-4) also show better soil characteristics than the samples from the steeper slopes. ASMC Guidelines prohibit the substitution of soils which are suited for cultivation of hay production. Therefore the flatter ridgetops above the 520 foot contour on the southern side of the proposed permit, as depicted on the accompanying Soils Map, are not included in the Variance. These soils will have to be saved, stored and reapplied to the surface per ASMC regulations."

In the 2006 approval letter there was no defined boundary or area that identified exactly what soils were excepted and were to be saved other than the flatter ridgetops above the 520 contour elevation. The permittee and the ASMC had little to go on to determine what topsoil had to be saved.

On previously approved topsoil variance requests at other mine locations that had soils excepted because they were suitable for hay or crop production, a 10 percent slope limitation has been applied. Soils suitable for hay or crop production that were on slopes of 10 percent or less were exempted from the topsoil variance request and had to be saved. Soils suitable for hay or crop production that were on slopes greater than 10 percent were not exempted from the topsoil variance request and did not have to be saved and could be replaced with a suitable overburden substitute material. Also the depth of topsoil required to be put back on other previously approved topsoil variance requests that had soils excepted because they were suitable for hay or crop production has been 6 inches.

UPDATED CONTOUR MAPPING

In the original topsoil variance application the contours mapping depicted on the soils map was 20 foot interval contours available from USGS. The permit map was updated in Revision R-1 with more detailed 10 foot contour intervals from aerial contour mapping. The mapping that was obtained was actually on 2 foot contour intervals but due to the steep nature of the terrain, only the 10 foot contour lines are shown on the updated permit map. Based on the updated contour mapping there was a total of 94 acres of the Montevallo-Nauvoo Association (Steep) soil that exists above the 520 contour interval.

SLOPE ANALYSIS

A three dimensional grid of the existing surface was created from the updated 10 foot contour mapping. The density of the grid was on 20 foot spacing. This means that there is an elevation value every 20 feet. A Slope Zone Analysis of the areas above the 520 contour elevation was performed using Carlson SurvCad software. The Slope Zone Analysis checks the elevation difference between each grid spacing and generates a slope zone contour at the intervals specified.

The specified intervals for the Slope Zone Analysis was 10 percent or less and anything greater than 10 percent slope. The results of the slope zone analysis revealed that only 18 acres of the 94 acres above the 520 contour was on a slope of 10 percent or less. The remaining 76 acres was on slopes greater than 10 percent.

The attached **Soils Map** shows the boundaries of the existing soil groups, the 520 contour, and the areas above the 520 contour that are on slopes of 10 percent or less.

CONCLUSION

The side by side comparison of the native topsoil ridgetop samples (TS-1 and TS-4) shown in Table 5 against the proposed substitute material samples (SP-1 and SP-2) reveals that the substitute material is better than the native topsoil in the following categories pH, average acid base account, organic matter, extractable nutrients and required soil amendments (lime & fertilizer). The proposed substitute material had more coarse fragments than the native soils and had a lower total available water capacity.

As shown in this study and in the previous study (the chemical, textural and physical properties) of the proposed substitute material in the area is equal to or more suitable for sustaining revegetation than the native topsoils and is the best to support revegetation and therefore satisfies the criteria set forth in 880-X-10C -(5) (a).

While Cane Creek acknowledges that the ASMC Guidelines state that soils that are suitable for crop or hay production are exempted from topsoil variance requests we do not agree that ASMC Guidelines should overrule 880-X-10C-(5) (a) that allows selected overburden material to be substituted as a topsoil replacement. Rule 880-X-10C-(5) (a) should take precedence over the ASMC Guidelines.

If the ASMC Guidelines are held to and soils that are suitable for crop or hay production are exempted from this topsoil waiver request and must be saved, then CANE CREEK, LLC respectfully requests that the topsoil to be saved be limited to areas on the ridgetops that are 10 percent or less in slope and that the depth of the topsoil to be reapplied be kept to a minimum of 6 inches.

MINE SITE INFORMATION

The Flat Top Mine occupies approximately 625 acres of which approximately 477 acres are mining acres, 137 are spoil areas and 11 acres are roads, ponds, and other incidentals. Flat Top Mine is located in Sections 24, Township 16 South, Range 5 West, and Sections 18, 19, 20 & 30 Township 16 South, Range 4 West, Jefferson County, Alabama as found on the Adamsville, Brookside, Dora and Sylvan Springs U.S.G.S. Quadrangles. The attached Soils Map shows the Mine site location, soil types within the permit area and drill hole/topsoil collection sites. Previously mined overburden samples were taken on-site. The Pratt, Nickel Plate and American Coal Seams are the seams to be mined at Flat Top Mine.

SOILS PRESENT BEFORE MINING

Soils present within the permit area are as follows:

Palmerdale Complex	
Montevallo-Nauvoo Association	Steep

LANDUSE

The pre-mining landuse of the permitted area consists of undeveloped/no current use with trees and undeveloped/no current use without trees. The proposed post mining landuse of the permit area will be Undeveloped/No Current Use (Forestry Reclamation Approach) and/or Undeveloped/No Current Use with grasses as the primary vegetative cover. All Sediment basins are proposed as permanent water impoundments except Basins 008 and 011.

SOIL DESCRIPTIONS

The following descriptions were obtained from the Data obtained from the Jefferson County Soil Conservation Services.

PALMERDALE COMPLEX

The Palmerdale Soils consist of deep, somewhat excessively drained, moderately rapidly permeable soils that formed in acid spoil material in sloping to very steep areas that have been strip-mined for coal. Slopes range from 6 to 60 percent.

Horizon descriptions are as follows:

0 - 6 inches: dark grayish brown extremely channery loam; weak medium granular structure; friable; few fine roots; about 70 percent randomly oriented coarse fragments; mostly channery siltstone; very strongly acid; gradual wavy boundary.

6 - 60 inches: dark grayish brown extremely channery loam; massive; weak medium granular structure; friable; about 80 percent randomly oriented coarse fragments, mostly siltstone; very strongly acid.

Palmerdale soils range from 2.0 - 6.0 in./hr. in permeability. Available water capacity ranges from .04 - .10 in./in. Erodibility factor is .24 and is considered light. Lobolly Pines have a site index of (85). These soils are poorly suited for pasture and unsuited to cultivated crops. This soil is well suited for the production of loblolly pines.

MONTEVALLO - NAUVOO COMPLEX

The Montevallo series consists of shallow, well drained, moderately permeable soils that formed in shale and siltstone residuum. These soils are on steep side slopes of strongly dissected plateau uplands that are underlain by shale and sandstone. Slope ranges from 15 to 55 percent.

Montevallo soils are geographically associated with Allen, Docena, Gorgas, Leesburg, Nauvoo, Palmerdale, State, Sullivan, and Townley soils. Allen, Leesburg, Nauvoo, and Townley soils are deeper to bedrock. Allen, Nauvoo, and Townley soils have fewer fragments than Montevallo soils. Docena soils are moderately well drained. Gorgas soils are underlain by hard sandstone bedrock. Palmerdale soils formed in coal mining rock spoil. State and Sullivan soils are subject to flooding.

Typical pedon of Montevallo shaly silt loam in an area of Montevallo-Nauvoo association, steep, in a wooded area about 1 mile west of Graysville, 1,100 feet north and 3,500 feet west of the southeast corner of sec. 19, T. 1 6 S., R. 4 W.

