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PART V
GEOLOGY

A. **Does the applicant request a waiver of the requirements to submit information pertaining to logs of drill holes, thickness and chemical properties of the coal to be mined, potentially acid and toxic-forming strata, and chemical analyses of the stratum immediately below the lowest coal to be mined in accordance with 310 IAC 12-3-31(c)?**

[ ] YES [X] NO

If "YES", submit, as Attachment V.A., a written request that provides the Director with the source or sources of geologic descriptions that are the same or similar to that of the permit and adjacent areas, that exist at the Division of Reclamation and provide a demonstration that the referenced geologic descriptions are sufficient to characterize the permit and adjacent area.

B. Overburden Characterization:

1. **Based upon test borings, core samples or fresh, unweathered, uncontaminated samples from rock outcrops, describe the nature, thickness and lithologic characteristics of each geologic stratum occurring within and adjacent to the permit area down to and including the stratum immediately beneath the lowest coal seam to be mined or any aquifer below the lowest coal seam to be mined which may be adversely impacted by mining, whichever is deeper, and identify all water bearing units. The lithologic descriptions submitted on the drill logs used to sample overburden for analysis under Part V.B.4. shall be described in accordance with A Comprehensive Core Book of Pennsylvanian Rocks of the Illinois Basin (Indiana Geologic Survey) if the samples are acquired following the publication of that document:**

The information summarized below has been gathered from a variety of sources including site-specific drill logs, published reports, unpublished reports, laboratory analyses, maps, aerial photographs, accounts by local informants, technical specialists with specific knowledge of the permit area, and information from the Geological Surveys of Indiana, Illinois, and Kentucky, and the USGS.

PHYSIOGRAPHY

The proposed permit area comprises approximately 2,351.2 acres of partially mined property located in Warrick County, Indiana, on the eastern shelf of the Illinois Basin, within the Wabash Lowland physiographic province, and within Hydrologic Area 33. The proposed permit area consists of unglaciated dissected uplands. Present landforms are the result of weathering, mass wasting, and stream erosion. Local uplands exhibit narrow ridge tops and moderate to steep slopes. The uplands typically abruptly grade into lowlands. Drainage pattern is dendritic, indicating generally uniform structure. Topographic relief within the permit area is about 78 feet, ranging from about 460 feet above mean sea level in the uplands to about 382 feet in the lowlands. Attachment V.B.1. depicts a generalized stratigraphic column for the interval proposed for disturbance.

UNCONSOLIDATED STRATA

Quaternary unconsolidated material covers the Pennsylvanian bedrock in the proposed permit area. This material is typically compositionally heterogeneous and can include organic matter, clay, alluvium, and weathered and fragments of the underlying bedrock. The unconsolidated interval generally thickens away from the uplands and exhibits maximum thickness directly adjacent to streams. Site-specific drilling data indicate that the unconsolidated layer ranges between about 5.45 and 42.0 feet in thickness within and adjacent to the proposed permit area.

BEDROCK STRATA

The interval of bedrock to be affected by mining within the permit area consists of cyclic sequences of shale and sandstone with intermittent units of coal and limestone. These strata exhibit considerable variability in composition, thickness, and continuity over very short horizontal distances. Lithologic variability of this degree is a defining characteristic of Pennsylvanian rocks in this region. Mississippian strata unconformably underlie the Pennsylvanian interval regionally but these rocks were not encountered in any of the test borings. The table below summarizes thickness and lithology variations for the strata down to and including the stratum directly beneath the lowest coal seam to be mined within the proposed permit area. Information obtained from drill logs indicates regional structural dip to be in a generally southwesterly direction at a rate of about 25 feet per mile. For strata that are not formally named by Indiana Geological Survey, driller's terminology or nomenclature from the Geological Surveys of Illinois and Kentucky may be used in this application.

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TABLE 5-1: SUMMARY OF DRILLING DATA

THICKNESS	DESCRIPTION	EPOCH OR FORMATION
5.45 - 42.00	unconsolidated (soil, clay, alluvium)	Quaternary Epoch
0 - 100.90	discontinuous shale, sandy shale, sandstone, limestone	Shelburn Formation
0 - 3.60	**Indiana Coal-7 (Danville, Upper Millersburg)**	Dugger Formation
0 – 31.93	discontinuous shale, sandy shale, limestone, underclay	
0 - 8.90	**Indiana Coal-6 (Hymera, Lower Millersburg)**	
0 – 20.80	discontinuous shale, limestone, sandstone, underclay	
0 – 2.20	**Herrin Coal**	
37.85 – 124.60	discontinuous underclay, shale, sandy shale, siltstone, sandstone, shaly limestone, limestone	
1.10 – 8.80	**Indiana Coal-5 (Springfield)**	Petersburg Formation
??	underclay, shale, sandstone	

COAL SEAMS PROPOSED FOR EXTRACTION

The coal seams proposed for mining are Coal-7, Coal-6, Herrin Coal, and Coal-5, of which the latter will be the lowest coal seam to be mined. The applicant will extract all coal seams encountered above the lowest coal seam to be mined that exhibit suitable thickness and quality. Coal deemed by the applicant to be unsuitable for extraction will be handled as toxic or acid-forming overburden or left in place.

COAL-7

Indiana Coal-7, also known as Danville or Upper Millersburg Coal in Indiana. The seam correlates with Danville Coal of Illinois and likely with Baker or Wheatcroft Coal of Kentucky. The seam is described by the Indiana Geological Survey as a bright, banded coal containing thin partings of clay and shale, with films of clay in vertical joints, and localized concentrations of pyrite and marcasite. The seam ranges between about 0.23 and 3.60 feet and averages about 2.65 feet in thickness where present in the permit area. Rocks directly above Coal-7 consist of various sequences of shale, sandy shale, and sandstone likely equivalent to and/or replacing rocks of the Busseron and/or West Franklin Members of the Shelburn Formation. Coal-7 and the rocks directly beneath it are part of the Dugger Formation. The interburden between Coal-7 and Coal-6 is variable, ranging between 1.83 and 31.93 feet in thickness and averaging about 6.17 feet in thickness locally. This interburden consists intermittently of shale, sandy shale, and limestone, and is stratigraphically equivalent to and/or replaces the Universal Limestone-Anvil Rock/Lawson Shale interval of the Dugger Formation. Coal-7 is absent in the south part of the proposed permit area because of previous surface mining. The estimated cropline of Coal-7 is drawn on Map 4.

COAL-6

Indiana Coal-6, also known as Hymera Coal or Lower Millersburg Coal. Coal-6 likely correlates with Paradise Coal of Kentucky and Jamestown Coal of Illinois. The seam is described by the IGS as a bright, banded coal with shale and pyrite partings. Locally the seam ranges between about 0.30 and 8.90 feet and averages about 5.43 feet in thickness where present, and where the Herrin Coal is absent, occurs between about 55.00 and 102.90 feet above Coal-5. The rocks directly beneath Coal-6 consist of intermittent sequences of underclay, shale, limestone, and sandstone that are stratigraphically equivalent to and/or replace the Providence Limestone interval of the Dugger Formation. Coal-6 is absent in the southern part of the proposed permit area because of previous surface mining. The estimated cropline of Coal-6 is drawn on Map 4.

HERRIN COAL

A coal seam of limited areal extent occupying a stratigraphic position possibly equivalent to the Herrin Coal seam of Illinois was identified by the applicant in 3 proximal drill holes on the east side of the proposed permit area. Herrin Coal likely correlates with Providence Coal of Kentucky. According to the Indiana Geological Survey, Herrin Coal is a bright-banded coal that contains clay or shale partings. Herrin Coal is generally thin and discontinuous in Indiana but thickens westward in Vanderburgh and Posey Counties, where it can be over 5 feet thick. Within the proposed permit area the seam averages about 1.32 feet in thickness where present, occurs between 7.75 and 20.80 feet below Coal-6 and between 37.85 and 78.80 feet above Coal-5. Rocks directly above Herrin Coal consist of various sequences of shale, sandy shale, and limestone and are stratigraphically equivalent to and/or replace the Providence Limestone interval. Rocks directly beneath the Herrin consist of various sequences of sandstone, shale, and limestone. Although currently unnamed in Indiana, the applicant considers the rocks directly beneath the Herrin to be equivalent to and/or replacing the Vermillionville Sandstone interval of Illinois. Herrin Coal will be extracted in the proposed permit area where exhibiting suitable quality and thickness. The estimated cropline of Herrin Coal is drawn on Map 4. Site-specific short-prox coal analytical data for the Herrin coal seam will be forwarded to the Division of Reclamation prior to mining said seam.

COAL-5

Coal-5, also known in Indiana as Springfield Coal, in Illinois as No. 5 Coal, Springfield Coal, and Harrisburg Coal, and in Kentucky as No. 9 Coal and Mulford Coal, is the lowest coal seam to be mined within the proposed permit area. Coal-5 is described by the Indiana Geological Survey as a bright coal that dulls upward. The seam ranges between about 1.10 and 8.80 feet and averages about 5.57 feet in thickness within the proposed permit area. The rocks above Coal-5 are equivalent to and/or replace the Alum Cave Limestone - Turner Mine/Dykersburg Shale interval of the Lower Dugger Formation. Coal-5 and the rocks directly beneath it are part of the Upper Petersburg Formation. These rocks are currently unnamed in Indiana except in places where Coal-5 splits into two or more thinner seams, in which case the interburden interval is known as the Folsomville Member (Eggert, 1982). In areas where Coal-5 is continuous, the directly underlying rocks are unnamed in Indiana but are likely equivalent to and/or replacing the Excello Shale of Illinois (Hopkins and Simon, 1975). Locally, these rocks consist of variable, intermittent sequences of underclay, shale, and sandstone. Local structural dip of the base of Coal-5 ranges between about 0.20 and 0.70 degrees in a generally southwesterly direction. Strike and dip vary locally because of the undulating structure of the differentially compacted strata above and below Coal-5. General strike and dip is indicated on Map 4. Structural contours of the base of the seam are shown on Map 4. Site-specific drilling data indicate that Coal-5 is present within the entire proposed permit area and the applicant has made no attempt to draw the cropline of the seam on Map 4.

OVERBURDEN GEOCHEMISTRY

The bedrock interval proposed for disturbance was characterized via six rock cores located in various parts of the permit area. Four of these cores penetrate rocks at least through Coal-6 and two cores penetrate rocks through the lowest coal seam to be mined. Calculations by the applicant using data obtained from laboratory testing of these cores indicate that about 7.56% of the overburden proposed for disturbance exhibits net neutralization potential equal to or less than -5.0 tons of calcium carbonate per kiloton. These strata will be handled as toxic or acid-forming materials when possible. The balance of the overburden of approximately 92.44% which includes multiple limestone and calcareous shale beds, exhibits considerable surplus neutralization potential, representing a substantial impediment to generation and mobilization of toxic or acidic fluids. The Quaternary interval within the proposed permit area was not geochemically characterized because it is composed of degraded materials that are generally not toxic or acid-forming.

WATER BEARING UNITS

The Quaternary interval within the proposed permit area is composed of unconsolidated clay and alluvium. The area is mapped as unglaciated during the Wisconsin (Wayne, 1966), Illinoian (Gray, etal, 1970), or Kansan (Gooding, 1966) events of the Pleistocene Epoch. No Quaternary sand and gravel aquifers are known to exist in the proposed permit area. Hydraulic testing of regional Quaternary-interval wells indicate permeability ranging from 10^{-6} to 10^{-7} cm/sec. Shallow wells completed in the Quaternary interval are typically unreliable water sources. Most wells in the general area of the proposed permit are either abandoned or not used for residential water supply. Of the wells that are used for residential water supply, most are periodically refilled with water obtained from public supplies or surface sources. Site-specific drilling information indicates that rocks equivalent to the sandstone interval of the Busseron Member of the Shelburn Formation are either poorly defined or absent in the immediate vicinity of the proposed permit area. This interval is not known to be exploited as a potable water source locally.

SUMMARY OF BONDING PARAMETERS RELATED TO GEOLOGY

PARAMETER	VALUE
percent of permit area overlying significant ground water resources	0
amount of consolidated overburden	84.07%
average depth to lowest coal	135.08 ft.
amount of toxic or acid-forming overburden	7.56%

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2. **Submit sufficient cross-sections showing each stratum present to characterize the permit area as Attachment V.B.2. A minimum of two (2) cross-sections shall be submitted. Cross-sections shall be positioned and oriented in a manner that provides an accurate approximation of the total variability and characteristics of the entire permit area and show:**

   See Cross-Sections A-A', B-B', C-C', and D-D'; and Map 4.

   a. The pre-mining surface elevations and contours,
   b. Stratigraphic lithology,
   c. Groundwater table elevations as indicated from monitoring wells and other available information, and
   d. Geologic sampling locations that form the basis for the cross-sections.

3. **Attach copies of all drill logs used to characterize the geology of permit and adjacent areas at Attachment V.B.3**

   See Attachment V.B.3.

4. **Attach the results of chemical analyses of each stratum of overburden, coal, and interburden identified in Part V.B.1. as Attachment V.B.4.**

   Six overburden cores (12910E, 12911E, 12912E, 12913E, OVB-1394, 104C) were drilled within the proposed permit area. Four of these cores penetrate strata through and immediately beneath Coal-6 and two of these cores (104C, OVB-1394) penetrate strata through and immediately beneath the lowest coal seam to be mined (Coal-5). Samples taken in core 104C were analyzed for quality for Coal-7, Coal-6 and Coal-5. Drill logs and analytical results for the above referenced cores are contained in Attachment V.B.4.

   a. **The analyses shall be accompanied by:**

      (1). The name of the person who collected the sample,
      (2). The date of sample collection,
      (3). The name of the person who analyzed the sample,
      (4). The date the sample was analyzed,
      (5). The method used to collect the sample, and
      (6). The method used to analyze the sample.

   b. **Each analysis of non-coal strata and coal seam(s) that will not be mined shall report the following parameters:**

      (1). Paste pH,
      (2). Total dissolved solids in water extract filtered from the saturated paste,
      (3). Total Sulfur
      (4). Acid-Base account expressed as tons of $CaCO_3$ equivalent / 1000 tons of material:
         (A). Pyritic sulfur (includes combined sulfides of pyrite and marcasite)
         (B). Neutralization Potential
         (C). Calcium Carbonate Deficiency or Surplus calculated from (A) and (B)
      (5). Fizz Rate
      (6). If the paste pH is less than or equal to 5.5, the water extract from the saturated paste shall be analyzed for the following parameters:
         (A). Iron
         (B). Manganese
         (C). Aluminum
      (7). If the paste pH is greater than or equal to 8.5, the water extract from the saturated paste shall be analyzed for the following parameters:
         (A). Sodium
         (B). Calcium
         (C). Magnesium
         (D). Calculated Sodium Absorption Ratio

   c. **Each analysis of coal seams to be mined shall report the following parameters:**

      (1).* Total Sulfur,
      (2).* Pyritic Sulfur (includes combined pyrite and marcasite),
      (3). BTU produced per pound of coal,
      (4). Percentage Ash, and
      (5). Moisture Content

      Parameters indicated by a "*" cannot be held CONFIDENTIAL and must be included in the application text.