All—0 to 2 inches; very dark gray (10YR 3/1) shaly silt loam, upper 1/2 inch black (10YR 2/1) and high in humus; moderate fine granular structure; friable; many fine roots; strongly acid; clear wavy boundary. A12—2 to 6 inches; dark grayish brown (10YR 4/2) shaly silt loam; weak fine granular structure; friable; many fine and medium roots; strongly acid; lower 2 inches is mixed with from 5 to 15 percent material like that of the B horizon; gradual wavy boundary. B2—6 to 16 inches; yellowish brown (10YR 5/4) very shaly silt loam; weak fine subangular blocky structure; friable; common fine roots; few large roots; about 70 percent by volume of fragments of silty shale; strongly acid; gradual irregular boundary. Cr—16 to 36 inches; light yellowish brown (10YR 6/4), weakly cemented, fractured silty shale containing less than 5 percent by volume of fines as coatings on fragments of shale in cracks.

Solum thickness ranges from 10 to 20 inches. Reaction ranges from medium to strongly acid in all horizons. Fragments of shale and siltstone range from 10 to 40 percent in the A1 horizon and from 35 to 90 percent in the B2 horizon.

The A1 horizon is 3 to 6 inches thick and is shaly silt loam or shaly loam. This horizon has hue of 10YR, value of 3 or 4, and chrome of 1 through 3.

The B2t horizon is shaly or very shaly silt loam or silty clay loam. This horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chrome of 4 or 6.

The Cr horizon is fractured

The Nauvoo series consists of deep, well drained; moderately rapid permeable soils that are forming in loamy residuum weathered from sandstone or interbedded sandstone and shale. These soils are on broad plateaus, mountainsides, hilltops, and benches. Water runs off the surface slowly to rapidly, depending upon the slope and vegetative cover. Slope is dominantly 2-10 % but ranges up to 35 %. Nauvoo soils are well drained and have moderate permeability. Horizon description is as follows:

0 – 7 inches: brown fine sandy loam; weak fine granular structure; slightly hard; very friable; many fine and medium roots; 10-15 % coarse fragments less than 1 inch in diameter; very strongly acid.

7 -11 inches: yellowish red fine sandy loam; weak medium subangular blocky structure; hard; friable; common fine and medium roots; common fine and medium pores; 5 % coarse fragments less than 1 inch in diameter; very strongly acid.

Nauvoo soils range from 2-6 in./hr. in permeability. Available water capacity ranges from .12 - .17 inc./in. Erodibility factor ranges from 0.24 – 0.32 and this hazard is considered moderate. Loblolly pine site index for Nauvoo Soils is (89). These soils have fair potential for grass & legumes, and good potential for wild herbaceous plants, hardwood trees and coniferous plants.

GEOLOGIC DESCRIPTION

The geologic information provided in Part II-E of the Flat Top Mine permit application describes the stratigraphy of the mine site from drillholes within the permit area as follows:

The Flat Top Mine is located within the southern limb of the Sequatchie Anticline, and the northwestern limb of the Coalburg Syncline on the Appalachian Plateaus Physiographic Province Geologic Map of Alabama dated 1989. The mine site is primarily underlain by the Pottsville Formation of Pennsylvanian age is characterized as the following: Interbedded dark-gray shale, siltstone, medium-gray sandstone, and lesser amounts of coal, fireclay and conglomerate.

There is one fault within the permit area. It is found in the northwestern portion of the permit area and is aligned from northwest to southeast.

Geochemistry:
The attached Exhibit 2.2 (copied from P-3665) and Overburden Analysis Spreadsheet shows overburden analyses and acid-base account for the site that were performed on samples collected by air-drilling at the location shown on the Soils Map.

Samples were collected in five-foot intervals by catching cuttings throughout each interval to insure representation of the entire geologic column. Breaks may occur at lithology breaks. Drillholes Exhibit 2.2 (copied from P-3665) show additional lithologic descriptions of the area. Results of analysis of drill holes E-16, 802-011 & 802-012 are shown below:

Drill Hole ID	Percent Sulfur	Neutralization Potential	Acid-Base Account	Tons/Acre Excess CaCO3
E-16	0.1307	15.246	17.2421	3582
802011	0.124	16.940	11.7567	2224
802012	0.1060	18.654	13.6804	2589
Average	0.1202	16.947	14.2264	2798.33

DRUMMOND COMPANY, INC.
FLAT TOP SOUTH MINE
EXHIBIT 2.2

GEOLOGICAL DESCRIPTION

Area: Flat Top South Mine
Drill No: E-16
Drill Date: 02/01/80
Geologist: Perry Hubbard
Elevation: 572.4
Log Date: 06/20/80

Sample Type: Core

3665

Ft. & 10ths	Lithology
0-5	Light brown, silty claystone.
5-10	Light brown to medium gray claystone and shale.
10-21.5	Medium dark gray, silty shale.
21.5-39.1	Medium gray siltstone with some sandstone.
39.1-74.7	Medium dark gray, silty shale with thin sandstone interbeds.
74.7-119.1	Light gray, fine-grained sandstone with silty shale interbeds.
119.1-122.8	Medium dark gray, silty shale.
122.8-125.5	Coal: Pratt Seam.
125.5-127.3	Medium gray siltstone.
127.3-128.4	Coal: Nickel Plate Seam.
128.4-129.5	Dark gray underclay.
129.5-149.9	Medium gray, fine to coarse-grained sandstone.
149.9-157.35	Medium gray siltstone with thin interbed of fine-grained sandstone.
157.35-159.5	Coal: America Seam.
159.5-161.3	Medium gray, sandy underclay.
161.3-164.8	Medium light gray, medium to coarse-grained sandstone.
164.8	T.D.

I certify that this log is correct and accurate to the best of my knowledge and belief.

Bradley A. Brasfield 1-30-91
BRADLEY A. BRASFIELD DATE
CERTIFIED PROFESSIONAL ENGINEER
REGISTERED 13691

ftsout/020-3

OVERBURDEN ANALYSIS SPREADSHEET
OPERATOR: **UNITED LAND CORPORATION**
PERMIT NO: **FLAT TOP** DRILL HOLE: **E-16**
COUNTY: **JEFFERSON** TOWNSHIP:

THRESHOLD VALUES:	SULFUR	NP	FIZZ
	0	0.00	0

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	CL	0	0.00	2.25	2.25	1.00	3450	1.00	0.00	38.81	38.81	17250
10.00	5.00	CL	0	0.05	13.20	11.64	12.24	3450	1.00	329.93	2787.25	2457.32	211155
21.50	11.50	SH	0	0.09	24.25	21.44	24.61	3700	1.00	2944.63	25389.28	22444.64	1046980
39.10	17.60	SS	0	0.10	25.00	21.88	46.41	3670	1.00	9368.51	74948.08	65579.57	2997923
55.00	15.90	SH	0	0.09	23.50	20.69	71.52	3700	1.00	11833.31	98873.86	87040.55	4207398
74.70	19.70	SS	0	0.08	24.75	22.25	98.20	3670	1.00	17748.74	175712.48	157963.75	7099494
95.00	20.30	SS	0	0.08	25.50	23.00	128.17	3670	1.00	23872.36	243498.08	219625.72	9548944
119.10	24.10	SS	0	0.10	19.75	16.63	161.45	3670	1.00	44622.92	282016.84	237393.92	14279333
121.70	2.60	SH	0	0.65	13.50	-6.81	181.45	3700	1.00	35457.22	23565.42	-11891.81	1745586
122.80	1.10	CO	0			0.00	149.01	1800	0.00	0.00	0.00	0.00	0
127.30	4.50	SH	0	0.44	2.50	-11.25	188.42	3700	1.00	43137.15	7843.12	-35294.03	3137247
129.50	2.20	CO	0			0.00	193.44	1800	0.00	0.00	0.00	0.00	0
149.90	20.40	SS	0	0.03	16.50	15.56	210.38	3670	1.00	14766.34	259887.61	245121.27	15750764
157.35	7.45	SS	0	0.04	18.50	17.25	231.25	3670	1.00	7903.44	116970.89	109067.45	6322751
161.30	3.95	CO	0			0.00	239.79	1800	0.00	0.00	0.00	0.00	0
164.80	3.50	SS	0	0.02	1.50	0.88	248.00	3670	1.00	1990.98	4778.34	2787.37	3185560

TOTAL OVERBURDEN VOL.(ACRE-FT):	18933	TOTAL (TONS):	213975.52	1316310.05	1102334.53	69550388
PERCENT SANDSTONE:	85%	TOTAL (TONS/THOUSAND):	3.0766	18.9260	15.85	
NP/MPA RATIO:	6.15					
TONS/ACRE REQUIRED (1:1):	4445 EXCESS					

ABA SUMMARY VALUES USING % SULFUR * 62.5 = MPA:

NP/MPA RATIO:	3.08	TOTAL (TONS):	427951.03	1316310.05	888359.01
TONS/ACRE REQUIRED (1:1):	3582 EXCESS	TOTAL (TONS/THOUSAND):	6.15	18.93	12.77

CANE CREEK, LLC
FLAT TOP MINE, P-3882, R-5
ATTACHMENT IV-C-2

DRUMMOND COMPANY, INC.
FLAT TOP SOUTH MINE
EXHIBIT 2.2

GEOLOGICAL DESCRIPTION

Area: Flat Top South Mine
Well No: 802-011
Drill Date: 10/15/90
Geologist: Mark Fowler
Elevation: 510.28
Log Date: 11/12/90

Sample Type: Cuttings

#3665

Ft. & 10ths	Lithology
0-10	Dark yellowish orange sand with clay.
10-25	Moderate yellowish brown sandy shale with clay.
25-35	Light olive gray to yellowish gray shale.
35-75	Light gray to medium gray sandy shale.
75-80	Medium light gray, very hard, medium-grained sandstone.
80-90	Medium light gray to olive gray, sandstone with shale.
90-100	Light gray shale.
100-105	Light gray, very hard, medium-grained sandstone.
105-115.2	Medium gray sandstone with shale.
115.2-117.9	Coal: Pratt Seam.
117.9-123	Medium dark gray shale.
123-124	Coal: Nickel Plate Seam.
124-130	Medium light gray, sandy shale.
130-153	Medium light gray, medium to coarse-grained sandstone.
153-154.8	Coal: America Seam.
154.8-160	Light gray, sandy shale.
160-165	Light gray, medium-grained sandstone.
165	T.D.

I certify that this log is correct and accurate to the best of my knowledge and belief.

Bradley A. Brasfield 1-30-91
BRADLEY A. BRASFIELD DATE
CERTIFIED PROFESSIONAL ENGINEER
REGISTERED 13691

ftsout/020-2

OVERBURDEN ANALYSIS SPREADSHEET
OPERATOR: UNITED LAND CORPORATION
PERMIT NO: FLAT TOP DRILL HOLE: 802011
COUNTY: JEFFERSON TOWNSHIP:

THRESHOLD VALUES:	SULFUR	NP	FIZZ
	0	0.00	0

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	CL	0	0.01	0.00	-0.31	1.00	3450	1.00	5.39	0.00	-5.39	17250
10.00	5.00	CL	0	0.01	0.00	-0.31	15.55	3450	1.00	83.80	0.00	-83.80	268159
15.00	5.00	CL	0	0.01	0.00	-0.31	25.24	3450	1.00	136.07	0.00	-136.07	435432
20.00	5.00	CL	0	0.01	1.00	0.69	34.94	3450	1.00	188.35	602.70	414.36	602705
25.00	5.00	CL	0	0.00	3.00	3.00	44.64	3450	1.00	0.00	2309.93	2309.93	769977
30.00	5.00	SH	0	0.09	14.30	11.49	54.33	3700	1.00	2827.03	14373.88	11546.85	1005167
35.00	5.00	SH	0	0.03	4.00	3.06	64.03	3700	1.00	1110.53	4738.24	3627.72	1184561
40.00	5.00	SH	0	0.11	11.50	8.06	73.73	3700	1.00	4688.59	15685.48	10996.88	1363955
45.00	5.00	SH	0	0.10	18.80	15.68	83.42	3700	1.00	4822.96	29014.95	24191.99	1543348
50.00	5.00	SH	0	0.11	21.50	18.06	78.58	3700	1.00	4996.93	31253.51	26256.58	1453652
55.00	5.00	SH	0	0.10	27.50	24.38	102.82	3700	1.00	5944.18	52308.75	46364.57	1902136
60.00	5.00	SH	0	0.07	27.50	25.31	112.52	3700	1.00	4553.35	57242.08	52688.74	2081530
65.00	5.00	SH	0	0.10	28.30	25.18	122.21	3700	1.00	7065.39	63984.16	56918.77	2260924
70.00	5.00	SH	0	0.08	21.30	18.80	131.91	3700	1.00	6100.80	51978.78	45877.98	2440318
75.00	5.00	SH	0	0.14	21.30	16.93	141.61	3700	1.00	11461.24	55799.87	44338.63	2619712
80.00	5.00	SH	0	0.01	50.00	49.69	151.30	3700	1.00	874.72	139955.30	139080.58	2799106
85.00	5.00	SH	0	0.06	50.00	48.13	161.00	3700	1.00	5584.69	148925.00	143340.31	2978500
90.00	5.00	SH	0	0.03	11.80	10.86	170.70	3700	1.00	2960.53	37263.15	34302.62	3157894
95.00	5.00	SH	0	0.09	28.30	25.49	180.39	3700	1.00	9386.12	94445.25	85059.12	3337288
100.00	5.00	SH	0	0.09	28.30	25.49	190.09	3700	1.00	9890.67	99522.10	89631.43	3516682
105.00	5.00	SS	0	0.09	30.00	27.19	199.79	3670	1.00	10310.93	109983.23	99672.30	3666108
110.00	5.00	SH	0	0.24	26.30	18.80	209.48	3700	1.00	29066.02	101924.85	72858.83	3875470
115.00	5.00	SH	0	0.19	25.00	19.06	219.18	3700	1.00	24075.75	101371.59	77295.84	4054864
120.00	5.00	SH	0	1.76	2.50	-52.50	228.88	3700	1.00	232884.17	10585.64	-222298.52	4234258
123.00	3.00	CO	0			0.00	236.64	1800	0.00	0.00	0.00	0.00	0
130.00	7.00	SH	0	0.04	10.00	8.75	246.33	3700	1.00	7975.04	63800.33	55825.29	6380033
135.00	5.00	CO	0			0.00	257.97	1800	0.00	0.00	0.00	0.00	0
140.00	5.00	SS	0	0.01	8.50	8.19	267.67	3670	1.00	1534.90	41749.31	40214.41	4911683
145.00	5.00	SS	0	0.03	10.50	9.56	277.36	3670	1.00	4771.52	53441.04	48669.52	5089623
150.00	5.00	SS	0	0.06	16.50	14.63	287.06	3670	1.00	9876.68	86914.78	77038.10	5267562
153.00	3.00	CO	0			0.00	294.82	1800	0.00	0.00	0.00	0.00	0
160.00	7.00	SH	0	0.03	5.75	4.81	304.52	3700	1.00	7394.01	45349.92	37955.91	7886942
165.00	5.00	SS	0	0.02	4.75	4.13	321.00	3670	1.00	3681.47	27979.16	24297.69	5890350

TOTAL OVERBURDEN VOL.(ACRE-FT):	23608		TOTAL (TONS):	414251.81	1542502.98	1128251.17	86995188
PERCENT SANDSTONE:	29%		TOTAL (TONS/THOUSAND):	4.7618	17.7309	12.97	
NP/MPA RATIO:	3.72						
TONS/ACRE REQUIRED (1:1):	3515	EXCESS					

ABA SUMMARY VALUES USING % SULFUR * 62.5 = MPA:

NP/MPA RATIO:	1.86		TOTAL (TONS):	828503.62	1542502.98	713999.36
TONS/ACRE REQUIRED (1:1):	2224	EXCESS	TOTAL (TONS/THOUSAND):	9.52	17.73	8.21

DRUMMOND COMPANY, INC.
FLAT TOP SOUTH MINE
EXHIBIT 2.2

GEOLOGICAL DESCRIPTION

Area: Flat Top South Mine
Sample Type: Cuttings
Well No: 802-012
Drill Date: 10/15/90
Geologist: Mark Fowler
Elevation: 547.69
Log Date: 11/12/90

Ft. & 10ths	Lithology
0-10	Moderate yellowish brown, shaly clay.
10-20	Moderate yellowish brown, weathered shale.
20-25	Medium light gray shale.
25-30	Medium light gray, medium-grained sandstone with shale.
30-45	Medium light gray, sandy shale.
45-91.7	Medium light gray, fine-grained sandstone with shale.
91.7-94.4	Coal: Pratt Seam.
94.4-96.8	Medium dark gray shale.
96.8-97.8	Coal: Nickel Plate Seam.
97.8-126.2	Medium gray, medium-grained sandstone with some shale. (Water 114 feet)
126.2-128.2	Coal: America Seam
128.2-140	Medium dark gray, medium to coarse-grained sandstone.
140	T.D.

RECEIVED
SURFACE MINING
COMMISSION
APR 1991

I certify that this log is correct and accurate to the best of my knowledge and belief.

Mark Fowler 4-25-91
MARK FOWLER DATE
GEOLOGIST

ftsout/020-3

OVERBURDEN ANALYSIS SPREADSHEET
OPERATOR: **UNITED LAND CORPORATION**
PERMIT NO: **FLAT TOP** DRILL HOLE: **802012**
COUNTY: **JEFFERSON** TOWNSHIP:

THRESHOLD VALUES:	SULFUR	NP	FIZZ
	0	0.00	0

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	CL	0	0.01	5.25	4.94	1.00	3450	1.00	5.39	90.56	85.17	17250
10.00	5.00	CL	0	0.01	6.30	5.99	3.95	3450	1.00	21.27	428.88	407.60	68076
15.00	5.00	SH	0	0.01	6.00	5.69	5.91	3700	1.00	34.17	656.09	621.92	109348
20.00	5.00	SH	0	0.05	9.25	7.69	7.88	3700	1.00	227.64	1347.61	1119.97	145688
25.00	5.00	SH	0	0.09	21.00	18.19	9.84	3700	1.00	511.95	3822.56	3310.61	182027
30.00	5.00	SH	0	0.18	25.25	19.63	11.80	3700	1.00	1228.31	5513.74	4285.43	218366
35.00	5.00	SH	0	0.11	27.50	24.06	13.77	3700	1.00	875.55	7004.40	6128.85	254705
40.00	5.00	SH	0	0.13	23.50	19.44	15.73	3700	1.00	1182.37	6839.55	5657.18	291045
45.00	5.00	SH	0	0.20	22.00	15.75	17.70	3700	1.00	2046.15	7202.45	5156.30	327384
50.00	5.00	SH	0	0.11	25.80	22.36	16.71	3700	1.00	1062.92	7977.73	6914.80	309214
55.00	5.00	SH	0	0.09	26.30	23.49	21.63	3700	1.00	1125.18	10521.64	9396.47	400063
60.00	5.00	SH	0	0.09	23.80	20.99	23.59	3700	1.00	1227.38	10386.36	9158.98	436402
65.00	5.00	SH	0	0.08	24.00	21.50	25.55	3700	1.00	1181.85	11345.79	10163.93	472741
70.00	5.00	SH	0	0.07	27.30	25.11	27.52	3700	1.00	1113.61	13897.89	12784.28	509080
75.00	5.00	SH	0	0.09	22.30	19.49	29.48	3700	1.00	1533.99	12162.86	10628.87	545420
80.00	5.00	SH	0	0.16	25.30	20.30	31.45	3700	1.00	2908.79	14718.50	11809.71	581759
85.00	5.00	SH	0	0.09	22.80	19.99	33.41	3700	1.00	1738.40	14092.64	12354.24	618098
91.70	6.70	CO	0			0.00	35.71	1800	0.00	0.00	0.00	0.00	0
96.80	5.10	SH	0	0.48	1.30	-13.70	38.03	3700	1.00	10763.48	932.84	-9830.65	717565
100.00	3.20	CO	0			0.00	39.66	1800	0.00	0.00	0.00	0.00	0
105.00	5.00	SH	0	0.08	6.30	4.43	41.27	3700	1.00	1431.48	4809.77	3378.29	763455
110.00	5.00	SH	0	0.02	8.50	7.88	43.23	3700	1.00	499.87	6798.25	6298.38	799795
115.00	5.00	SH	0	0.01	26.50	26.19	45.20	3700	1.00	261.29	22157.55	21896.26	836134
120.00	5.00	SH	0	0.07	48.30	46.11	47.16	3700	1.00	1908.54	42140.46	40231.92	872473
126.20	6.20	SH	0	0.13	18.00	13.94	49.36	3700	1.00	4600.11	20382.03	15781.92	1132335
130.00	3.80	CO	0			0.00	51.33	1800	0.00	0.00	0.00	0.00	0
135.00	5.00	SS	0	0.21	5.00	-1.56	53.05	3670	1.00	6388.81	4867.67	-1521.15	973533
140.00	5.00	SS	0	0.10	8.80	5.68	56.00	3670	1.00	3211.25	9042.88	5831.63	1027600

TOTAL OVERBURDEN VOL.(ACRE-FT):	3414	TOTAL (TONS):	47089.76	239140.69	192050.92	12609556
PERCENT SANDSTONE:	16%	TOTAL (TONS/THOUSAND):	3.7345	18.9650	15.23	
NP/MPA RATIO:	5.08					
TONS/ACRE REQUIRED (1:1):	3429 EXCESS					

ABA SUMMARY VALUES USING % SULFUR * 62.5 = MPA:

NP/MPA RATIO:	2.54	TOTAL (TONS):	94179.53	239140.69	144961.16
TONS/ACRE REQUIRED (1:1):	2589 EXCESS	TOTAL (TONS/THOUSAND):	7.47	18.97	11.50

SAMPLING TECHNIQUES

Soil and overburden samples were taken at locations shown on the attached Soils Map. The Soils Map shows the mine site location, soil types within the permit area, previously mined areas within and adjacent (without topsoil) to the permit area, and topsoil and overburden collection sites. Soil samples of each soil were collected throughout the permit area.

Topsoil Samples were taken by digging a cylindrical to slightly conical shaped hole 10-12 inches deep with a spade. All contents of this section are included in the sample. Sieve analysis were conducted on oven-dry composite samples to determine coarse fragment and soil percentages. Results of these analyses are listed in Table 2.

Drill samples from the overburden holes were obtained by capturing cuttings from rotary drilled holes. The cuttings were sampled at each strata change, or in minimum five-foot increments. The down pressure was disengaged at each strata change or interval to allow all of the cuttings to be blown from the hole before proceeding with the next interval, to prevent contamination of the sampled interval.

It should be noted that all of the existing topsoil samples were taken above the 520 contour elevation.