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5. **Show the following information on the Environmental Resources Map:**

   See Map 4

   a. The location and elevation at the ground surface of each test boring or core sample used to compile the above data,
   b. The locations of all coal croplines and coal boundaries within the permit area,
   c. The strike and dip of the coal seam(s) to be mined within the permit area, and
   d. The location and identity of each cross-section submitted under part V.B.2.

6. **Provide a Coal Structure Map(s) of the base of the lowest coal seam to be mined at any location within the permit area.**

   See Map 4

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Attachment List

Attachment V.B.1	Generalized Stratigraphic Column
Attachment V.B.2.	Geologic Cross Sections A-A', B-B', C-C', D-D' (Filed with Maps)
Attachment V.B.3	Drill Logs
Attachment V.B.4	Chemical Analyses of Overburden and Coal

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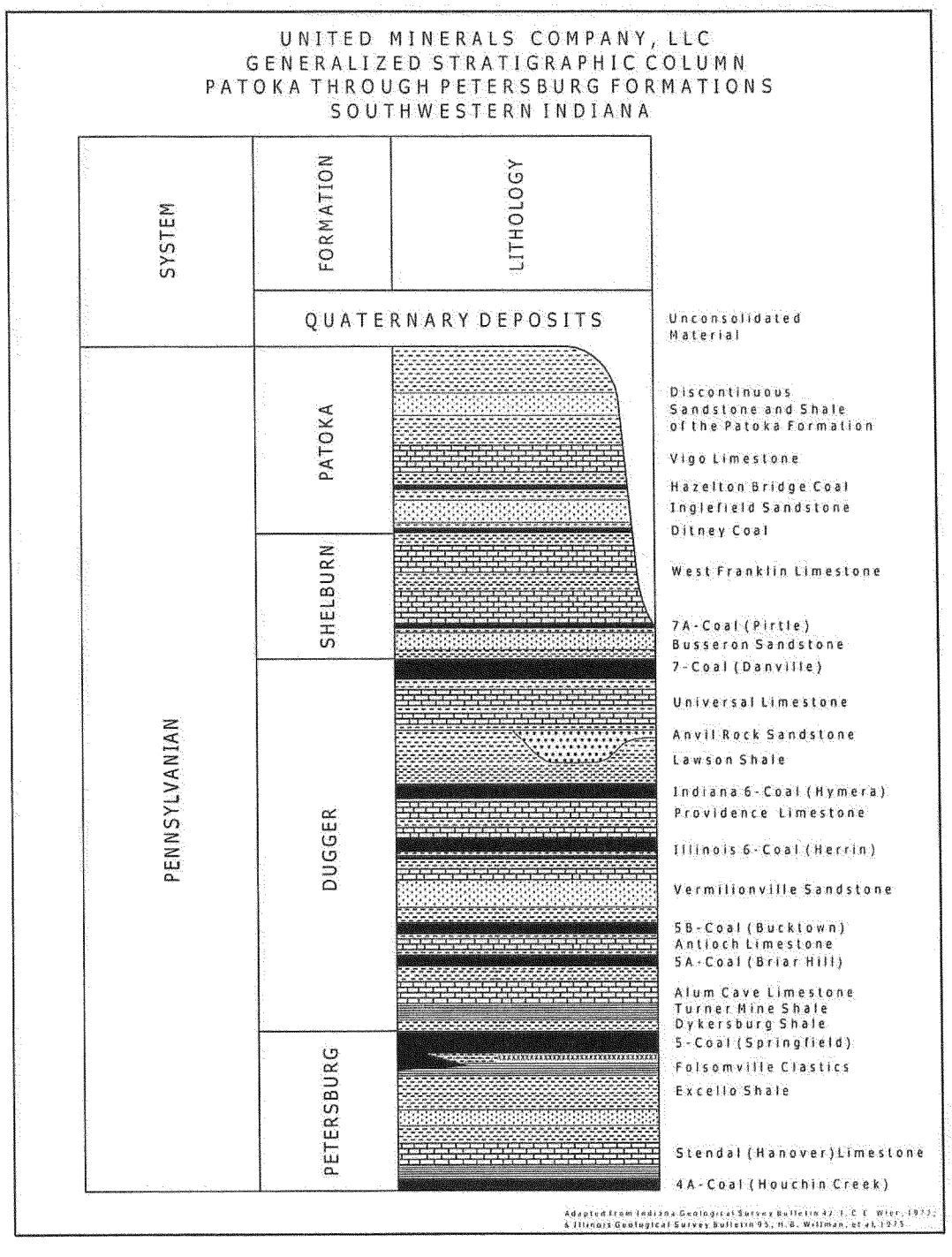
GENERALIZED STRATIGRAPHIC COLUMN



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DRILL LOGS

A-7	ELEV	386.60	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	35.00	35.00
shale	35.00	39.60	4.60
Coal-7	**39.60**	**42.30**	2.70
shale	42.30	46.70	4.40
Coal-6	**46.70**	**52.70**	6.00
shale	52.70	54.00	1.30
limestone	54.00	57.00	3.00
shale	57.00	60.00	3.00
limestone	60.00	64.00	4.00
shale	64.00	68.00	4.00
sandstone	68.00	82.00	14.00
shale	82.00	134.00	52.00
limestone	134.00	134.60	0.60
shale	134.60	143.50	8.90
black shale	143.50	146.70	3.20
Coal-5	**146.70**	**154.30**	7.60
shale	154.30	159.00	4.70
	T.D.	**159.00**	

A-8	ELEV	387.20	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	33.50	33.50
shale	33.50	37.60	4.10
Coal-7	**37.60**	**40.60**	**3.00**
shale	40.60	44.90	4.30
Coal-6	**44.90**	**50.00**	**5.10**
shale	50.00	54.50	4.50
limestone	54.50	56.50	2.00
shale	56.50	59.00	2.50
limestone	59.00	62.50	3.50
shale	62.50	69.00	6.50
sandstone	69.00	89.00	20.00
shale	89.00	132.00	43.00
limestone	132.00	132.50	0.50
sandstone	132.50	135.90	3.40
limestone	135.90	137.00	1.10
shale	137.00	145.00	8.00
black shale	145.00	150.50	5.50
limestone	150.50	152.90	2.40
Coal-5	**152.90**	**160.70**	**7.80**
sandstone	160.70	177.00	16.30
	T.D.	**177.00**	

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DRILL LOGS

A-9	ELEV	386.70	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	36.00	36.00
shale	36.00	50.90	14.90
Coal-7	**50.90**	**54.00**	**3.10**
shale	54.00	57.80	3.80
Coal-6	**57.80**	**64.50**	**6.70**
shale	64.50	70.00	5.50
limestone	70.00	71.00	1.00
sandstone	71.00	76.00	5.00
limestone	76.00	81.00	5.00
shale	81.00	85.30	4.30
Herrin Coal	**85.30**	**86.85**	**1.55**
sandstone	86.85	106.95	20.10
shale	106.95	140.45	33.50
limestone	140.45	141.45	1.00
shale	141.45	150.95	9.50
black shale	150.95	159.25	8.30
Coal-5	**159.25**	**166.75**	**7.50**
sandstone	166.75	178.95	12.20
	T.D.	**178.95**	

A-11	ELEV	387.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	36.60	36.60
shale	36.60	74.50	37.90
Coal-7	**74.50**	**77.60**	**3.10**
underclay	77.60	79.00	1.40
shale	79.00	82.50	3.50
Coal-6	**82.50**	**91.00**	**8.50**
shale	91.00	91.70	0.70
underclay	91.70	92.20	0.50
limestone	92.20	93.00	0.80
shale	93.00	100.30	7.30
limestone	100.30	100.90	0.60
shale	100.90	102.90	2.00
limestone	102.90	106.85	3.95
shale	106.85	137.00	30.15
limestone	137.00	138.55	1.55
shale	138.55	148.05	9.50
black shale	148.05	152.45	4.40
Coal-5	**152.45**	**159.55**	**7.10**
shale	159.55	179.55	20.00
	T.D.	**179.55**	

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DRILL LOGS

A-12	ELEV	386.70	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	34.50	34.50
Shale	34.50	35.00	0.50
sandstone	35.00	51.00	16.00
Shale	51.00	75.00	24.00
Coal-7	**75.00**	**78.20**	**3.20**
Shale	78.20	79.00	0.80
limestone	79.00	79.50	0.50
Shale	79.50	83.60	4.10
Coal-6	**83.60**	**92.50**	**8.90**
Shale	92.50	94.05	1.55
limestone	94.05	97.05	3.00
sandstone	97.05	97.55	0.50
limestone	97.55	98.05	0.50
shale	98.05	100.25	2.20
Herrin Coal	**100.25**	**102.45**	**2.20**
sandstone	102.45	111.05	8.60
limestone	111.05	112.60	1.55
shale	112.60	132.10	19.50
limestone	132.10	133.65	1.55
black shale	133.65	139.20	5.55
limestone	139.20	140.30	1.10
Coal-5	**140.30**	**147.80**	**7.50**
sandstone	147.80	158.70	10.90
	T.D.	**158.70**	

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DRILL LOGS

A-13	ELEV	386.30	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	37.00	37.00
shale	37.00	77.20	40.20
Coal-7	**77.20**	**80.50**	**3.30**
shale	80.50	84.20	3.70
Coal-6	**84.20**	**93.10**	**8.90**
limestone	93.10	93.80	0.70
shale	93.80	94.30	0.50
limestone	94.30	95.70	1.40
shale	95.70	114.00	18.30
limestone	114.00	115.00	1.00
sandstone	115.00	117.00	2.00
shale	117.00	146.50	29.50
limestone	146.50	147.50	1.00
shale	147.50	160.50	13.00
black shale	160.50	164.80	4.30
Coal-5	**164.80**	**172.80**	**8.00**
shale	172.80	188.00	15.20
	T.D.	**188.00**	

A-14	ELEV	385.40	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	34.50	34.50
shale	34.50	46.20	11.70
Coal-7	**46.20**	**48.60**	**2.40**
shale	48.60	53.30	4.70
Coal-6	**53.30**	**59.90**	**6.60**
shale	59.90	63.50	3.60
limestone	63.50	64.00	0.50
shale	64.00	69.00	5.00
limestone	69.00	71.50	2.50
shale	71.50	74.00	2.50
Herrin Coal	**74.00**	**74.20**	**0.20**
sandstone	74.20	97.00	22.80
shale	97.00	150.50	53.50
black shale	150.50	153.00	2.50
Coal-5	**153.00**	**161.80**	**8.80**
sandstone	161.80	173.50	11.70
	T.D.	**173.50**	

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DRILL LOGS

A-15	ELEV	426.70	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	8.00	8.00
sandstone	8.00	76.00	68.00
shale	76.00	94.60	18.60
Coal-7	**94.60**	**97.70**	**3.10**
shale	97.70	100.40	2.70
Coal-6	**100.40**	**108.00**	**7.60**
shale	108.00	110.00	2.00
limestone	110.00	112.10	2.10
shale	112.10	123.00	10.90
sandstone	123.00	139.00	16.00
shale	139.00	174.80	35.80
limestone	174.80	175.50	0.70
black shale	175.50	176.80	1.30
Coal-5	**176.80**	**181.50**	**4.70**
sandstone	181.50	190.00	8.50
	T.D.	**190.00**	

A-16	ELEV	385.10	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	38.90	38.90
Coal-6	**38.90**	**43.90**	5.00
shale	43.90	49.00	5.10
limestone	49.00	52.00	3.00
shale	52.00	55.50	3.50
limestone	55.50	57.00	1.50
sandstone	57.00	62.00	5.00
limestone	62.00	63.00	1.00
shale	63.00	70.00	7.00
limestone	70.00	71.00	1.00
sandstone	71.00	72.00	1.00
limestone	72.00	77.00	5.00
sandstone	77.00	82.00	5.00
shale	82.00	130.00	48.00
black shale	130.00	134.50	4.50
Coal-5	**134.50**	**142.00**	7.50
shale	142.00	148.00	6.00
	T.D.	**148.00**	

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DRILL LOGS

A-17	ELEV	426.80	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	9.00	9.00
sandstone	9.00	59.00	50.00
shale	59.00	83.70	24.70
Coal-7	**83.70**	**86.50**	2.80
shale	86.50	89.10	2.60
Coal-6	**89.10**	**93.20**	4.10
shale	93.20	95.70	2.50
limestone	95.70	98.30	2.60
shale	98.30	98.70	0.40
limestone	98.70	99.00	0.30
shale	99.00	102.00	3.00
limestone	102.00	106.90	4.90
shale	106.90	110.00	3.10
limestone	110.00	111.80	1.80
shale	111.80	120.10	8.30
limestone	120.10	123.00	2.90
sandstone	123.00	146.00	23.00
shale	146.00	173.00	27.00
limestone	173.00	174.10	1.10
shale	174.10	179.50	5.40
black shale	179.50	181.70	2.20
Coal-5	**181.70**	**187.60**	5.90
shale	187.60	189.00	1.40
sandstone	189.00	198.00	9.00
	T.D.	**198.00**	

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A-18	ELEV	415.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	9.00	9.00
sandstone	9.00	36.00	27.00
shale	36.00	60.10	24.10
Coal-7	**60.10**	**63.10**	3.00
shale	63.10	64.00	0.90
limestone	64.00	64.30	0.30
shale	64.30	66.30	2.00
Coal-6	**66.30**	**71.30**	5.00
shale	71.30	72.30	1.00
limestone	72.30	74.20	1.90
shale	74.20	76.80	2.60
limestone	76.80	80.20	3.40
shale	80.20	85.50	5.30
limestone	85.50	86.70	1.20
sandstone	86.70	91.00	4.30
limestone	91.00	92.30	1.30
sandstone	92.30	93.00	0.70
limestone	93.00	94.30	1.30
sandstone	94.30	113.00	18.70
shale	113.00	147.10	34.10
black shale	147.10	148.90	1.80
Coal-5	**148.90**	**153.60**	4.70
underclay	153.60	154.00	0.40
sandstone	154.00	159.00	5.00
	T.D.	**159.00**	

A-20	ELEV	386.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	34.80	34.80
Coal-7	**34.80**	**35.20**	0.40
shale	35.20	35.80	0.60
limestone	35.80	38.00	2.20
shale	38.00	39.70	1.70
Coal-6	**39.70**	**40.00**	0.30
shale	40.00	44.00	4.00
sandstone	44.00	54.00	10.00
limestone	54.00	55.00	1.00
sandstone	55.00	62.00	7.00
shale	62.00	103.00	41.00
limestone	103.00	103.60	0.60
Coal-5	**103.60**	**107.70**	4.10
sandstone	107.70	128.00	20.30
	T.D.	**128.00**	

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A-21	ELEV	386.30	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	30.50	30.50
shale	30.50	37.40	6.90
Coal-7	**37.40**	**40.40**	3.00
shale	40.40	40.70	0.30
limestone	40.70	41.00	0.30
shale	41.00	41.40	0.40
limestone	41.40	42.50	1.10
shale	42.50	43.20	0.70
Coal-6	**43.20**	**47.90**	4.70
shale	47.90	49.00	1.10
limestone	49.00	52.00	3.00
shale	52.00	52.70	0.70
limestone	52.70	53.40	0.70
shale	53.40	57.00	3.60
limestone	57.00	61.50	4.50
shale	61.50	66.50	5.00
limestone	66.50	69.10	2.60
shale	69.10	131.20	62.10
black shale	131.20	136.60	5.40
Coal-5	**136.60**	**143.00**	6.40
shale	143.00	147.00	4.00
	T.D.	**147.00**	