Existing Topsoil Sample ID Number	Approximate Surface Elevation
TS-1	610 msl
TS-2	530 msl
TS-3	550 msl
TS-4	550 msl

TABLE 1 - SIEVE ANALYSIS

Company Name: **CANE CREEK, LLC**

Mine Name: **FLAT TOP MINE, P-3882**

Sample I.D.: **TS-1**

Sampled: **10/25/05**

Analyzed: **10/26/05**

Analyzed By: **GW**

Sample Weight: **1000.0 gm**

Sieve No.	Sieve Opening (mm)	Weight Retained on each Sieve (gm)	Percent of Weight Retained on each Sieve	Cumulative Percent Retained	Percent Finer
1”	25.00	0.0	0.0	0.0	100.0
¾”	19.00	0.0	0.0	0.0	100.0
½”	12.50	0.0	0.0	0.0	100.0
4	4.75	67.0	6.7	6.7	93.3
10	2.00	151.0	15.1	21.8	78.2
Pan	---	780.0	78.2	100.0	0.0

% of sample that is coarse fragments: **21.8**

% of sample that is soil: **78.2**

Average size left in 1" Sieve: **0"**

TABLE 1 - SIEVE ANALYSIS

Company Name: **CANE CREEK, LLC**

Mine Name: **FLAT TOP MINE, P-3882**

Sample I.D.: **TS-2**

Sampled: **10/25/05**

Analyzed: **10/26/05**

Analyzed By: **GW**

Sample Weight: **1000.0 gm**

Sieve No.	Sieve Opening (mm)	Weight Retained on each Sieve (gm)	Percent of Weight Retained on each Sieve	Cumulative Percent Retained	Percent Finer
1”	25.00	0.0	0.0	0.0	100.0
¾”	19.00	0.0	0.0	0.0	100.0
½”	12.50	0.0	0.0	0.0	100.0
4	4.75	99.0	9.9	9.9	90.1
10	2.00	271.0	27.1	37.0	63.0
Pan	---	630.0	63.0	100.0	0.0

% of sample that is coarse fragments: **37.0**

% of sample that is soil: **63.0**

Average size left in 1" Sieve: **0"**

TABLE 1 - SIEVE ANALYSIS

Company Name: **CANE CREEK, LLC**

Mine Name: **FLAT TOP MINE, P-3882**

Sample I.D.: **TS-3**

Sampled: **10/25/05**

Analyzed: **10/26/05**

Analyzed By: **GW**

Sample Weight: **1000.0 gm**

Sieve No.	Sieve Opening (mm)	Weight Retained on each Sieve (gm)	Percent of Weight Retained on each Sieve	Cumulative Percent Retained	Percent Finer
1”	25.00	0.0	0.0	0.0	100.0
¾”	19.00	0.0	0.0	0.0	100.0
½”	12.50	0.0	0.0	0.0	100.0
4	4.75	82.0	8.2	8.2	91.8
10	2.00	260.0	26.1	34.3	65.7
Pan	---	656.0	65.7	100.0	0.0

% of sample that is coarse fragments: **34.3**

% of sample that is soil: **65.7**

Average size left in 1" Sieve: **0"**

TABLE 1 - SIEVE ANALYSIS

Company Name: **CANE CREEK, LLC**

Mine Name: **FLAT TOP MINE, P-3882**

Sample I.D.: **TS-4**

Sampled: **10/25/05**

Analyzed: **10/26/05**

Analyzed By: **GW**

Sample Weight: **1000.0 gm**

Sieve No.	Sieve Opening (mm)	Weight Retained on each Sieve (gm)	Percent of Weight Retained on each Sieve	Cumulative Percent Retained	Percent Finer
1”	25.00	0.0	0.0	0.0	100.0
¾”	19.00	0.0	0.0	0.0	100.0
½”	12.50	1.0	0.1	0.1	99.9
4	4.75	70.0	7.0	7.1	92.9
10	2.00	153.0	15.4	22.5	77.5
Pan	---	771.0	77.5	100.0	0.0

% of sample that is coarse fragments: **22.5**

% of sample that is soil: **77.5**

Average size left in 1" Sieve: **0"**

TABLE 1 - SIEVE ANALYSIS

Company Name: **CANE CREEK, LLC**

Mine Name: **FLAT TOP MINE, P-3882**

Sample I.D.: **SP-1**

Sampled: **10/25/05**

Analyzed: **10/26/05**

Analyzed By: **GW**

Sample Weight: **1000.0 gm**

Sieve No.	Sieve Opening (mm)	Weight Retained on each Sieve (gm)	Percent of Weight Retained on each Sieve	Cumulative Percent Retained	Percent Finer
1”	25.00	0.0	0.0	0.0	100.0
¾”	19.00	0.0	0.0	0.0	100.0
½”	12.50	0.0	0.0	0.0	100.0
4	4.75	167.0	16.7	16.7	83.3
10	2.00	251.0	25.2	41.9	58.1
Pan	---	580.0	58.1	100.0	0.0

% of sample that is coarse fragments: **41.9**

% of sample that is soil: **58.1**

TABLE 1 - SIEVE ANALYSIS

Company Name: **CANE CREEK, LLC**

Mine Name: **FLAT TOP MINE, P-3882**

Sample I.D.: **SP-2**

Sampled: **10/25/05**

Analyzed: **10/26/05**

Analyzed By: **GW**

Sample Weight: **1000.0 gm**

Sieve No.	Sieve Opening (mm)	Weight Retained on each Sieve (gm)	Percent of Weight Retained on each Sieve	Cumulative Percent Retained	Percent Finer
1”	25.00	0.0	0.0	0.0	100.0
¾”	19.00	0.0	0.0	0.0	100.0
½”	12.50	15.0	1.5	1.5	98.5
4	4.75	185.0	18.5	20.0	80.0
10	2.00	243.0	24.3	44.4	55.6
Pan	---	555.0	55.6	100.0	0.0

% of sample that is coarse fragments: **44.4**

% of sample that is soil: **55.6**

The minus 2 mm (or soil) fraction of all samples are then sent to Auburn University Soil Testing Laboratory for the following analyses: soil fertility; pH; recommendations for post-mining revegetation; % sand, silt, and clay; CEC; available water capacity; neutralization potential; maximum potential acidity; % organic matter; and ppm of nitrate nitrogen in the soil. Results of the analyses are shown in Table 2.

*NOTE: available water capacity conducted by Auburn University Testing Laboratory is determined on only the soil (-2mm) fraction of the sample. To obtain a "total" available water capacity, the AWC should be multiplied by the fraction of the soil sample obtained in the field. See Table 5 for an Estimation of the Total Available Water Capacity.

CHEMICAL ANALYSIS COMPARISONS

Examination of the physical and chemical comparison between the average of the topsoils within the permit area and the average of the overburden samples collected reveals that selected overburden at the Flat Top Mine site is more suitable than the natural topsoils present as a plant growth medium. The pH of the topsoils ranged between 4.0 and 4.5, the pH of the previously mined overburden samples ranged between 6.8 and 7.8, the pH of the selected overburden samples (drill hole E-16, 802-011 & 802-012) ranged between 7.0 and 8.0. The post mine land use proposes to be Undeveloped/No Current Use(Forestry Reclamation Approach) and/or Undeveloped/No Current Use. Auburn University has recommended an average of 4.13 tons/acre of limestone on the naturally occurring topsoils and 0.00 tons/acre of limestone on the selected overburden material.

Auburn University has recommended an average of 60 Pounds Per Acre of N on the naturally occurring topsoils and 60 Pounds Per Acre of N on the previously mined selected overburden material to be used as a substitute material. Auburn University has recommended an average of 85 Pounds Per Acre of P2O5 on the naturally occurring topsoils and an average of 40 Pounds Per Acre of P2O5 on the previously mined selected overburden material. Auburn University has recommended an average of 60 Pounds Per Acre of K2O on the naturally occurring topsoils and 40 Pounds Per Acre of K2O on the previously mined selected overburden material to be used as a substitute material.

The acid-base accounts for the natural soils was negative while the selected overburden material (drill holes) was positive. The previously mined overburden was also positive. The selected overburden material (drill holes) was higher in neutralization potential than the natural soils.

TEXTURAL ANALYSIS COMPARISON

Textural analyses revealed, that the overburden samples (previously mined area) have less soil and more coarse fragments than the topsoil samples. However, the analyses from Auburn on the – 2 mm fraction indicates that the quality of the soil in the overburden samples was higher than that shown by the natural topsoil.

The native soils and previously mined selected overburden soil (<2mm) averaged basically the same percent sand, silt and clay. The soil samples indicate the previously mined selected overburden >2mm averages approximately 14% more coarse fragments than the native soils. The available water capacity for the native soil particles is (0.1800 cm./cm. average) while the available water capacity for the previously mined selected overburden is (0.1300 cm./cm. average). The "Total" available water capacity as shown in Table 3 is (0.1363 cm./cm. average) for the native soil and (0.0897 cm./cm. average) for the previously mined. As shown in the topsoil -vs.- overburden table, the overburden and native topsoil samples for silt, clay, and sand are relatively equal. This shows that the overburden is suitable for post mining revegetation.

The overburden at the Flat Top Mine is better than the native topsoils in the following parameters: pH, extractable nutrients, required soil amendments and water capacity. As shown in the overburden and topsoil comparison, the overburden is more suitable for surface mine revegetation and therefore satisfies the criteria set forth in section 880-X-10C.08(5).

TABLE 2

TOPSOIL VS. OVERBURDEN COMPARISON

	NATIVE SOILS (range)	PREVIOUSLY MINED OVERBURDEN (range)	SELECTED OVERBURDEN DRILL HOLES (range)
pH (low)	4.0	6.8	7.7
pH (high)	4.5	7.8	8.1

EXTRACTABLE NUTRIENTS FOR P, K, & Mg, (lbs./acre)

	NATIVE SOILS (average)	PREVIOUSLY MINED OVERBURDEN (average)	SELECTED OVERBURDEN E-16, 802011, 802012 (average)
PHOSPHOROUS	11.5	39.0	N/A
POTASSIUM	75.75	96.0	N/A
MAGNESIUM	79.25	241	N/A
CALCIUM	101.5	689.5	N/A

RECOMMENDATIONS FOR LIMESTONE, N, P-205, K-20:

	NATIVE SOILS (average)	PREVIOUSLY MINED OVERBURDEN (average)	SELECTED OVERBURDEN E-16, 802011, 802012 (average)
LIMESTONE (ton/acre)	4.13	0	N/A
NITROGEN (lbs./acre)	60	60	N/A
P-205 (lbs./acre)	85	40	N/A
K-20 (lbs./acre)	60	40	N/A
NO_3 – N (ppm)	0.25	0.30	N/A

TABLE 2

TOPSOIL VS. OVERBURDEN COMPARISON
(continued)

	NATIVE SOILS (average)	PREVIOUSLY MINED OVERBURDEN (average)	SELECTED OVERBURDEN E-16, 802011, 802012 (average)
NEUTRALIZATION POTENTIAL	0.00	6.68	+16.947
MAXIMUM POTENTIAL ACIDITY	0.70	1.86	2.7206
SULFUR (%)	0.02	0.06	0.1
ACID-BASE ACCOUNT	-0.70	+4.82	+14.2264
SAND (%)	25.63	49.88	N/A
SILT (%)	55.0	40.63	N/A
CLAY (%)	19.38	10.0	N/A
AVAILABLE WATER CAPACITY (cm/cm)	0.18	0.13	N/A
COARSE FRAGMENTS (%)	28.9	43.1	N/A
SOIL (%)	71.1	56.9	N/A
TOTAL AVAILABLE WATER CAPACITY (cm/cm)	0.1363	0.0897	N/A
SOIL ERODIBILITY FACTOR “K”	0.30	0.24	N/A

TABLE 3

TOTAL AVAILABLE WATER CAPACITY
NATIVE SOILS

	PERCENT OF SAMPLE RETAINED			
SAMPLE I.D.	**1"**	**1/2"**	**1/4"**	**2 mm**
TS-1	0.0	0.0	6.7	15.1
TS-2	0.0	0.0	9.9	27.1
TS-3	0.0	0.0	8.2	26.1
TS-4	0.0	0.1	7.0	15.4
AVERAGE	**0.0**	**0.0**	**8.0**	**20.9**

SIEVE OPENING	**PERCENT RETAINED**	**AWC FACTOR**	**AWC in./in.**
1"	0.0	0.0389	0.0000
1/2"	0.0	0.0492	0.0000
1/4"	8.0	0.0603	0.0048
2 mm	20.9	0.1149	0.0240
TOTAL			**0.0288**

< 2mm average from Table 2: 71.1%
> 2mm average from Table 2: 28.9%
Average available water capacity of < 2mm from Auburn Data = 0.1800 in./in.

71.1% X 0.1800 in./in. = 0.1280 in./in.
28.9% X 0.0288 in./in. = 0.0083 in./in.
Total = 0.1363 in./in.

Average Total Available Water Capacity for the Native Soils = 0.1363 in./in.
Available water capacity values were obtained from "A Method of Comparing Soil Materials for Plant Available Water" which was supplied by the Alabama Surface Mining Commission.

TABLE 3

TOTAL AVAILABLE WATER CAPACITY
PREVIOUSLY MINED OVERBURDEN

	PERCENT OF SAMPLE RETAINED			
SAMPLE I.D	**1"**	**1/2"**	**1/4"**	**2 mm**
SP-1	0	0	16.7	25.2
SP-2	0	1.5	18.5	24.3
AVERAGE	0.0	0.8	17.6	24.8

SIEVE OPENING	**PERCENT RETAINED**	**AWC FACTOR**	**AWC in./in.**
1"	0.0	0.0389	0.0000
1/2"	0.8	0.0492	0.0004
1/4"	17.6	0.0603	0.0106
2 mm	24.8	0.1149	0.0284
TOTAL			**0.0394**

< 2mm average from Table 2: 43.1%
> 2mm average from Table 2: 56.9%
Average available water capacity of < 2mm from Auburn Data = 0.1300 in./in.

56.9% X 0.1300 in./in. = 0.0740 in./in.
43.1% X 0.0364 in./in. = 0.0157 in./in.
Total =0.0897 in./in.

Average Total Available Water Capacity for the Previous Mined Soils = 0.0897 in./in.

Available water capacity values were obtained from "A Method of Comparing Soil Materials for Plant Available Water" which was supplied by the Alabama Surface Mining Commission.

CANE CREEK, LLC
FLAT TOP MINE, P-3882, R-5
ATTACHMENT IV-C-2

Cane Creek, LLC - Flat Top Mine

Detailed Comparison of Native Topsoil vs Topsoil Substitute (spoil)