A-23	ELEV	386.70	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	37.00	37.00
shale	37.00	61.10	24.10
Coal-7	**61.10**	**64.20**	3.10
shale	64.20	64.60	0.40
limestone	64.60	65.30	0.70
shale	65.30	65.90	0.60
limestone	65.90	66.70	0.80
shale	66.70	68.30	1.60
Coal-6	**68.30**	**76.10**	7.80
limestone	76.10	76.20	0.10
shale	76.20	76.60	0.40
limestone	76.60	77.00	0.40
shale	77.00	78.10	1.10
limestone	78.10	78.30	0.20
shale	78.30	84.80	6.50
limestone	84.80	87.90	3.10
shale	87.90	133.50	45.60
black shale	133.50	138.90	5.40
Coal-5	**138.90**	**145.50**	6.60
shale	145.50	150.00	4.50
	T.D.	**150.00**	

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A-25	ELEV	427.60	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	6.00	6.00
sandstone	6.00	9.00	3.00
shale	9.00	13.00	4.00
sandstone	13.00	20.00	7.00
shale	20.00	27.00	7.00
sandstone	27.00	58.00	31.00
shale	58.00	89.90	31.90
Coal-7	**89.90**	**93.00**	3.10
shale	93.00	95.80	2.80
Coal-6	**95.80**	**101.40**	5.60
shale	101.40	101.60	0.20
limestone	101.60	102.50	0.90
shale	102.50	105.70	3.20
limestone	105.70	109.90	4.20
shale	109.90	112.80	2.90
limestone	112.80	113.90	1.10
shale	113.90	122.90	9.00
limestone	122.90	123.20	0.30
shale	123.20	129.80	6.60
limestone	129.80	131.80	2.00
sandstone	131.80	132.90	1.10
limestone	132.90	134.80	1.90
sandstone	134.80	156.40	21.60
limestone	156.40	156.70	0.30
shale	156.70	159.50	2.80
limestone	159.50	159.90	0.40
shale	159.90	176.00	16.10
black shale	176.00	177.60	1.60
Coal-5	**177.60**	**181.90**	4.30
shale	181.90	184.70	2.80
	T.D.	**184.70**	

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DRILL LOGS

A-30	ELEV	435.40	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	8.00	8.00
sandstone	8.00	16.00	8.00
shale	16.00	28.00	12.00
sandstone	28.00	46.00	18.00
shale	46.00	108.90	62.90
Coal-7	**108.90**	**112.00**	3.10
shale parting	112.00	112.30	0.30
Coal-7	**112.30**	**112.50**	0.20
shale	112.50	114.40	1.90
Coal-6	**114.40**	**121.00**	6.60
shale	121.00	122.50	1.50
limestone	122.50	125.20	2.70
shale	125.20	127.90	2.70
limestone	127.90	131.80	3.90
shale	131.80	136.60	4.80
limestone	136.60	138.00	1.40
sandstone	138.00	169.00	31.00
shale	169.00	188.20	19.20
limestone	188.20	190.50	2.30
black shale	190.50	192.50	2.00
Coal-5	**192.50**	**198.30**	5.80
sandstone	198.30	204.00	5.70
	T.D.	**204.00**	

116C	ELEV	395.42	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	42.00	42.00
Coal-7	**42.00**	**44.00**	2.00
limestone	44.00	44.33	0.33
shale	44.33	47.00	2.67
Coal-6	**47.00**	**52.50**	5.50
underclay	52.50	58.00	5.50
limestone	58.00	60.50	2.50
shale	60.50	61.00	0.50
limestone	61.00	62.00	1.00
sandy shale	62.00	80.00	18.00
shale	80.00	120.00	40.00
black shale	120.00	121.00	1.00
Coal-5	**121.00**	**127.00**	6.00
	T.D.	**127.00**	

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DRILL LOGS

344PC	ELEV	385.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	17.00	17.00
clay	17.00	36.10	19.10
Coal-7	**36.10**	**37.65**	**1.55**
shale	37.65	41.28	3.63
Coal-6	**41.28**	**45.84**	**4.56**
shale	45.84	46.54	0.70
underclay	46.54	49.02	2.48
limestone	49.02	50.57	1.55
shale	50.57	53.47	2.90
limestone	53.47	57.90	4.43
shale	57.90	61.60	3.70
limestone	61.60	62.60	1.00
shale	62.60	68.75	6.15
sandstone	68.75	76.05	7.30
shale	76.05	128.15	52.10
black shale	128.15	131.04	2.89
Coal-5	**131.04**	**137.14**	**6.10**
underclay	137.14	138.37	1.23
sandstone	138.37	140.37	2.00
	T.D.	**140.37**	

347PC	ELEV	392.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	15.00	15.00
shale	15.00	57.45	42.45
Coal-7	**57.45**	**60.12**	**2.67**
shale	60.12	65.68	5.56
Coal-6	**65.68**	**73.53**	**7.85**
underclay	73.53	75.08	1.55
shale	75.08	78.08	3.00
limestone	78.08	80.88	2.80
shale	80.88	91.09	10.21
sandstone	91.09	93.59	2.50
shale	93.59	131.55	37.96
black shale	131.55	133.25	1.70
Coal-5	**133.25**	**138.09**	**4.84**
sandstone	138.09	141.19	3.10
	T.D.	**141.19**	

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DRILL LOGS

1204PC	ELEV	389.30	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	20.57	20.57
shale	20.57	24.29	3.72
Coal-6	**24.29**	**26.85**	**2.56**
underclay	26.85	27.95	1.10
limestone	27.95	28.80	0.85
shale	28.80	33.45	4.65
limestone	33.45	39.30	5.85
shale	39.30	104.36	65.06
black shale	104.36	106.81	2.45
Coal-5	**106.81**	**111.98**	**5.17**
underclay	111.98	112.73	0.75
	T.D.	**112.73**	

1360P	ELEV	427.40	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	17.50	17.50
shale	17.50	86.92	69.42
Coal-7	**86.92**	**89.64**	**2.72**
shale	89.64	95.79	6.15
Coal-6	**95.79**	**103.29**	**7.50**
underclay	103.29	**103.95**	0.66
	T.D.	**103.95**	

1733PC	ELEV	463.60	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	5.45	5.45
sandstone	5.45	15.75	10.30
shale	15.75	84.02	68.27
Coal-7	**84.02**	**87.09**	**3.07**
shale	87.09	88.03	0.94
limestone	88.03	89.74	1.71
shale	89.74	90.80	1.06
Coal-6	**90.80**	**93.99**	**3.19**
underclay	93.99	98.00	4.01
limestone	98.00	108.10	10.10
shale	108.10	110.91	2.81
limestone	110.91	112.11	1.20
shale	112.11	162.89	50.78
shaly limestone	162.89	169.25	6.36
black shale	169.25	170.15	0.90
limestone	170.15	170.20	0.05
Coal-5	**170.20**	**174.50**	**4.30**
underclay	174.50	177.00	2.50
	T.D.	**177.00**	

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DRILL LOGS

1736PC	ELEV	385.90	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	24.13	24.13
shale	24.13	24.42	0.29
Coal-7	**24.42**	**27.40**	**2.98**
shale	27.40	27.94	0.54
limestone	27.94	28.11	0.17
shale	28.11	28.97	0.86
limestone	28.97	30.01	1.04
shale	30.01	31.87	1.86
Coal-6	**31.87**	**35.90**	**4.03**
underclay	35.90	39.69	3.79
limestone	39.69	41.44	1.75
shale	41.44	42.65	1.21
limestone	42.65	43.46	0.81
shale	43.46	45.84	2.38
limestone	45.84	47.08	1.24
shale	47.08	51.10	4.02
limestone	51.10	52.65	1.55
shale	52.65	58.24	5.59
sandstone	58.24	63.18	4.94
shale	63.18	123.92	60.74
black shale	123.92	127.26	3.34
Coal-5	**127.26**	**134.53**	**7.27**
shale	134.53	136.92	2.39
	T.D.	**136.92**	

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DRILL LOGS

1741PC	ELEV	466.40	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	11.63	11.63
sandstone	11.63	18.35	6.72
shale	18.35	74.70	56.35
Coal-7	**74.70**	**77.77**	**3.07**
shale	77.77	78.51	0.74
limestone	78.51	80.05	1.54
shale	80.05	80.77	0.72
Coal-6	**80.77**	**83.07**	**2.30**
underclay	83.07	86.80	3.73
limestone	86.80	88.08	1.28
shale	88.08	89.94	1.86
limestone	89.94	96.85	6.91
shale	96.85	100.77	3.92
limestone	100.77	104.24	3.47
shale	104.24	110.81	6.57
sandstone	110.81	114.83	4.02
shale	114.83	171.28	56.45
black shale	171.28	173.33	2.05
shale	173.33	173.58	0.25
black shale	173.58	173.67	0.09
Coal-5	**173.67**	**179.05**	**5.38**
shale	179.05	181.07	2.02
	T.D.	**181.07**	

1762PC	ELEV	465.70	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	8.26	8.26
shale	8.26	20.50	12.24
sandstone	20.50	26.24	5.74
shale	26.24	88.50	62.26
Coal-7	**88.50**	**91.47**	**2.97**
shale	91.47	92.25	0.78
limestone	92.25	94.00	1.75
shale	94.00	94.58	0.58
Coal-6	**94.58**	**97.05**	**2.47**
underclay	97.05	108.80	11.75
limestone	108.80	113.90	5.10
shale	113.90	124.69	10.79
sandstone	124.69	135.60	10.91
shale	135.60	175.75	40.15
black shale	175.75	177.12	1.37
Coal-5	**177.12**	**181.07**	**3.95**
underclay	181.07	182.62	1.55
	T.D.	**182.62**	

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DRILL LOGS

1758PC	ELEV	451.30	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	11.00	11.00
shale	11.00	89.13	78.13
Coal-7	**89.13**	**92.18**	**3.05**
shale	92.18	92.83	0.65
limestone	92.83	95.43	2.60
shale	95.43	96.53	1.10
Coal-6	**96.53**	**101.23**	**4.70**
underclay	101.23	102.33	1.10
limestone	102.33	102.95	0.62
shale	102.95	105.90	2.95
limestone	105.90	107.43	1.53
shale	107.43	113.66	6.23
sandstone	113.66	122.84	9.18
shale	122.84	166.88	44.04
black shale	166.88	168.58	1.70
Coal-5	**168.58**	**173.90**	**5.32**
sandstone	173.90	174.50	0.60
	T.D.	**174.50**	

1787PC	ELEV	416.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	8.15	8.15
shale	8.15	72.48	64.33
Coal-7	**72.48**	**75.35**	**2.87**
shale	75.35	77.77	2.42
Coal-6	**77.77**	**82.74**	**4.97**
underclay	82.74	85.81	3.07
limestone	85.81	88.73	2.92
shale	88.73	91.11	2.38
limestone	91.11	96.49	5.38
shale	96.49	99.12	2.63
limestone	99.12	100.11	0.99
shale	100.11	110.00	9.89
sandstone	110.00	112.23	2.23
shale	112.23	161.47	49.24
black shale	161.47	163.02	1.55
Coal-5	**163.02**	**167.96**	**4.94**
shale	167.96	169.85	1.89
	T.D.	**169.85**	

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DRILL LOGS

1788P	ELEV	386.40	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	19.65	19.65
shale	19.65	61.81	42.16
Coal-7	**61.81**	**64.98**	**3.17**
shale	64.98	68.67	3.69
Coal-6	**68.67**	**75.89**	**7.22**
shale	75.89	76.78	0.89
underclay	76.78	77.03	0.25
limestone	77.03	78.43	1.40
shale	78.43	140.21	61.78
black shale	140.21	142.84	2.63
Coal-5	**142.84**	**150.06**	**7.22**
shale	150.06	151.05	0.99
	T.D.	**151.05**	

1790PC	ELEV	385.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	21.84	21.84
shale	21.84	22.89	1.05
Coal-6	**22.89**	**26.13**	**3.24**
underclay	26.13	28.07	1.94
limestone	28.07	29.97	1.90
shale	29.97	33.49	3.52
limestone	33.49	40.82	7.33
shale	40.82	44.23	3.41
limestone	44.23	45.78	1.55
shale	45.78	103.29	57.51
limestone	103.29	103.72	0.43
shale	103.72	107.15	3.43
limestone	107.15	107.45	0.30
black shale	107.45	109.68	2.23
Coal-5	**109.68**	**114.87**	**5.19**
shale	114.87	117.17	2.30
	T.D.	**117.17**	

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DRILL LOGS

3420E	ELEV	459.50	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	9.20	9.20
shale	9.20	10.75	1.55
sandstone	10.75	13.45	2.70
shale	13.45	23.45	10.00
sandstone	23.45	28.15	4.70
shale	28.15	84.94	56.79
Coal-7	**84.94**	**88.04**	**3.10**
shale	88.04	89.04	1.00
limestone	89.04	91.02	1.98
shale	91.02	91.62	0.60
Coal-6	**91.62**	**94.66**	**3.04**
underclay	94.66	102.15	7.49
limestone	102.15	108.65	6.50
shale	108.65	168.63	59.98
black shale	168.63	169.34	0.71
Coal-5	**169.34**	**173.97**	**4.63**
underclay	173.97	174.56	0.59
	T.D.	**174.56**	

4760EC	ELEV	457.90	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	13.90	13.90
shale	13.90	84.20	70.30
Coal-7	**84.20**	**87.20**	**3.00**
shale	87.20	87.70	0.50
limestone	87.70	90.30	2.60
shale	90.30	91.20	0.90
Coal-6	**91.20**	**94.30**	**3.10**
underclay	94.30	101.20	6.90
limestone	101.20	108.30	7.10
shale	108.30	112.50	4.20
sandstone	112.50	117.10	4.60
shale	117.10	166.10	49.00
black shale	166.10	167.43	1.33
Coal-5	**167.43**	**172.14**	**4.71**
underclay	172.14	172.74	0.60
	T.D.	**172.74**	

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DRILL LOGS

4825EC	ELEV	386.60	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	34.60	34.60
shale	34.60	44.50	9.90
Coal-6	**44.50**	**50.37**	**5.87**
underclay	50.37	58.10	7.73
limestone	58.10	64.10	6.00
shale	64.10	127.60	63.50
Coal-5	**127.60**	**132.17**	**4.57**
underclay	132.17	133.32	1.15
	T.D.	**133.32**	

4895EC	ELEV	434.60	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	14.80	14.80
shale	14.80	88.00	73.20
Coal-7	**88.00**	**90.50**	**2.50**
shale	90.50	91.30	0.80
limestone	91.30	92.50	1.20
shale	92.50	94.20	1.70
Coal-6	**94.20**	**97.70**	**3.50**
underclay	97.70	100.10	2.40
limestone	100.10	102.60	2.50
shale	102.60	105.70	3.10
limestone	105.70	112.30	6.60
shale	112.30	115.30	3.00
sandstone	115.30	135.10	19.80
shale	135.10	180.20	45.10
black shale	180.20	181.75	1.55
Coal-5	**181.75**	**186.98**	**5.23**
underclay	186.98	187.88	0.90
	T.D.	**187.88**	