TABLE 5

Sample ID	TS-1	TS-2	TS-3	TS-4	Average TS-1 & TS-4	All Soil Avg	SP-1	SP-2	Spoil Avg	Difference Spoil vs all soil avg.	Difference Spoil vs TS-1 & TS-4 Avg.
Sample Location type	Ridgetop	Side Slope	Ridgetop	Side Slope							
% Coarse Fragments	21.8	37.0	34.3	22.5	22.2	28.9	41.9	44.4	43.2	14.3	21.0
% Soil	78.2	63.0	65.7	77.5	77.9	71.1	58.1	55.6	56.9	-14.3	-21.0
AWC 1" (0.0389)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
AWC 1/2" (0.0492)	0.0	0.0	0.0	0.1	0.1	0.0	0.0	1.5	0.8		
AWC 1/4" (0.0603)	6.7	9.9	8.2	7.0	6.9	8.0	16.7	18.5	17.6		
AWC 2mm (0.1149)	15.1	27.1	26.1	15.4	15.3	20.9	25.2	24.8	25.0		
AWC>2mm (coarse fragments)	0.0214	0.0371	0.0349	0.0220	0.0217	0.0288	0.0390	0.0404	0.0397		
AWC<2mm (AU data) (soil portion)	0.1700	0.1900	0.2000	0.1600	0.1650	0.1800	0.1200	0.1300	0.1250		
Total Available Water Capacity	0.1376	0.1334	0.1434	0.1289	0.1333	0.1358	0.0861	0.0902	0.0881	-0.0477	-0.0451
% Organic Matter (AU Data)	2.0	0.6	1.7	4.4	3.2	2.18	7.0	2.1	4.55	2.38	1.35
% NO_3-N (AU Data)	0.4	0.1	0.1	0.4	0.4	0.25	0.4	0.2	0.30	0.05	-0.10
N.P. Tons $CaCO_3$/ Tons Material (AU Data)	trace	trace	trace	trace	trace	trace	4.65	11.7	8.18	8.18	8.18
Maximum potential acidity (AU Data)	0.31	0.52	0.66	1.29	0.80	0.7	2.29	1.43	1.86	1.17	1.06
Avg. % Sulfur (4 runs)	0.0990	0.0167	0.0211	0.0412	0.0701	0.0	0.0733	0.0457	0.0595	0.0150	-0.0106
% Sand (AU Data)	28.75	22.50	16.25	35.00	31.88	25.6	51.25	47.50	49.38	23.75	17.50
% Silt (AU Data)	61.25	57.50	43.75	57.50	59.38	55.0	36.25	45.00	40.63	-14.38	-18.75
% Clay (AU Data)	10.00	20.00	40.00	7.50	8.75	19.4	12.50	7.50	10.00	-9.38	1.25
Soil Textural Class	Silt Loam	Silt Loam	Silty Clay Loam	Silt Loam			Loam	Loam			
Soil Group	4.0	4.0	4.0	4.0		4.0	4.0	1.0			
Soil pH	4.5	4.0	4.4	4.3	4.40	4.30	6.8	7.8	7.30	3.00	2.90
Available Nutrients											
Phosphorus (P)	23	6	2	15	19.0	11.5	45	33	39	27.5	20.0
Potassium (K)	32	96	98	77	54.5	75.8	114	78	96	20.3	41.5
Manesium (Mg)	13	175	82	47	30.0	79.3	249	233	241	161.8	211.0
Calcium (Ca)	112	66	115	113	112.5	101.5	611	768	689.5	588.0	577.0
Fertilizer Recommendations											
Limestone Tons/acre	3.0	4.5	4.5	4.5	3.8	4.1	0.0	0.0	0.0	-4.1	-3.8
Nitrogen (N) pounds/acre	60	60	60	60	60	60	60	60	60	0.0	0.0
P_2O_5 pounds/acre	70	90	100	80	75	85	40	40	40	-45.0	-35.0
K_2O pounds/acre	80	50	50	60	70	60	40	40	40	-20.0	-30.0

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 with a Caterpillar type dozers. Once rough grading has been completed, a farm-type tractor will be used to disc the overburden to its final contour, decrease compaction, and increase the mechanical breakage of the surface layer. If any rocks +24 inches in diameter remain on the surface, they will be collected and buried. All slopes too steep to operate farm equipment on will use the following criteria to evaluate the textural quality of the graded overburden:

A) Rocks of size larger than ten (10") inches shall not exceed 10% by weight of the substitute material, and no rocks larger than twenty four (24) inches can be included in the substitute material.
B) Rock between three (3") inches and ten (10") inches in size shall not exceed 15% by weight of the topsoil substitute material.
C) The substitute material shall not contain more than 50% by weight of materials between 3 and .75 inches in size.
D) The substitute material shall contain at least 30% by weight of material less than 2 millimeters in size.

NOTE: The particle size requirements are not applicable to the Forestry Reclamation Approach.

Sampling frequency shall be 1 sample per 20 acres. Overburden sampling will follow the guidelines as described in the "SAMPLING TECHNIQUES" section of this report.

Based on the sieve analysis shown in Table 1 the overburden material meets the grading requirements of the Topsoil Variance. The final texture samples will be sent to the Auburn University Soil Laboratory where the following tests will be conducted: % sand, silt, and clay; textural classification; pH, % sulfur; fertility ratings for phosphorus, potassium, and magnesium; and amendment recommendations for limestone, nitrogen, phosphorus, and potassium. An acid base account will be calculated from the sulfur and neutralization potential readings. Results of this analyses will be used to determine the amount of soil amendments, if any, to be applied to the plant medium. All results of analyses will be submitted to the Regulatory Authority for review. Any acid-forming materials encountered will be covered with four (4) feet of non-toxic, non-acid forming material.

AUBURN DATA

Auburn University

Auburn University, Alabama 36849-5411

College of Agriculture and
Agricultural Experiment Station System

Department of Agronomy and Soils
Telephone: 844-3958
Area Code: 334

Reply: Soil Testing Laboratory
Auburn University
Auburn University, AL 36849-5411

SURFACE MINE ANALYSIS REPORT

December 13,2005

CLIENT I.D. :McGehee Engineering Corporation
SAMPLE I.D. :United Land Coorporation
Flat Top Mine Topsoil & Spoil Samples
LAB I.D. :B24-06 (3586-3591)
ANALYSIS :Special Mine Package
INCLUDES :Organic Matter, NO_3-N,Alkalinity,Potential Acidity,
Particle Size,Multiple Sulfur.

Lab I.D.	Sample I.D.	OM %	NO_3-N ppm	Neutralizing Potential Tons $CaCO_3$/1000Tons material max	pot acid
3586	TS-1	2.0	0.4	Trace	0.31
3587	TS-2	0.6	0.1	Trace	0.52
3588	TS-3	1.7	0.1	Trace	0.66
3589	TS-4	4.4	0.4	Trace	1.29
3590	SP-1	7.0	0.4	4.65	2.29
3591	SP-2	2.1	0.2	11.70	1.43

		Particle Size				
Lab I.D.	Sample I.D.	% Sand	% Silt	% Clay	Textural Class	H2O avail. cm/cm
3586	TS-1	28.75	61.25	10	Silt Loam	0.17
3587	TS-2	22.5	57.5	20	Silt Loam	0.19
3588	TS-3	16.25	43.75	40	Silty Clay Loam	0.20
3589	TS-4	35	57.5	7.5	Silt Loam	0.16
3590	SP-1	51.25	36.25	12.5	Loam	0.12
3591	SP-2	47.5	45	7.5	Loam	0.13

A LAND-GRANT UNIVERSITY

SURFACE MINE ANALYSIS REPORT

December 13,2005

CLIENT I.D. :McGehee Engineering Corporation
SAMPLE I.D. :United Land Coorporation
Flat Top Mine Topsoil & Spoil Samples
LAB I.D. :B24-06 (3586-3591)
ANALYSIS :Special Mine Package
INCLUDES :Organic Matter, NO_3-N,Alkalinity,Potential Acidity,
Particle Size,Multiple Sulfur.