4896EC	ELEV	382.90	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	26.60	26.60
limestone	26.60	34.10	7.50
shale	34.10	40.40	6.30
sandstone	40.40	54.60	14.20
shale	54.60	99.90	45.30
black shale	99.90	100.50	0.60
Coal-5	**100.50**	**104.51**	**4.01**
underclay	104.51	105.51	1.00
	T.D.	**105.51**	

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DRILL LOGS

4900EB	ELEV	388.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	38.70	38.70
limestone	38.70	43.90	5.20
shale	43.90	84.80	40.90
sandstone	84.80	90.50	5.70
shale	90.50	137.60	47.10
black shale	137.60	138.70	1.10
Coal-5	**138.70**	**143.70**	**5.00**
underclay	143.70	145.60	1.90
shale	145.60	150.70	5.10
	T.D.	**150.70**	

4901EB	ELEV	400.50	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	26.90	26.90
underclay	26.90	32.20	5.30
limestone	32.20	35.90	3.70
shale	35.90	40.40	4.50
limestone	40.40	43.00	2.60
shale	43.00	60.10	17.10
sandstone	60.10	65.50	5.40
shale	65.50	150.80	85.30
black shale	150.80	151.50	0.70
Coal-5	**151.50**	**156.40**	**4.90**
shale	156.40	165.80	9.40
	T.D.	**165.80**	

4905EB	ELEV	399.80	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	36.10	36.10
shale	36.10	37.65	1.55
Coal-7	**37.65**	**40.25**	**2.60**
shale	40.25	45.45	5.20
Coal-6	**45.45**	**50.75**	**5.30**
shale	50.75	55.65	4.90
limestone	55.65	56.75	1.10
shale	56.75	61.15	4.40
limestone	61.15	65.65	4.50
shale	65.65	138.85	73.20
Coal-5	**138.85**	**139.95**	**1.10**
shale	139.95	195.95	56.00
	T.D.	**195.95**	

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DRILL LOGS

5403EC	ELEV	454.20	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	11.00	11.00
shale	11.00	74.90	63.90
Coal-7	**74.90**	**76.95**	**2.05**
shale	76.95	78.15	1.20
limestone	78.15	80.10	1.95
shale	80.10	81.30	1.20
Coal-6	**81.30**	**84.10**	**2.80**
shale	84.10	89.00	4.90
limestone	89.00	89.85	0.85
shale	89.85	156.22	66.37
black shale	156.22	157.60	1.38
Coal-5	**157.60**	**161.97**	**4.37**
shale	161.97	164.30	2.33
sandstone	164.30	177.25	12.95
shale	177.25	198.50	21.25
	T.D.	**198.50**	

5404EC	ELEV	420.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	15.80	15.80
shale	15.80	86.10	70.30
Coal-7	**86.10**	**89.10**	**3.00**
shale	89.10	91.60	2.50
Coal-6	**91.60**	**96.50**	**4.90**
underclay	96.50	98.60	2.10
limestone	98.60	100.30	1.70
shale	100.30	103.60	3.30
limestone	103.60	107.60	4.00
shale	107.60	110.90	3.30
sandstone	110.90	123.90	13.00
shale	123.90	128.80	4.90
limestone	128.80	131.20	2.40
sandstone	131.20	137.70	6.50
shale	137.70	177.40	39.70
limestone	177.40	178.05	0.65
shale	178.05	181.89	3.84
limestone	181.89	182.27	0.38
black shale	182.27	185.03	2.76
Coal-5	**185.03**	**190.54**	**5.51**
sandstone	190.54	194.27	3.73
underclay	194.27	194.35	0.08
sandstone	194.35	197.08	2.73
	T.D.	**197.08**	

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DRILL LOGS

5405EC	ELEV	430.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	12.90	12.90
shale	12.90	71.60	58.70
Coal-7	**71.60**	**74.50**	**2.90**
shale	74.50	74.80	0.30
black shale	74.80	75.50	0.70
shale	75.50	76.20	0.70
limestone	76.20	77.50	1.30
shale	77.50	79.20	1.70
Coal-6	**79.20**	**83.90**	**4.70**
underclay	83.90	88.20	4.30
limestone	88.20	89.50	1.30
shale	89.50	93.30	3.80
limestone	93.30	96.70	3.40
shale	96.70	103.70	7.00
limestone	103.70	104.40	0.70
shale	104.40	105.80	1.40
limestone	105.80	107.20	1.40
shale	107.20	146.70	39.50
shaly limestone	146.70	155.59	8.89
black shale	155.59	157.83	2.24
limestone	157.83	158.30	0.47
black shale	158.30	158.77	0.47
Coal-5	**158.77**	**164.81**	**6.04**
sandstone	164.81	170.16	5.35
	T.D.	**170.16**	

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DRILL LOGS

5409EC	ELEV	420.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	18.20	18.20
shale	18.20	20.80	2.60
Coal-7	**20.80**	**24.10**	**3.30**
shale	24.10	24.80	0.70
limestone	24.80	26.50	1.70
shale	26.50	27.10	0.60
Coal-6	**27.10**	**29.00**	**1.90**
underclay	29.00	36.20	7.20
shale	36.20	37.75	1.55
limestone	37.75	43.15	5.40
shale	43.15	52.75	9.60
sandstone	52.75	76.95	24.20
shale	76.95	89.95	13.00
shaly limestone	89.95	116.00	26.02
black shale	116.00	116.80	0.80
Coal-5	**116.80**	**120.80**	**4.00**
underclay	120.80	124.83	4.03
sandstone	124.83	126.80	1.97
	T.D.	**126.80**	

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DRILL LOGS

5412EC	ELEV	440.80	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	17.80	17.80
shale	17.80	21.70	3.90
sandstone	21.70	32.00	10.30
shale	32.00	81.40	49.40
Coal-7	**81.40**	**84.30**	**2.90**
shale	84.30	85.20	0.90
limestone	85.20	87.30	2.10
shale	87.30	88.30	1.00
Coal-6	**88.30**	**93.30**	**5.00**
underclay	93.30	96.00	2.70
limestone	96.00	102.30	6.30
shale	102.30	104.40	2.10
limestone	104.40	108.20	3.80
shale	108.20	114.50	6.30
limestone	114.50	115.20	0.70
shale	115.20	151.60	36.40
limestone	151.60	152.30	0.70
shale	152.30	154.15	1.85
limestone	154.15	154.28	0.13
shale	154.28	155.94	1.66
limestone	155.94	156.30	0.36
black shale	156.30	158.43	2.13
Coal-5	**158.43**	**164.28**	**5.85**
underclay	164.28	165.28	1.00
sandstone	165.28	167.30	2.02
shale	167.30	199.30	32.00
	T.D.	**199.30**	

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DRILL LOGS

5414EC	ELEV	415.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	8.10	8.10
shale	8.10	23.90	15.80
Coal-7	**23.90**	**26.50**	**2.60**
shale	26.50	27.60	1.10
limestone	27.60	29.00	1.40
shale	29.00	30.20	1.20
Coal-6	**30.20**	**32.60**	**2.40**
underclay	32.60	34.15	1.55
limestone	34.15	35.95	1.80
shale	35.95	39.35	3.40
limestone	39.35	45.95	6.60
shale	45.95	56.85	10.90
limestone	56.85	60.65	3.80
shale	60.65	64.15	3.50
sandstone	64.15	80.55	16.40
shale	80.55	101.44	20.89
limestone	101.44	101.54	0.10
shale	101.54	102.37	0.83
limestone	102.37	102.47	0.10
shale	102.47	110.88	8.41
shaly limestone	110.88	120.19	9.31
black shale	120.19	121.72	1.53
Coal-5	**121.72**	**126.44**	**4.72**
underclay	126.44	127.39	0.95
sandstone	127.39	129.19	1.80
	T.D.	**129.19**	

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DRILL LOGS

5402EC	ELEV	465.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	22.00	22.00
shale	22.00	83.40	61.40
Coal-7	**83.40**	**86.00**	**2.60**
shale	86.00	87.00	1.00
limestone	87.00	88.85	1.85
shale	88.85	90.20	1.35
Coal-6	**90.20**	**92.30**	**2.10**
shale	92.30	98.25	5.95
limestone	98.25	106.45	8.20
shale	106.45	164.85	58.40
limestone	164.85	166.25	1.40
shale	166.25	169.70	3.45
limestone	169.70	170.35	0.65
black shale	170.35	171.63	1.28
Coal-5	**171.63**	**175.86**	**4.23**
shale	175.86	178.18	2.32
sandstone	178.18	187.03	8.85
shale	187.03	207.33	20.30
	T.D.	**207.33**	

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DRILL LOGS

10023C	ELEV	399.90	
DESCRIPTION	TOP	BOT	THICK
fill	0.00	22.70	22.70
unconsolidated	22.70	37.20	14.50
shale	37.20	47.90	10.70
limestone	47.90	49.80	1.90
shale	49.80	54.00	4.20
limestone	54.00	58.30	4.30
shale	58.30	65.20	6.90
underclay	65.20	67.50	2.30
limestone	67.50	68.50	1.00
shale	68.50	72.00	3.50
limestone	72.00	74.10	2.10
shale	74.10	112.53	38.43
sandstone	112.53	116.18	3.65
shale	116.18	125.15	8.97
limestone	125.15	126.02	0.87
shale	126.02	131.91	5.89
limestone	131.91	132.87	0.96
black shale	132.87	136.08	3.21
Coal-5	**136.08**	142.98	6.90
shale	142.98	143.05	0.07
sandstone	143.05	146.25	3.20
	T.D.	**146.25**	

10024	ELEV	440.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	9.50	9.50
shale	9.50	25.60	16.10
sandstone	25.60	29.10	3.50
shale	29.10	71.20	42.10
Coal-7	**71.20**	**73.20**	**2.00**
underclay	73.20	77.20	4.00
shale	77.20	89.35	12.15
Coal-6	**89.35**	**96.10**	**6.75**
underclay	96.10	99.10	3.00
limestone	99.10	101.50	2.40
shale	101.50	104.30	2.80
limestone	104.30	108.20	3.90
shale	108.20	119.90	11.70
limestone	119.90	126.70	6.80
shale	126.70	176.56	49.86
limestone	176.56	177.31	0.75
shale	177.31	179.12	1.81
limestone	179.12	180.06	0.94
black shale	180.06	181.99	1.93
Coal-5	**181.99**	**187.41**	**5.42**
underclay	187.41	189.71	2.30
sandstone	189.71	192.46	2.75
	T.D.	**192.46**	

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DRILL LOGS

10035C	ELEV	395.90	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	24.00	24.00
shale	24.00	27.00	3.00
limestone	27.00	34.50	7.50
shale	34.50	37.00	2.50
limestone	37.00	38.55	1.55
shale	38.55	43.55	5.00
sandstone	43.55	52.05	8.50
shale	52.05	99.75	47.70
black shale	99.75	100.85	1.10
Coal-5	**100.85**	**104.93**	**4.08**
underclay	104.93	108.76	3.83
limestone	108.76	119.05	10.29
sandstone	119.05	125.05	6.00
shale	125.05	165.84	40.79
	T.D.	**165.84**	

12914C	ELEV	459.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	14.20	14.20
shale	14.20	20.50	6.30
sandstone	20.50	27.10	6.60
limestone	27.10	28.65	1.55
shale	28.65	29.65	1.00
sandstone	29.65	40.45	10.80
shale	40.45	73.85	33.40
Coal-7	**73.85**	**75.66**	**1.81**
shale	75.66	107.59	31.93
Coal-6	**107.59**	**114.84**	**7.25**
shale	**114.84**	**116.45**	1.61
	T.D.	**116.45**	

12923C	ELEV	443.26	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	6.70	6.70
shale	6.70	23.00	16.30
sandstone	23.00	33.50	10.50
shale	33.50	61.56	28.06
Coal-7	**61.56**	**63.31**	**1.75**
sandstone	63.31	64.65	1.34
shale	64.65	67.95	3.30
sandstone	67.95	68.70	0.75
shale	68.70	89.97	21.27
Coal-6	**89.97**	**97.57**	**7.60**
underclay	97.57	**99.50**	1.93
	T.D.	**99.50**	

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DRILL LOGS

13027C	ELEV	422.69	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	9.60	9.60
shale	9.60	81.22	71.62
Coal-7	**81.22**	**83.12**	**1.90**
shale	83.12	105.66	22.54
Coal-6	**105.66**	**112.61**	**6.95**
shale	112.61	114.50	1.89
	T.D.	**114.50**	

13037C	ELEV	441.00	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	10.50	10.50
shale	10.50	12.05	1.55
sandstone	12.05	16.25	4.20
shale	16.25	62.05	45.80
Coal-7	**62.05**	**63.88**	**1.83**
shale	63.88	90.33	26.45
Coal-6	**90.33**	**97.23**	**6.90**
shale	97.23	**98.75**	1.52
	T.D.	**98.75**	

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DRILL LOGS

OVB-1394	ELEV	437.00	
DESCRIPTION	TOP	BOT	THICK
soil	0.00	1.00	1.00
clay	1.00	15.00	14.00
sandy shale	15.00	17.00	2.00
shale	17.00	41.00	24.00
sandy shale	41.00	57.00	16.00
shale	57.00	80.00	23.00
Coal-7	**80.00**	**81.83**	**1.83**
sandy shale	81.83	104.00	22.17
Coal-6	**104.00**	**104.33**	**0.33**
shale	104.33	106.00	1.67
sandstone	106.00	110.00	4.00
Coal-6	**110.00**	**116.75**	**6.75**
shale	116.75	119.00	2.25
limestone	119.00	124.00	5.00
shale	124.00	133.00	9.00
limestone	133.00	135.00	2.00
sandstone	135.00	143.00	8.00
sandy shale	143.00	173.00	30.00
black shale	173.00	180.00	7.00
sandy shale	180.00	202.00	22.00
black shale	202.00	219.00	17.00
Coal-5	**219.00**	**226.92**	**7.92**
shale	226.92	234.00	7.08
	T.D.	**234.00**	

SHS100	ELEV	395.85	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	20.00	20.00
shale	20.00	56.00	36.00
Coal-7	**56.00**	**59.00**	**3.00**
shale	59.00	62.00	3.00
Coal-6	**62.00**	**66.00**	**4.00**
underclay	66.00	73.00	7.00
limestone	73.00	75.50	2.50
shale	75.50	117.00	41.50
black shale	117.00	119.00	2.00
shale	119.00	127.00	8.00
black shale	127.00	128.00	1.00
Coal-5	**128.00**	**133.33**	**5.33**
underclay	133.33	135.00	1.67
	T.D.	**135.00**	

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DRILL LOGS

SHS108C	ELEV	404.24	
DESCRIPTION	TOP	BOT	THICK
unconsolidated	0.00	27.00	27.00
shale	27.00	60.00	33.00
Coal-7	**60.00**	**63.17**	**3.17**
underclay	63.17	65.00	1.83
Coal-6	**65.00**	**70.00**	**5.00**
underclay	70.00	72.00	2.00
limestone	72.00	73.00	1.00
shale	73.00	78.00	5.00
siltstone	78.00	81.00	3.00
shale	81.00	82.00	1.00
limestone	82.00	85.00	3.00
shale	85.00	95.00	10.00
limestone	95.00	97.00	2.00
shale	97.00	154.00	57.00
Coal-5	**154.00**	**160.00**	**6.00**
underclay	160.00	161.00	1.00
	T.D.	**161.00**	

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

Summary Table of Analytical Results for Overburden Core No. 12910E (Ground elevation = 391.00)

drilled by Hardesty Drilling Co. on May 22, 1995
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Freeburg, IL, report dated July 3, 1995.

Stratum	From (ft.)	To (ft.)	Lab ID	Paste pH	Total Sulfur (%)	Pyritic Sulfur (%)	Poten. Acid. (t/kt)	Neut. Poten. (t/kt)	Net Neut. (t/kt)	TDS (mg/l)	Sp. Cnd. (mmho/cm)	Na (mg/l)	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Fe (mg/l)	Mn (mg/l)	SAR
not logged	0	7.00	not analyzed		3.56	1.60	not analyzed											
sandstone	7.00	10.00	1548	8.0	0.05	0.05	1.56	95.39	93.83	580	0.7	2.6	1.9	2.7	<0.1	<2.0	<1.0	1.7
shale	10.00	14.86	1549	8.0	0.08	0.08	2.50	21.00	18.50	620	0.8	3.6	1.9	2.4	0.4	<2.0	<1.0	2.5
shale	14.86	19.72	1550	8.2	0.07	0.07	2.19	24.41	22.22	550	0.7	5.0	1.1	1.2	0.4	<2.0	<1.0	4.7
shale	19.72	24.58	1551	8.3	0.09	0.09	2.81	27.93	25.12	680	0.9	6.8	0.8	0.8	0.4	<2.0	<1.0	7.6
shale	24.58	29.44	1552	8.4	0.09	0.09	2.81	23.11	20.30	800	1.0	9.6	0.6	0.6	0.3	<2.0	<1.0	12.4
shale	29.44	34.30	1553	8.5	0.10	0.10	3.12	23.48	20.36	900	1.1	10.2	0.4	0.4	0.3	<2.0	<1.0	16.1
shale	34.30	39.16	1554	8.6	0.09	0.09	2.81	20.82	18.01	1010	1.2	12.23	0.4	0.3	0.3	<2.0	<1.0	20.6
shale	39.16	44.00	1555	8.7	0.10	0.10	3.12	20.12	17.00	1089	1.4	13.2	0.2	0.2	0.3	<2.0	<1.0	29.5
shale	44.00	49.17	1556	8.8	0.12	0.12	3.75	18.97	15.22	1171	1.5	14.5	0.2	0.1	0.3	<2.0	<1.0	37.4
shale	49.17	54.34	1557	8.9	0.13	0.13	4.06	22.29	18.23	1288	1.6	15.8	0.2	0.1	0.3	<2.0	<1.0	40.8
shale	54.34	59.51	1558	8.8	0.17	0.17	5.31	24.60	19.29	1467	1.8	18.1	0.2	0.1	0.3	<2.0	<1.0	46.7
shale	**59.51**	**64.68**	**1559**	**7.7**	**1.57**	**1.57**	**49.06**	**23.68**	**-25.38**	**3540**	**4.4**	**39.9**	**3.7**	**2.1**	**0.8**	**<2.0**	**<1.0**	23.4
Coal-7	64.68	67.72	not analyzed		3.56	1.60	not analyzed											
shale	**67.62**	**73.22**	**1560**	**7.8**	**0.94**	**0.86**	**26.88**	**13.78**	**-13.10**	**3140**	**4.0**	**38.9**	**1.9**	**0.7**	**0.5**	**<2.0**	**<1.0**	**34.1**
Coal-6	73.22	82.09	not analyzed		5.30	3.99	not analyzed											
shale	82.09	83.05	1561	7.4	5.21	5.17	161.56	312.13	150.57	6960	7.7	73.0	17.9	3.9	1.1	<2.0	<1.0	22.1
limestone	83.05	83.45	1562	7.8	1.99	1.90	59.38	806.00	746.62	1660	2.1	12.6	6.2	2.3	0.7	<2.0	<1.0	6.1
shale	83.45	84.95	1563	7.4	2.14	2.08	65.00	532.04	467.04	5330	6.1	51.1	15.3	4.2	1.0	<2.0	<1.0	16.4
sandstone	84.95	87.05	1564	7.2	1.77	1.53	47.81	126.48	78.67	4860	5.1	27.3	31.0	8.2	1.2	<2.0	<1.0	6.2
shale	87.05	???	1565	8.9	0.25	0.25	7.81	14.92	7.11	970	1.5	16.6	<0.1	<0.1	0.2	<2.0	<1.0	74.2

Note:
Overburden Core 12910E was drilled in May of 1995. Lab data for this core was obtained from the archives of Peabody Energy in tabular format as shown.
No other format is known to exist and the original laboratory reports are not known to be available.

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

Summary Table of Analytical Results for Overburden Core No. 12911E (Ground elevation = 417.00)

core drilled by Hardesty Drilling Co. on May 24, 1995
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Freeburg, IL, report dated July 3, 1995.

Stratum	From (ft.)	To (ft.)	Lab ID	Paste pH	Total Sulfur (%)	Pyritic Sulfur (%)	Poten. Acid. (t/kt)	Neut. Poten. (t/kt)	Net Neut. (t/kt)	TDS (mg/l)	Sp. Cnd. (mmho/cm)	Na (mg/l)	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Fe (mg/l)	Mn (mg/l)	SAR
not logged	0	8.00	not analyzed															
shale	8.00	10.30	1566	7.3	0.04	0.04	1.25	4.22	2.97	178	0.2	1.6	<0.1	0.1	<0.1	<2.0	<1.0	7.2
sandstone	10.30	15.03	1567	7.9	0.03	0.03	0.94	41.02	40.08	320	0.5	2.1	1.3	1.8	0.1	<2.0	<1.0	1.7
sandstone	15.03	19.75	1568	8.2	0.06	0.06	1.88	19.94	18.06	520	0.8	4.9	1.0	1.7	0.4	<2.0	<1.0	4.2
shale	19.75	25.40	1569	8.4	0.07	0.07	2.19	18.68	16.49	610	0.9	7.0	0.7	1.0	0.4	<2.0	<1.0	7.6
shale	25.40	31.05	1570	8.5	0.08	0.08	2.50	17.44	14.94	640	0.9	7.7	0.3	0.5	0.3	<2.0	<1.0	12.2
shale	31.05	36.70	1571	8.6	0.10	0.10	3.12	18.22	15.10	700	1.0	9.0	0.2	0.3	0.3	<2.0	<1.0	18.0
shale	36.70	42.35	1572	8.7	0.08	0.08	2.50	22.90	20.40	740	1.1	10.3	0.2	0.2	0.3	<2.0	<1.0	23.0
shale	42.35	48.00	1573	8.8	0.09	0.09	2.81	17.54	14.73	860	1.2	11.9	0.2	0.2	0.3	<2.0	<1.0	26.6
shale	48.00	53.15	1574	9.0	0.12	0.12	3.75	16.81	13.06	920	1.4	13.3	0.2	0.2	0.3	<2.0	<1.0	29.7
shale	53.15	58.30	1575	8.9	0.21	0.21	6.56	14.64	8.08	1080	1.6	14.8	0.2	0.2	0.3	<2.0	<1.0	33.1
shale	58.30	63.45	1576	9.0	0.25	0.25	7.81	20.01	12.20	1340	2.0	18.4	0.2	0.2	0.4	<2.0	<1.0	41.1
shale	**63.45**	**68.60**	**1577**	**7.0**	**5.11**	**4.91**	**153.44**	**44.28**	**-109.16**	**7160**	**7.3**	**53.0**	**26.5**	**12.3**	**1.7**	**<2.0**	**7.3**	**12.0**
Coal-7	68.60	71.27	not analyzed		2.68	1.16	not analyzed											
shale	**71.27**	**73.71**	**1578**	**5.4**	**1.98**	**1.66**	**51.88**	**1.31**	**-50.57**	**3820**	**4.7**	**45.7**	**1.7**	**1.5**	**0.6**	**5.9**	**2.5**	**36.1**
Coal-6	73.71	78.67	not analyzed		3.67	2.53	not analyzed											
shale	**78.67**	**80.15**	**1579**	**8.0**	**1.72**	**1.63**	**50.94**	**5.02**	**-45.92**	**3030**	**4.1**	**52.1**	**0.5**	**0.3**	**0.4**	**<2.0**	**<1.0**	**82.4**
limestone	80.15	81.65	1580	8.6	0.27	0.27	8.44	974.26	965.82	860	1.2	9.9	0.6	0.2	0.4	<2.0	<1.0	15.7
shale	81.65	83.35	1581	9.2	0.27	0.27	8.44	614.63	606.19	1460	2.1	20.5	0.1	<0.1	0.3	<2.0	<1.0	91.7
shale	83.35	85.95	1582	9.3	0.35	0.35	10.94	7.84	-3.10	1440	2.2	20.5	<0.1	<0.1	0.2	<2.0	<1.0	81.7
limestone	85.95	???	1583	8.8	0.36	0.36	11.25	904.64	893.39	1320	1.9	18.3	0.3	0.3	0.5	<2.0	<1.0	33.4

Note:
Overburden Core 12911E was drilled in May of 1995. Lab data for this core was obtained from the archives of Peabody Energy in tabular format as shown.
No other format is known to exist and the original laboratory reports are not known to be available.

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

Summary Table of Analytical Results for Overburden Core No. 12912E (Ground elevation = 386.00)

core drilled by Hardesty Drilling Co. on May 25, 1995
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Freeburg, IL, report dated July 3, 1995.

Stratum	From (ft.)	To (ft.)	Lab ID	Paste pH	Total Sulfur (%)	Pyritic Sulfur (%)	Poten. Acid. (t/kt)	Neut. Poten. (t/kt)	Net Neut. (t/kt)	TDS (mg/l)	Sp. Cnd. (mmho/cm)	Na (mg/l)	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Fe (mg/l)	Mn (mg/l)	SAR
not logged	0	33.00	not analyzed															
shale	33.00	38.21	1433	8.0	0.12	0.12	3.75	30.14	26.39	420	0.5	1.2	1.9	1.2	0.5	<2.0	<1.0	1.0
Coal-7	38.21	38.44	1434	3.7	6.35	5.43	169.69	1.22	-168.47	3033	2.7	2.0	19.1	10.4	0.6	120	3.0	0.5
shale	38.44	43.53	1435	8.0	0.13	0.13	4.06	23.08	19.02	500	0.6	2.2	2.1	1.1	0.5	<2.0	<1.0	1.7
Coal-6	43.53	50.37	not analyzed		1.71	0.74	not analyzed											
shale	**50.37**	**54.00**	**1436**	**8.4**	**0.85**	**0.85**	**26.56**	**19.24**	**-7.32**	**1556**	**2.1**	**19.1**	**0.4**	**0.2**	**0.3**	**<2.0**	**<1.0**	**34.9**
shale	54.00	???	1437	8.9	0.37	0.37	11.56	600.53	588.97	1100	1.5	14.5	0.1	<0.1	0.3	<2.0	<1.0	64.8

Note:
Overburden Core 12912E was drilled in May of 1995. Lab data for this core was obtained from the archives of Peabody Energy in tabular format as shown.
No other format is known to exist and the original laboratory reports are not known to be available.

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

Summary Table of Analytical Results for Overburden Core No. 12913E (Ground elevation = 393.00)

core drilled by Hardesty Drilling Co. on May 26, 1995
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Freeburg, IL, report dated July 3, 1995.

Stratum	From (ft.)	To (ft.)	Lab ID	Paste pH	Total Sulfur (%)	Pyritic Sulfur (%)	Poten. Acid. (t/kt)	Neut. Poten. (t/kt)	Net Neut. (t/kt)	TDS (mg/l)	Sp. Cnd. (mmho/cm)	Na (mg/l)	Ca (mg/l)	Mg (mg/l)	K (mg/l)	Fe (mg/l)	Mn (mg/l)	SAR
not logged	0	10.00	not analyzed															
clay	10.00	11.70	1438	8.0	0.05	0.05	1.56	7.46	5.90	410	0.5	4.8	0.5	0.6	<0.1	<2.0	<0.1	6.5
sandstone	11.70	15.85	1439	8.0	0.05	0.05	1.56	7.35	5.79	380	0.4	3.0	0.5	0.7	<0.1	<2.0	<0.1	3.9
sandstone	15.85	20.00	1440	8.1	0.04	0.04	1.25	25.68	24.43	410	0.5	3.2	0.8	1.3	<0.1	<2.0	<0.1	3.1
shale	20.00	24.86	1441	8.2	0.08	0.08	2.50	33.85	31.35	430	0.5	3.2	0.7	1.3	0.3	<2.0	<0.1	3.2
shale	24.86	29.72	1442	8.4	0.07	0.07	2.19	29.38	27.19	510	0.6	4.5	0.5	0.8	0.4	<2.0	<0.1	5.6
shale	29.72	34.58	1443	8.5	0.07	0.07	2.19	29.40	27.21	610	0.7	5.7	0.3	0.5	0.3	<2.0	<0.1	9.0
shale	34.58	39.44	1444	8.6	0.09	0.09	2.81	31.80	28.99	630	0.7	7.2	0.2	0.3	0.3	<2.0	<0.1	14.4
shale	39.44	44.30	1445	8.7	0.08	0.08	2.50	36.20	33.70	670	0.9	8.3	0.2	0.2	0.3	<2.0	<0.1	18.6
shale	44.30	49.20	1446	8.8	0.10	0.10	3.12	25.20	22.08	760	0.9	8.4	0.1	0.2	0.3	<2.0	3.0	21.7
shale	49.20	54.10	1447	9.0	0.10	0.10	3.12	28.81	25.69	770	1.0	9.8	0.1	0.1	0.2	<2.0	<0.1	31.0
shale	54.10	59.00	1448	9.0	0.12	0.12	3.75	35.02	31.27	810	1.1	10.5	0.1	<0.1	0.2	<2.0	<0.1	47.0
shale	59.00	63.90	1449	9.1	0.11	0.11	3.44	35.30	31.86	770	1.0	15.0	<0.1	<0.1	0.2	<2.0	<0.1	67.1
shale	63.90	68.80	1450	9.0	0.18	0.18	5.62	31.80	26.18	1110	1.2	11.5	0.1	0.1	0.4	<2.0	<0.1	36.4
shale	**68.80**	**73.81**	**1451**	**8.3**	**1.66**	**1.66**	**51.88**	**36.49**	**-15.39**	**1870**	**2.4**	**24.3**	**0.6**	**0.4**	**0.5**	**<2.0**	**<0.1**	**34.4**
Coal-7	73.81	75.92	not analyzed		4.55	3.02	not analyzed											
shale	75.92	80.65	1452	9.2	0.53	0.47	14.69	11.55	-3.14	1030	1.4	13.3	<0.1	<0.1	0.1	<2.0	<0.1	59.5
shale	80.65	85.38	1453	9.4	0.08	0.08	2.50	27.44	24.94	770	1.0	10.4	<0.1	<0.1	0.1	<2.0	<0.1	46.5
shale	85.38	90.11	1454	9.0	0.37	0.36	11.25	23.06	11.81	1220	1.5	14.7	0.1	<0.1	0.2	<2.0	<0.1	65.7
shale	90.11	94.83	1455	8.7	0.65	0.56	17.50	15.68	-1.82	1270	1.7	16.7	0.1	<0.1	0.2	<2.0	<0.1	74.7
Coal-6	94.83	101.90	not analyzed		3.97	2.82	not analyzed											
shale	101.90	107.20	1456	9.2	0.47	0.47	14.69	19.25	4.56	1400	1.9	18.3	<0.1	<0.1	0.2	<2.0	<0.1	81.8
shale	107.20	???	1457	9.1	0.48	0.48	15.00	355.38	340.38	1300	1.7	16.5	<0.1	<0.1	0.2	<2.0	<0.1	73.8

Note:
Overburden Core 12913E was drilled in May of 1995. Lab data for this core was obtained from the archives of Peabody Energy in tabular format as shown.
No other format is known to exist and the original laboratory reports are not known to be available.