MULTIPLE SULFUR ANALYSES

Lab I.D.	Sample I.D.	% 1rst	% 2nd	% 3rd	% 4rth	% Ave
3586	TS-1	0.0102	0.0098	0.0095	0.0102	0.0099
3587	TS-2	0.0162	0.0169	0.0158	0.0177	0.0167
3588	TS-3	0.0204	0.0210	0.0217	0.0214	0.0211
3589	TS-4	0.0116	0.0132	0.0130	0.1270	0.0412
3590	SP-1	0.0685	0.0695	0.0635	0.0918	0.0733
3591	SP-2	0.0498	0.0479	0.0434	0.0418	0.0457

Page 2 of 2

Report on Soil Test

Auburn University Soil Testing Laboratory

Auburn University, AL 36849-5411

MCGEHEE ENGINEERING CORP
450 19TH ST WEST
JASPER, AL 35501

County: Walker
District: 1
Test Date: 2005-11-09

					SOIL TEST RESULTS				RECOMMENDATIONS			
LAB No.	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		
03586	TS 1 Flat Top Mine See Comment 1 See Comment 2	Revegetation	4	4.5	L 23	VL 32	L 13	112	3.0	60	70	80
03587	TS 2 FTM See Comment 3 See Comment 2	Revegetation	4	4.0	VL 6	L 96	H 175	66	4.5	60	90	50
* 03588	TS 3 FTM See Comment 3 See Comment 2	Revegetation	4	4.4	VL 2	L 98	H 82	115	4.5 *	60	100	50
03589	TS 4 FTM See Comment 1 See Comment 2	Revegetation	4	4.3	VL 15	L 77	L 47	113	4.5	60	80	60
03590	SP 1 FTM See Comment 2	Revegetation	4	6.8	M 45	L 114	H 249	611	0.0	60	40	40
03591	SP 2 FTM See Comment 2	Revegetation	1	7.8	M 33	M 78	H 233	768	0.0	60	40	40

Comment No.1: Both soil acidity and low magnesium can be corrected by applying dolomitic lime at the recommended rate.

Comment No.2: For perennial winter grass pasture, apply N, P, and K as recommended by September 1. Repeat N application in February.

Comment No.3: Soil acidity (low pH) can be corrected with either dolomitic or calcitic lime. * See page 2.

Final Comment: As a precautionary measure, consider applying 10 lb. sulfur per acre per year. Mixed fertilizers often contain enough sulfur to supply this amount.

* 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.

Print Date: 11 November 2005 Approved by: Hamilton Byard

Report on Soil Test

Auburn University Soil Testing Laboratory

Auburn University, AL 36849-5411

MCGEHEE ENGINEERING CORP
450 19TH ST WEST
JASPER, AL 35501

County: Walker
District: 1
Test Date: 2005-11-09

The number of samples processed in this report is: 6

For further information call your county agent: (205) 221-3392

Sirs; Sample # 3588 (your 'T53 FTM') has low pH and high buffering capacity, suggesting you'll need to increase the lime recommendation to about 6.0 tons/acre for that area, in order to raise pH to near 6.5. Call or visit w/ questions. Thanks,

JB

334-844-3958

* 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.

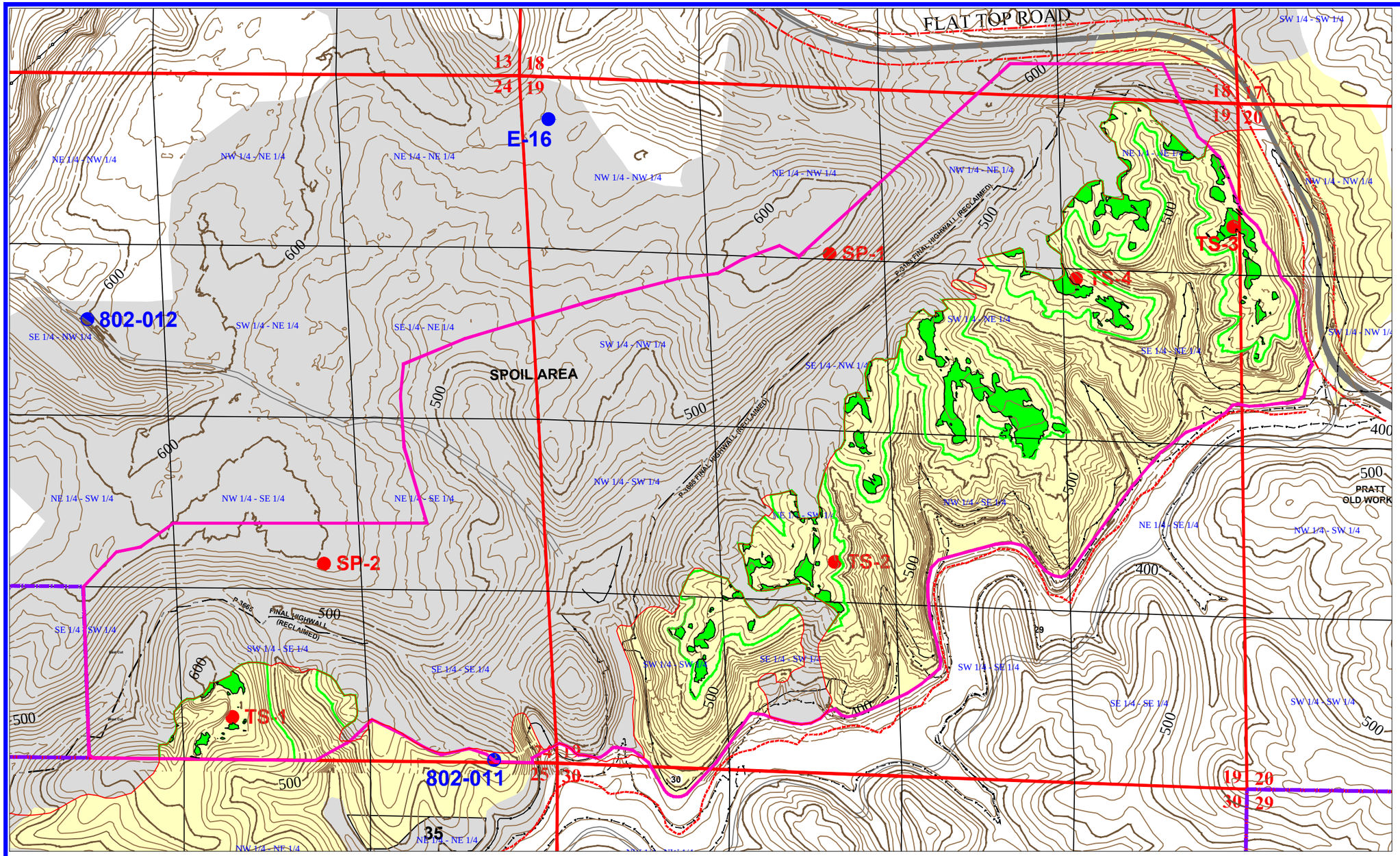
Print Date: 11 November 2005 Approved by: Page 2 of 2

ON-SITE
COLOR PHOTOS

Reclamation from Drummond Coal Company, Inc. – Flat Top South Mine, P-3665

Reclamation from Drummond Coal Company, Inc. – Flat Top Mine, P-3183

Reclamation from Drummond Coal Company, Inc. – Flat Top Mine, P-3183



N

0 800 1600

SOILS MAP LEGEND

- PALMERDALE COMPLEX (370 ACRES)
- MONTEVALLO–NAUVOO ASS. (steep) (161 ACRES)
- MONTEVALLO–NAUVOO ASS. (steep) Above 520 Contour
- MONTEVALLO–NAUVOO ASS. Above 520 Contour and <10% Slope (18 ACRES)
- ASMC PERMIT BOUNDARY R–5
- SP-2 SOIL/SPOIL SAMPLE LOCATION
- 802-011 OVERBUDEN SAMPLE LOCATION

ALL SOILS DATA AND MAPPING TAKEN FROM SOIL SURVEY OF JEFFERSON COUNTY, ALABAMA U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE.

mcgehee engineering corp
post office box 3431
jasper, alabama 35502-3431
telephone: (205) 221-0686 fax: 221-7721
email: staff@mcgehee.org

CANE CREEK, LLC

FLAT TOP MINE
ASMC PERMIT: P-3882, R-5

SOILS MAP

FILE:	SCALE:	JOB NO.:
FLATTOP	1" = 800'	
APPROVED BY:	DATE:	SHEET NO.:
S.M.H.	10-4-2016	1 OF 1