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

Summary Table of Analytical Results for Overburden Core No. OVB-1394 (Ground elevation = 437.00)

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core drilled by United Minerals Company, LLC, on July 26, 2011
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Evansville, IN, report dated March 21, 2012 (see attached lab reports)

Stratum	From (ft.)	To (ft.)	Lab ID	Paste pH	Total Sulfur (%)	Pyritic Sulfur (%)	Poten. Acid. (t/kt)	Neut. Poten. (t/kt)	Net Neut. (t/kt)	TDS (mg/l)	Fizz Rate	Na (mg/l)	Ca (mg/l)	Mg (mg/l)	Al (mg/l)	Fe (mg/l)	Mn (mg/l)	SAR
unconsolidated	0.00	17.00	not analyzed															
shale	17.00	22.00	1	6.4	0.15	0.15	4.69	9.66	4.97	880	0							
shale	22.00	27.00	2	7.7	0.16	0.16	5.00	45.45	40.45	540	1							
shale	27.00	32.00	3	8.0	0.10	0.10	3.13	62.39	59.26	890	1							
shale	32.00	37.00	4	8.0	0.11	0.11	3.44	57.91	54.47	850	1							
shale	37.00	41.00	5	8.3	0.12	0.12	3.75	115.96	112.21	585	2							
sandy shale	41.00	46.00	6	8.1	0.14	0.14	4.38	29.22	24.84	640	0							
sandy shale	46.00	51.00	7	8.1	0.14	0.14	4.38	47.95	43.57	1015	1							
sandy shale	51.00	56.00	8	8.2	0.15	0.15	4.69	44.58	39.89	930	1							
sandy shale	56.00	57.00	9	8.2	0.17	0.17	5.31	47.57	42.26	1010	1							
shale	57.00	62.00	10	8.4	0.17	0.17	5.31	47.00	41.69	1360	1							
shale	62.00	67.00	11	8.7	0.22	0.22	6.88	48.75	41.87	2467	1	543	16.1	19.8				21
shale	67.00	72.00	12	8.6	0.27	0.27	8.44	34.96	26.52	2640	0	729	12.4	13.3				34
shale	72.00	77.00	13	8.5	0.28	0.28	8.75	62.25	53.50	2240	1	612	14.3	12.2				29
shale	77.00	80.00	14	6.0	2.68	1.15	35.94	90.40	54.46	5735	2							
Coal-7	80.00	81.83	15		5.65	2.76												
sandy shale	81.83	87.00	16	6.0	0.67	0.32	10.00	20.05	10.05	3230	0							
sandy shale	87.00	92.00	17	9.2	0.16	0.16	5.00	29.71	24.71	2660	0	421	8.45	10.5				23
sandy shale	92.00	97.00	18	7.8	0.18	0.18	5.63	15.53	9.90	2230	0							
sandy shale	97.00	102.00	19	9.2	0.19	0.19	5.94	61.25	55.31	1100	1	442	8.80	5.66				29
sandy shale	102.00	104.00	20	9.2	0.21	0.21	6.56	21.52	14.96	2680	0	591	12.3	7.99				32
Coal-6	104.00	104.33	21		11.02	7.02												
shale	104.33	106.00	22	6.2	0.54	0.52	16.25	50.63	34.38	3300	1							
sandstone	106.00	110.00	23	8.2	0.22	0.22	6.88	54.13	47.25	2140	1							
Coal-6	110.00	116.75	24		1.90	0.70												
shale	116.75	119.00	25	7.9	0.41	0.41	12.81	252.17	239.36	3860	3							

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

Summary Table of Analytical Results for Overburden Core No. OVB-1394 (Ground elevation = 437.00)

core drilled by United Minerals Company, LLC, on July 26, 2011
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Evansville, IN, report dated March 21, 2012 (see attached lab reports)

Stratum	From (ft.)	To (ft.)	Lab ID	Paste pH	Total Sulfur (%)	Pyritic Sulfur (%)	Poten. Acid. (t/kt)	Neut. Poten. (t/kt)	Net Neut. (t/kt)	TDS (mg/l)	Fizz Rate	Na (mg/l)	Ca (mg/l)	Mg (mg/l)	Al (mg/l)	Fe (mg/l)	Mn (mg/l)	SAR
limestone	119.00	124.00	26	8.8	0.22	0.22	6.88	421.12	414.24	2480	3	743	24.9	7.37				34
shale	124.00	129.00	27	7.2	0.78	0.72	22.50	644.12	622.22	3905	3							
shale	129.00	133.00	28	8.6	0.53	0.52	16.25	32.89	16.64	1840	0	727	9.23	3.57				51
limestone	133.00	135.00	29	8.7	0.32	0.32	10.00	70.50	60.50	1520	1	590	9.12	3.61				42
sandstone	135.00	140.00	30	9.4	<0.10	0.06	1.88	9.17	7.29	2650	0	376	7.92	7.44				23
sandstone	140.00	143.00	31	9.5	<0.10	0.09	2.81	218.63	215.82	865	3	354	5.40	2.37				32
sandy shale	143.00	148.00	32	9.2	<0.10	0.08	2.50	82.29	79.79	970	2	426	8.85	2.69				32
sandy shale	148.00	153.00	33	9.1	0.11	0.11	3.44	63.59	60.15	1295	2	511	9.67	3.06				37
sandy shale	153.00	158.00	34	9.4	0.20	0.20	6.25	85.00	78.75	1040	1	426	10.7	3.68				29
sandy shale	158.00	163.00	35	7.9	0.63	0.61	19.06	32.25	13.19	2405	0							
sandy shale	163.00	168.00	36	8.2	0.82	0.82	25.63	125.94	100.31	4200	2							
sandy shale	168.00	173.00	37	8.3	0.74	0.74	23.13	31.25	8.12	2660	0							
black shale	**173.00**	**178.00**	**38**	**6.5**	**2.24**	**2.21**	**69.06**	**21.50**	**-47.56**	**8335**	**1**							
black shale	178.00	180.00	39	8.7	0.57	0.57	17.81	60.50	42.69	3720	1	1300	19.5	9.38				61
sandy shale	180.00	185.00	40	8.5	0.50	0.50	15.63	57.88	42.25	3100	1	1160	23.3	11.1				50
sandy shale	185.00	190.00	41	7.8	0.79	0.79	24.69	70.45	45.76	4410	2							
sandy shale	190.00	195.00	42	7.7	0.62	0.60	18.75	78.75	60.00	3385	1							
sandy shale	195.00	200.00	43	8.1	0.45	0.45	14.06	78.25	64.19	2850	1							
sandy shale	200.00	202.00	44	8.8	0.39	0.39	12.19	29.13	16.94	2060	0	713	10.4	5.98				44
black shale	202.00	207.00	45	8.7	0.40	0.40	12.50	33.88	21.38	2030	0	682	9.50	3.13				49
black shale	207.00	212.00	46	9.1	0.48	0.48	15.00	388.82	373.82	2380	3	797	13.0	6.96				44
black shale	212.00	217.00	47	8.5	0.58	0.56	17.50	76.38	58.88	3430	1	1170	24.7	12.4				48
black shale	217.00	219.00	48	7.3	5.27	5.17	161.56	162.73	1.17	7730	3							
Coal-5	219.00	226.90	49		6.70	3.10												
shale	226.90	232.00	50	3.9	4.18	4.11	128.44	-2.00	-130.44	8020	0				60.9	485	36.2	
shale	232.00	234.00	51	5.7	1.32	1.32	41.25	20.13	-21.12	4725	0							

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

Summary Table of Analytical Results for Overburden Core No. OVB-104C (Ground elevation = 429.00) **PAGE 1 OF 2**

core drilled by United Minerals Company, LLC, on April 26, 2004
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Evansville, IN, report dated August 16, 2005 (see attached lab reports)

Stratum	From (ft.)	To (ft.)	Lab ID	Paste pH	Total Sulfur (%)	Pyritic Sulfur (%)	Poten. Acid. (t/kt)	Neut. Poten. (t/kt)	Net Neut. (t/kt)	TDS (mg/l)	Fizz Rate	Na (mg/l)	Ca (mg/l)	Mg (mg/l)	Al (mg/l)	Fe (mg/l)	Mn (mg/l)	SAR
shale	20.00	25.00	1495-1	8.1	0.15	0.15	4.69	30.59	25.90	800	0							
shale	25.00	30.00	1495-2	8.4	0.12	0.12	3.75	20.59	16.84	700	1							
shale	30.00	35.00	1495-3	8.5	<0.10	0.09	2.81	37.96	35.15	760	0	188	30.4	18.7				7
shale	35.00	40.00	1495-4	8.6	<0.10	0.06	1.88	31.08	29.30	880	0	231	24.0	8.9				10
shale	40.00	45.00	1495-5	8.7	<0.10	0.07	2.19	37.71	35.52	880	0	221	21.0	7.8				10
shale	45.00	50.00	1495-6	8.8	<0.10	0.06	1.88	28.62	26.74	900	0	244	19.0	6.2				12
shale	50.00	55.00	1495-7	8.9	<0.10	0.08	2.50	35.87	33.37	500	0	223	16.9	5.7				12
shale	55.00	58.00	1495-8	8.6	<0.10	0.07	2.19	30.84	28.65	940	0	301	25.2	8.4				13
sandy shale	58.00	61.00	1495-9	8.8	0.13	0.13	4.06	125.63	121.57	960	2	251	37.9	21.9				8
shale	61.00	65.00	1495-10	9.5	<0.10	0.06	1.88	214.01	212.13	960	3	303	19.1	6.2				15
shale	65.00	70.00	1495-11	8.8	0.10	0.10	3.13	33.91	30.78	1780	0	544	27.4	5.3				25
shale	70.00	75.00	1495-12	9.0	0.12	0.12	3.75	34.28	30.53	2267	0	545	28.5	8.4				23
shale	75.00	80.00	1495-13	9.2	0.13	0.13	4.06	44.36	40.30	1833	1	516	26.1	7.8				23
shale	80.00	85.00	1495-14	9.0	0.18	0.18	5.63	59.07	53.44	1900	1	535	24.5	8.1				24
shale	85.00	90.00	1495-15	9.1	0.11	0.11	3.44	51.84	48.40	1450	1	390	21.3	5.6				19
shale	90.00	95.00	1495-16	9.1	0.21	0.21	6.56	64.95	58.39	1767	1	511	8.2	3.5				38
shale	95.00	100.00	1495-17	9.1	0.38	0.38	11.88	74.88	63.00	2100	1	552	26.6	8.6				24
shale	100.00	105.00	1495-18	8.6	0.25	0.25	7.81	31.82	24.01	1300	0	843	31.4	9.8				34
shale	105.00	110.00	1495-19	8.6	0.44	0.44	13.75	48.65	34.90	2400	1	889	34.3	7.2				36
shale	**110.00**	**113.00**	**1495-20**	**4.8**	**9.04**	**6.86**	**214.38**	**10.66**	**-203.72**	**13240**	**1**				**0.56**	**1700**	**193**	
Coal-7	113.00	116.00	1069-7		3.76	2.27												
shale	116.00	118.00	1495-21	6.7	1.99	1.92	60.00	221.66	161.66	5700	3							
Coal-6	118.00	125.00	1069-1		5.17	3.42												
shale	125.00	127.00	1495-22	6.6	7.44	6.11	190.94	239.49	48.55	5550	3							
limestone	127.00	127.75	1495-23	8.1	1.40	1.40	43.75	917.20	873.45	2235	3							

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

Summary Table of Analytical Results for Overburden Core No. OVB-104C (Ground elevation = 429.00)

core drilled by United Minerals Company, LLC, on April 26, 2004
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Evansville, IN, report dated August 16, 2005 (see attached lab reports)

Stratum	From (ft.)	To (ft.)	Lab ID	Paste pH	Total Sulfur (%)	Pyritic Sulfur (%)	Poten. Acid. (t/kt)	Neut. Poten. (t/kt)	Net Neut. (t/kt)	TDS (mg/l)	Fizz Rate	Na (mg/l)	Ca (mg/l)	Mg (mg/l)	Al (mg/l)	Fe (mg/l)	Mn (mg/l)	SAR
shale	**127.75**	**128.00**	**1495-24**	**6.4**	**5.55**	**5.55**	**173.44**	**163.06**	**-10.38**	**6260**	**3**							
unnamed coal	128.00	128.25	1495-25	7.2	2.81	1.84	57.50	184.71	127.21	3215	3							
shale	**128.25**	**129.25**	**1495-26**	**6.3**	**2.75**	**1.87**	**58.44**	**20.10**	**-38.34**	**8720**	**2**							
limestone	129.25	130.00	1495-27	9.5	0.85	0.85	26.56	526.11	499.55	2000	3	598	46.7	8.5				21
shale	130.00	130.50	1495-28	8.0	1.28	0.96	30.00	51.59	21.59	4000	3							
limestone	130.50	130.75	1495-29	9.8	0.17	0.14	4.38	25.75	21.37	940	2	313	14.7	2.2				20
shale	130.75	131.66	1495-30	9.5	0.29	0.29	9.06	189.81	180.75	1950	3	640	30.3	5.5				28
limestone	131.66	137.83	1495-31	9.7	0.21	0.21	6.56	784.71	778.15	1367	3	446	29.9	4.2				20
shale	137.83	139.00	1495-32	9.5	0.23	0.20	6.25	18.38	12.13	800	1	585	30.6	6.2				25
limestone	139.00	143.00	1495-33	9.8	0.18	0.18	5.63	840.76	835.13	1140	3	451	23.3	3.6				23
shale	143.00	148.00	1495-34	9.4	0.34	0.34	10.63	140.13	129.50	500	3	664	29.5	7.5				28
shale	148.00	153.00	1495-35	8.9	0.75	0.75	23.44	64.71	41.27	2100	1	793	27.1	4.6				37
shale	153.00	158.00	1495-36	9.2	0.66	0.66	20.63	104.27	83.64	1600	2	861	28.2	5.2				39
shale	158.00	163.00	1495-37	8.7	1.86	1.86	58.13	92.96	34.83	2300	2	904	26.9	5.2				42
shale	**163.00**	**168.00**	**1495-38**	**6.4**	**1.43**	**1.43**	**44.69**	**20.34**	**-24.35**	**4530**	**1**							
shale	168.00	173.00	1495-39	8.3	0.55	0.54	16.88	94.85	77.97	3740	2							
shale	173.00	178.00	1495-40	8.8	1.42	1.42	44.38	184.71	140.33	2600	3	898	33.4	6.6				37
limestone	178.00	178.83	1495-41	7.7	6.33	6.33	197.81	230.57	32.76	7030	3							
black shale	**178.83**	**180.00**	**1495-42**	**8.2**	**1.76**	**1.76**	**55.00**	**28.03**	**-26.97**	**4000**	**3**							
Coal-5	180.00	184.33	1069-4		3.04	1.30												
underclay	184.33	188.00	1495-43	6.7	2.53	2.25	70.31	67.84	-2.47	8850	2							

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

Summary Table of Drilling Data and Laboratory Analytical Results for Coal Core No. 104C

core drilled by United Minerals Company, LLC, on April 26, 2004
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Evansville, IN, report dated June 22, 2004 (see attached lab reports)

Stratum	From (ft.)	To (ft.)	AR Moisture (%)	AR Ash (%)	AR BTU	Total Sulfur (%)	Pyritic Sulfur (%)	MAF BTU
Coal-7	113.00	116.00	10.56	13.36	10,803	3.76	2.27	14,201
Coal-6	118.00	125.00	9.95	11.06	11,145	5.17	3.42	14,109
Coal-5	180.00	184.33	9.94	9.20	11,609	3.04	1.30	14,357

Summary Table of Laboratory Analytical Results for Coal Seams in Overburden Core OVB-1394

core drilled by United Minerals Company, LLC, on July 26, 2011
method of sampling: rotary drilling rig with core barrel and recirculating drilling fluid using standard procedures
sample material analyzed by Standard Labs, Inc., Evansville, IN, report dated March 21, 2012 (see attached lab reports)

Seam	From (ft.)	To (ft.)	AR Moisture (%)	AR Ash (%)	AR BTU	AR Sulfur	Total Sulfur (%)	Pyritic Sulfur (%)	MAF BTU
Coal-7	80.00	81.33	6.93	12.52	11,178	5.26	5.65	2.76	13,876
Coal-6	104.00	104.33	6.80	40.64	6,306	10.27	11.02	7.02	11,999
Coal-6	110.00	116.75	5.41	10.39	11,500	1.80	1.90	0.70	13,658
Coal-5	219.00	226.90	5.65	16.18	10,930	6.32	6.70	3.10	13,983

CORE SAMPLE COLLECTION AND ANALYTICAL METHODS SUMMARY

Parameter	Method
sample collection method	rotary solid cores, wrapped in plastic, boxed sequentially
paste pH	EPA-600/2-78-054 3.2.2
short prox sulfur	ASTM-D4239
total sulfur	ASTM D4239C
pyritic sulfur, sulfur forms	ASTM D2492
potential acidity	EPA-600/2-78-054 1.3.1
neutralization potential, fizz rate	EPA-600/2-78-054 3.2.3
moisture at saturation	EPA-600/2-78-054 3.2.18
Ca, Mg, Na, SAR	EPA-600/2-78-054 3.2.19
Net Neut, Fe, Mn, Al	EPA-600/2-78-054 3.2.19 mod
short prox moisture	ASTM-D3302 – D3173
short prox ash	ASTM-D3174
short prox BTU	ASTM-D5865
TDS	EPA-600/2-78-054 3.2.18 mod

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

TOXIC OR ACID-FORMING OVERBURDEN SUMMARY TABLE				
OVERBURDEN CORE 12910E (total applied core footage = 68.24)				
Description	Top Depth	Bot. Depth	Net Neut.	<-5.0 Net Neut. Thickness
shale	59.51	64.68	-25.38	5.17
shale	67.62	73.22	-13.10	5.60
Core 12910E total toxic or acid-forming interval (ft.)				10.77
OVERBURDEN CORE 12911E (total applied core footage = 70.32)				
Description	Top Depth	Bot. Depth	Net Neut.	<-5.0 Net Neut. Thickness
shale	63.45	68.60	-109.16	5.15
shale	71.27	73.71	-50.57	2.44
shale	78.67	80.15	-45.92	1.48
Core 12911E total toxic or acid-forming interval (ft.)				9.07
OVERBURDEN CORE 12912E (total applied core footage = 13.93)				
Description	Top Depth	Bot. Depth	Net Neut.	<-5.0 Net Neut. Thickness
shale	50.37	54.00	-7.32	3.63
Core 12912E total toxic or acid-forming interval (ft.)				3.63
OVERBURDEN CORE 12913E (total applied core footage = 88.02)				
Description	Top Depth	Bot. Depth	Net Neut.	<-5.0 Net Neut. Thickness
shale	68.80	73.81	-15.39	5.01
Core 12913E total toxic or acid-forming interval (ft.)				5.01
OVERBURDEN CORE OVB-1394 (total applied core footage = 193.09)				
Description	Top Depth	Bot. Depth	Net Neut.	<-5.0 Net Neut. Thickness
black shale	173.00	178.00	-47.56	5.00
Core OVB-1394 total toxic or acid-forming interval (ft.)				5.00
OVERBURDEN CORE 104C (total applied core footage = 150.00)				
Description	Top Depth	Bot. Depth	Net Neut.	<-5.0 Net Neut. Thickness
shale	110.00	113.00	-203.72	3.00
shale	127.75	128.00	-10.38	0.25
unnamed coal	128.00	128.25	127.21*	0.25
shale	128.25	129.25	-38.34	1.00
shale	163.00	168.00	-24.35	5.00
black shale	178.83	180.00	-26.97	1.17
Core 104C total toxic or acid-forming interval (ft.)				10.67
Total Applied Core Footage (all cores) = 583.76				Total <-5.0 Footage = 44.15
AVERAGE TOXIC OR ACID-FORMING OVERBURDEN = (44.15) ÷ (583.76)				
AVERAGE TOXIC OR ACID-FORMING OVERBURDEN = 7.56%				

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

OVB-1394 LAB REPORT

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

Laboratory ID	2012-331-1	2012-331-2	2012-331-3	2012-331-4	2012-331-5		
Interval, ft	17-22	22-27	27-32	32-37	37-41		
Lithology	shale	shale	shale	shale	shale		
						Units of Measure	Analyzed Tech
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)	6.4	7.7	8.0	8.0	8.3	Units	03/09/12 JKO
Sulfur, Total (ASTM D4239C)	0.15	0.16	0.10	0.11	0.12	% as detd	03/12/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.15	0.16	0.10	0.11	0.12	% as detd	03/12/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	4.69	5.00	3.13	3.44	3.75	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	0	1	1	1	2	Rating	03/09/12 JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	9.66	45.45	62.39	57.91	115.96	Ton CaCO3/T Ton	03/10/12 JKO
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	4.97	40.45	59.26	54.47	112.21	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	52	47	39	39	37	%	03/12/12 JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	880	540	890	850	585	mg/l	03/14/12 JKO
Iron (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Manganese (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Aluminum (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Calcium (EPA-600/2-78-054 3.2.19)						mg/l	
Magnesium (EPA-600/2-78-054 3.2.19)						mg/l	
Sodium (EPA-600/2-78-054 3.2.19)						mg/l	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)							Calculated

Respectfully Submitted,
Judith W. Snider

Permit ID S-00357
Attachment V.B.4
Rev Date 10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

Laboratory ID	2012-331-6	2012-331-7	2012-331-8	2012-331-9	2012-331-10		
Interval, ft	41-46	46-51	51-56	56-57	57-62		
Lithology	sandy shale	sandy shale	sandy shale	sandy shale	shale		
						Units of Measure	Analyzed Tech
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)	8.1	8.1	8.2	8.2	8.4	Units	03/09/12 JKO
Sulfur, Total (ASTM D4239C)	0.14	0.14	0.15	0.17	0.17	% as detd	03/12/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.14	0.14	0.15	0.17	0.17	% as detd	03/12/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	4.38	4.38	4.69	5.31	5.31	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	0	1	1	1	1	Rating	03/09/12 JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	29.22	47.95	44.58	47.57	47.00	Ton CaCO3/T Ton	03/10/12 JKO
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	24.84	43.57	39.89	42.26	41.69	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	44	44	40	44	46	%	03/12/12 JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	640	1015	930	1010	1360	mg/l	03/14/12 JKO
Iron (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Manganese (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Aluminum (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Calcium (EPA-600/2-78-054 3.2.19)						mg/l	
Magnesium (EPA-600/2-78-054 3.2.19)						mg/l	
Sodium (EPA-600/2-78-054 3.2.19)						mg/l	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)							Calculated

Respectfully Submitted,
Judith W. Snider

Permit ID	S-00357
Attachment	V.B.4
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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

Laboratory ID	2012-331-11	2012-331-12	2012-331-13	2012-331-14	2012-331-15			
Interval, ft	62-67	67-72	72-77	77-80	80-81.83			
Lithology	shale	shale	shale	shale	Coal-7			
						Units of Measure	Analyzed	Tech
Acid-Base Account:								
pH, Paste (EPA-600/2-78-054 3.2.2)	8.7	8.6	8.5	6.0		Units	03/09/12	JKO
Sulfur, Total (ASTM D4239C)	0.22	0.27	0.28	2.68		% as detd	03/12/12	PAJ
Sulfur, Pyritic (ASTM D2492)	0.22	0.27	0.28	1.15		% as detd	03/14/12	PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	6.88	8.44	8.75	35.94		Ton CaCO3/T Ton	Calculated	
Fizz Rate (EPA-600/2-78-054 3.2.3)	1	0	1	2		Rating	03/09/12	JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	48.75	34.96	62.25	90.40		Ton CaCO3/T Ton	03/12/12	SJH
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	41.87	26.52	53.50	54.46		Ton CaCO3/T Ton	Calculated	
Saturated Paste:								
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	47	51	60	55		%	03/12/12	JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	2467	2640	2240	5735		mg/l	03/14/12	JKO
Iron (EPA-600/2-78-054 3.2.19 mod)						mg/l		
Manganese (EPA-600/2-78-054 3.2.19 mod)						mg/l		
Aluminum (EPA-600/2-78-054 3.2.19 mod)						mg/l		
Calcium (EPA-600/2-78-054 3.2.19)	16.1	12.4	14.3			mg/l	03/20/12	SLF
Magnesium (EPA-600/2-78-054 3.2.19)	19.8	13.3	12.2			mg/l	03/20/12	SLF
Sodium (EPA-600/2-78-054 3.2.19)	543	729	612			mg/l	03/20/12	SLF
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)	21	34	29				Calculated	

Respectfully Submitted,

Judith W. Snider

Permit ID S-00357
Attachment V.B.4
Rev Date 10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

Laboratory ID	2012-331-16	2012-331-17	2012-331-18	2012-331-19	2012-331-20		
Interval, ft	81.83-87.0	87.0-92.0	92.0-97.0	97.0-102.0	102.0-104		
Lithology	sandy shale	sandy shale	sandy shale	sandy shale	sandy shale		
						Units of Measure	Analyzed Tech
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)	6.0	9.2	7.8	9.2	9.2	Units	03/09/12 JKO
Sulfur, Total (ASTM D4239C)	0.67	0.16	0.18	0.19	0.21	% as detd	03/12/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.32	0.16	0.18	0.19	0.21	% as detd	03/14/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	10.00	5.00	5.63	5.94	6.56	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	0	0	0	1	0	Rating	03/09/12 JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	20.05	29.71	15.53	61.25	21.52	Ton CaCO3/T Ton	03/10/12 JKO
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	10.05	24.71	9.90	55.31	14.96	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	60	48	55	45	62	%	03/12/12 JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	3230	2660	2230	1100	2680	mg/l	03/14/12 JKO
Iron (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Manganese (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Aluminum (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Calcium (EPA-600/2-78-054 3.2.19)		8.45		8.80	12.3	mg/l	03/20/12 SLF
Magnesium (EPA-600/2-78-054 3.2.19)		10.5		5.66	7.99	mg/l	03/20/12 SLF
Sodium (EPA-600/2-78-054 3.2.19)		421		442	591	mg/l	03/20/12 SLF
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)		23		29	32		Calculated

Respectfully Submitted,
Judith W. Snider

Permit ID	S-00357
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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Date Reported: 03/21/12

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Laboratory ID	2012-331-21	2012-331-22	2012-331-23	2012-331-24	2012-331-25		
Interval, ft	104.0-104.33	104.33-106	106.0-110.0	110.0-116.75	116.75-119.0		
Lithology	Coal-6	shale	sandstone	Coal-6	shale		
						Units of Measure	Analyzed Tech
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)		6.2	8.2		7.9	Units	
Sulfur, Total (ASTM D4239C)		0.54	0.22		0.41	% as detd	03/15/12 KBM
Sulfur, Pyritic (ASTM D2492)		0.52	0.22		0.41	% as detd	03/14/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)		16.25	6.88		12.81	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)		1	1		3	Rating	
Neutralization Potential (EPA-600/2-78-054 3.2.3)		50.63	54.13		252.17	Ton CaCO3/T Ton	
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)		34.38	47.25		239.36	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)		54	46		47	%	
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)		3300	2140		3860	mg/l	
Iron (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Manganese (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Aluminum (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Calcium (EPA-600/2-78-054 3.2.19)						mg/l	
Magnesium (EPA-600/2-78-054 3.2.19)						mg/l	
Sodium (EPA-600/2-78-054 3.2.19)						mg/l	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)							Calculated

Respectfully Submitted, Judith W. Snider

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STANDARD LABORATORIES, INC.

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UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

Laboratory ID	2012-331-26	2012-331-27	2012-331-28	2012-331-29	2012-331-30		
Interval, ft	119.0-124.0	124.0-129.0	129.0-133	133.0-135.0	135.0-140		
Lithology	limestone	shale	shale	limestone	sandstone		
						Units of Measure	Analyzed Tech
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)	8.8	7.2	8.6	8.7	9.4	Units	03/09/12 JKO
Sulfur, Total (ASTM D4239C)	0.22	0.78	0.53	0.32	<0.10	% as detd	03/15/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.22	0.72	0.52	0.32	0.06	% as detd	03/14/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	6.88	22.50	16.25	10.00	1.88	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	3	3	0	1	0	Rating	03/09/12 JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	421.12	644.72	32.89	70.50	9.17	Ton CaCO3/T Ton	03/13/12 SJN
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	414.24	622.22	16.64	60.50	7.29	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	53	46	55	55	49	%	03/14/12 JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	2480	3905	1840	1520	2650	mg/l	03/15/12 JKO
Iron (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Manganese (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Aluminum (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Calcium (EPA-600/2-78-054 3.2.19)	24.9		9.23	9.12	7.92	mg/l	03/20/12 SLF
Magnesium (EPA-600/2-78-054 3.2.19)	7.37		3.57	3.61	7.44	mg/l	03/20/12 SLF
Sodium (EPA-600/2-78-054 3.2.19)	743		727	590	376	mg/l	03/20/12 SLF
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)	34		51	42	23		Calculated

Respectfully Submitted, Judith W. Snider

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

Laboratory ID	2012-331-31	2012-331-32	2012-331-33	2012-331-34	2012-331-35		
Interval, ft	140.0-143.0	143.0-148.0	148.0-153.0	153.0-158.0	158.0-163.0		
Lithology	sandstone	sandy shale	sandy shale	sandy shale	sandy shale		
						Units of Measure	Analyzed Tech
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)	9.5	9.2	9.1	9.4	7.9	Units	03/09/12 JKO
Sulfur, Total (ASTM D4239C)	<0.10	<0.10	0.11	0.20	0.63	% as detd	03/15/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.09	0.08	0.11	0.20	0.61	% as detd	03/15/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	2.81	2.50	3.44	6.25	19.06	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	3	2	2	1	0	Rating	03/09/12 JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	218.63	82.29	63.59	85.00	32.25	Ton CaCO3/T Ton	03/13/12 SJN
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	215.82	79.79	60.15	78.75	13.19	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	39	44	37	37	46	%	03/14/12 JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	865	970	1295	1040	2405	mg/l	03/15/12 JKO
Iron (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Manganese (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Aluminum (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Calcium (EPA-600/2-78-054 3.2.19)	5.40	8.85	9.67	10.7		mg/l	03/20/12 SLF
Magnesium (EPA-600/2-78-054 3.2.19)	2.37	2.69	3.06	3.68		mg/l	03/20/12 SLF
Sodium (EPA-600/2-78-054 3.2.19)	354	426	511	426		mg/l	03/20/12 SLF
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)	32	32	37	29			Calculated

Respectfully Submitted, Judith W. Snider

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CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

Laboratory ID	2012-331-36	2012-331-37	2012-331-38	2012-331-39	2012-331-40		
Interval, ft	163.0-168.0	168.0-173.0	173.0-178.0	178.0-180	180.0-185.0		
Lithology	sandy shale	sandy shale	black shale	black shale	sandy shale		
						Units of Measure	Analyzed Tech
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)	8.2	8.3	6.5	8.7	8.5	Units	03/10/12 JKO
Sulfur, Total (ASTM D4239C)	0.82	0.74	2.24	0.57	0.50	% as detd	03/15/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.82	0.74	2.21	0.57	0.50	% as detd	03/15/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	25.63	23.13	69.06	17.81	15.63	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	2	0	1	1	1	Rating	03/10/12 JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	125.94	31.25	21.50	60.50	57.88	Ton CaCO3/T Ton	03/13/12 SJN
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	100.31	8.12	-47.56	42.69	42.25	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	36	42	36	46	39	%	03/14/12 JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	4200	2660	8335	3720	3100	mg/l	03/15/12 JKO
Iron (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Manganese (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Aluminum (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Calcium (EPA-600/2-78-054 3.2.19)				19.5	23.3	mg/l	03/20/12 SLF
Magnesium (EPA-600/2-78-054 3.2.19)				9.38	11.1	mg/l	03/20/12 SLF
Sodium (EPA-600/2-78-054 3.2.19)				1300	1160	mg/l	03/20/12 SLF
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)				61	50		Calculated

Respectfully Submitted, Judith W. Snider

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STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

Laboratory ID	2012-331-41	2012-331-42	2012-331-43	2012-331-44	2012-331-45		
Interval, ft	185.0-190	190.0-195.0	195.0-200.0	200.0-202.0	202.0-207.0		
Lithology	sandy shale	sandy shale	sandy shale	sandy shale	black shale		
						Units of Measure	Analyzed Tech
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)	7.8	7.7	8.1	8.0	8.7	Units	03/10/12 JKO
Sulfur, Total (ASTM D4239C)	0.79	0.62	0.45	0.39	0.40	% as detd	03/15/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.79	0.60	0.45	0.39	0.40	% as detd	03/15/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	24.69	18.75	14.06	12.19	12.50	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	2	1	1	0	0	Rating	03/10/12 JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	70.45	78.75	78.25	29.13	33.88	Ton CaCO3/T Ton	03/13/12 SJN
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	45.76	60.00	64.19	16.94	21.38	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	39	34	42	64	62	%	03/14/12 JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	4410	3385	2850	2060	2030	mg/l	03/15/12 JKO
Iron (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Manganese (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Aluminum (EPA-600/2-78-054 3.2.19 mod)						mg/l	
Calcium (EPA-600/2-78-054 3.2.19)				10.4	9.50	mg/l	03/20/12 SLF
Magnesium (EPA-600/2-78-054 3.2.19)				5.98	3.13	mg/l	03/20/12 SLF
Sodium (EPA-600/2-78-054 3.2.19)				713	682	mg/l	03/20/12 SLF
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)				44	49		Calculated

Respectfully Submitted, Judith W. Snider

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UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

Laboratory ID	2012-331-46	2012-331-47	2012-331-48	2012-331-49	2012-331-50		
Interval, ft	207.0-212.0	212.0-217.0	217.0-219.0	219.0-226.9	226.9-232.0		
Lithology	black shale	black shale	black shale	Coal-5	shale		
						Units of Measure	Analyzed Tech
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)	9.1	8.5	7.3		3.9	Units	03/10/12 JKO
Sulfur, Total (ASTM D4239C)	0.48	0.58	5.27		4.18	% as dstd	03/15/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.48	0.56	5.17		4.11	% as dstd	03/15/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	15.00	17.50	161.56		128.44	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	3	1	3		0	Rating	03/10/12 JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	388.82	76.38	162.73		-2.00	Ton CaCO3/T Ton	03/13/12 SJN
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	373.82	58.88	1.17		-130.44	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	57	68	55		64	%	03/14/12 JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	2380	3430	7730		8020	mg/l	03/15/12 JKO
Iron (EPA-600/2-78-054 3.2.19 mod)					485	mg/l	03/20/12 SLF
Manganese (EPA-600/2-78-054 3.2.19 mod)					36.2	mg/l	03/20/12 SLF
Aluminum (EPA-600/2-78-054 3.2.19 mod)					60.9	mg/l	03/20/12 SLF
Calcium (EPA-600/2-78-054 3.2.19)	13.0	24.7				mg/l	03/20/12 SLF
Magnesium (EPA-600/2-78-054 3.2.19)	6.96	12.4				mg/l	03/20/12 SLF
Sodium (EPA-600/2-78-054 3.2.19)	797	1170				mg/l	03/20/12 SLF
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)	44	48					Calculated

Respectfully Submitted,
Judith W. Snider

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ATTN: Robert Dyer

Area: Seven Hills
Hole Number: OVB-1394
Date Drilled: July 26, 2011
Driller: Andy Wetzel

Date Reported: 03/21/12

		Units of Measure	Analyzed	Tech
Laboratory ID	2012-331-51			
Interval, ft	232.0-234.0			
Lithology	shale			
Acid-Base Account:				
pH, Paste (EPA-600/2-78-054 3.2.2)	5.7	Units	03/10/12	JKO
Sulfur, Total (ASTM D4239C)	1.32	% as dstd	03/15/12	PAJ
Sulfur, Pyritic (ASTM D2492)	1.32	% as dstd	03/15/12	PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	41.25	Ton CaCO3/T Ton	Calculated	
Fizz Rate (EPA-600/2-78-054 3.2.3)	0	Rating	03/10/12	JKO
Neutralization Potential (EPA-600/2-78-054 3.2.3)	20.13	Ton CaCO3/T Ton	03/12/12	SJN
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	-21.12	Ton CaCO3/T Ton	Calculated	
Saturated Paste:				
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	62	%	03/14/12	JKO
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	4725	mg/l	03/15/12	JKO
Iron (EPA-600/2-78-054 3.2.19 mod)		mg/l		
Manganese (EPA-600/2-78-054 3.2.19 mod)		mg/l		
Aluminum (EPA-600/2-78-054 3.2.19 mod)		mg/l		
Calcium (EPA-600/2-78-054 3.2.19)		mg/l		
Magnesium (EPA-600/2-78-054 3.2.19)		mg/l		
Sodium (EPA-600/2-78-054 3.2.19)		mg/l		
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)			Calculated	

Respectfully Submitted, Judith W. Snider

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

OVERBURDEN CORE 104C LAB REPORT

STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

Area: Seven Hills
Hole Number: 104C

Date Received: 06/30/05
Date Reported: 08/16/05

Ground Elevation: 429

Laboratory ID	2005-1495-1	2005-1495-2	2005-1495-3	2005-1495-4	2005-1495-5			
Interval, ft	20.0-25.0	25.0-30.0	30.0-35.0	35.0-40.0	40.0-45.0			
Description	shale	shale	shale	shale	shale			
Acid-Base Account:						Measure	Date	Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	8.1	8.4	8.5	8.6	8.7	Units	See Notes	
Sulfur, Total (ASTM D4239C)	0.15	0.12	<0.10	<0.10	<0.10	% as dstd	See Notes	
Sulfur, Pyritic (ASTM D2492)	0.15	0.12	0.09	0.06	0.07	% as dstd	See Notes	
Potential Acidity (EPA-600/2-78-054 1.3.1)	4.69	3.75	2.81	1.88	2.19	Ton CaCO3/T Ton	Calculated	
Fizz Rate (EPA-600/2-78-054 3.2.3)	0	1	0	0	0	Rating	See Notes	
Neutralization Potential (EPA-600/2-78-054 3.2.3)	30.59	20.59	37.96	31.08	37.71	Ton CaCO3/T Ton	See Notes	
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	25.90	16.84	35.15	29.20	35.52	Ton CaCO3/T Ton	Calculated	
Saturated Paste:								
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	55	50	50	47	45	%	See Notes	
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	800	700	760	880	880	mg/l	See Notes	
Calcium (EPA-600/2-78-054 3.2.19)			30.4	24.0	21.0	mg/l	See Notes	
Magnesium (EPA-600/2-78-054 3.2.19)			10.7	8.9	7.8	mg/l	See Notes	
Sodium (EPA-600/2-78-054 3.2.19)			180.0	231.0	221.0	mg/l	See Notes	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)			7	10	10		Calculated	

Notes:
pH analyzed by ASS 7/19/2005
Total Sulfur analyzed by ASS, MAS, 8/8/2005
Pyritic Sulfur analyzed by CGR 7/29-8/9/2005
Fizz analyzed by ASS 7/22/2005
Neutralization Potential analyzed by ASS 6/10-7/13/2005
Moisture at Saturation analyzed by ASO, TLK 7/14-26/2005
Total Dissolved Solids analyzed by CGK, TLK 7/25-28/2005
Ca, Mg, and Na analyzed by CGR 7/30/2005

Respectfully Submitted,

FORM 421

Permit ID S-00357
Attachment V.B.4
Rev Date 10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

Area: Seven Hills
Hole Number: 104C

Date Received: 06/30/05
Date Reported: 08/16/05

Ground Elevation: 429

Laboratory ID	2005-1495-6	2005-1495-7	2005-1495-8	2005-1495-9	2005-1495-10			
Interval, ft	45.0-50.0	50.0-55.0	55.0-59.0	59.0-61.0	61.0-65.0			
Description	shale	shale	shale	sandy shale	shale			
Acid-Base Account:						Measure Units	Date	Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	8.8	8.9	8.6	8.8	9.5		See Notes	
Sulfur, Total (ASTM D4239C)	<0.10	<0.10	<0.10	0.13	<0.10	% as dstd	See Notes	
Sulfur, Pyritic (ASTM D2492)	0.06	0.08	0.07	0.13	0.06	% as dstd	See Notes	
Potential Acidity (EPA-600/2-78-054 1.3.1)	1.88	2.50	2.19	4.06	1.88	Ton CaCO3/T Ton	Calculated	
Fizz Rate (EPA-600/2-78-054 3.2.3)	0	0	0	2	3	Rating	See Notes	
Neutralization Potential (EPA-600/2-78-054 3.2.3)	28.62	35.87	30.84	125.63	214.01	Ton CaCO3/T Ton	See Notes	
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	26.74	33.37	28.65	121.57	212.13	Ton CaCO3/T Ton	Calculated	
Saturated Paste:								
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	41	44	46	39	36	%	See Notes	
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	900	500	940	960	960	mg/l	See Notes	
Calcium (EPA-600/2-78-054 3.2.19)	19.0	16.9	25.2	37.9	19.1	mg/l	See Notes	
Magnesium (EPA-600/2-78-054 3.2.19)	6.2	5.7	8.4	21.9	6.2	mg/l	See Notes	
Sodium (EPA-600/2-78-054 3.2.19)	244.0	223.0	301.0	251.0	303.0	mg/l	See Notes	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)	12	12	13	8	15		Calculated	

Notes:
pH analyzed by ASS 7/19/2005
Total Sulfur analyzed by ASS, MAS, 8/8/2005
Pyritic Sulfur analyzed by CGR 7/29-8/9/2005
Fizz analyzed by ASS 7/22/2005
Neutralization Potential analyzed by ASS 6/10-7/13/2005
Moisture at Saturation analyzed by ASG, TLK 7/14-26/2005
Total Dissolved Solids analyzed by CGR, TLK 7/25-28/2005
Ca, Mg, and Na analyzed by CGR 7/30/2005

Respectfully Submitted,

Permit ID S-00357
Attachment V.B.4
Rev Date 10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

Area: Seven Hills
Hole Number: 104C
Date Received: 06/30/05
Date Reported: 08/16/05
Ground Elevation: 429

Laboratory ID	2005-1495-11	2005-1495-12	2005-1495-13	2005-1495-14	2005-1495-15			
Interval, ft	65.0-70.0	70.0-75.0	75.0-80.0	80.0-85.0	85.0-90.0			
Description	shale	shale	shale	shale	shale			
Acid-Base Account:						Measure	Date	Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	8.8	9.0	9.2	9.0	9.1	Units	See Notes	
Sulfur, Total (ASTM D4239C)	0.10	0.12	0.13	0.18	0.11	% as dstd	See Notes	
Sulfur, Pyritic (ASTM D2492)	0.10	0.12	0.13	0.18	0.11	% as dstd	See Notes	
Potential Acidity (EPA-600/2-78-054 1.3.1)	3.13	3.75	4.06	5.63	3.44	Ton CaCO3/T Ton	Calculated	
Fizz Rate (EPA-600/2-78-054 3.2.3)	0	0	1	1	1	Rating	See Notes	
Neutralization Potential (EPA-600/2-78-054 3.2.3)	33.91	34.28	44.36	59.07	51.84	Ton CaCO3/T Ton	See Notes	
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	30.78	30.53	40.30	53.44	48.40	Ton CaCO3/T Ton	Calculated	
Saturated Paste:								
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	43	41	50	53	58	%	See Notes	
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	1780	2267	1833	1900	1450	mg/l	See Notes	
Calcium (EPA-600/2-78-054 3.2.19)	27.4	28.5	26.1	24.5	21.3	mg/l	See Notes	
Magnesium (EPA-600/2-78-054 3.2.19)	5.3	8.4	7.8	8.1	5.6	mg/l	See Notes	
Sodium (EPA-600/2-78-054 3.2.19)	544.0	545.0	516.0	535.0	390.0	mg/l	See Notes	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)	25	23	23	24	19		Calculated	

Notes:
pH analyzed by ASS 7/19/2005
Total Sulfur analyzed by ASS, MAS, 8/8/2005
Pyritic Sulfur analyzed by CGR 7/29-8/9/2005
Fizz analyzed by ASS 7/22/2005
Neutralization Potential analyzed by ASS 6/10-7/13/2005
Moisture at Saturation analyzed by ASG, TLK 7/14-26/2005
Total Dissolved Solids analyzed by CGR, TLK 7/25-28/2005
Ca, Mg, and Na analyzed by CGR 7/30/2005

Respectfully Submitted,

FORM # 21

Permit ID S-00357
Attachment V.B.4
Rev Date 10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

Area: Seven Hills
Hole Number: 104C

Date Received: 06/30/05
Date Reported: 08/16/05

Ground Elevation: 429

Laboratory ID	2005-1495-16	2005-1495-17	2005-1495-18	2005-1495-19	2005-1495-20			
Interval, ft	90.0-95.0	95.0-100.0	100.0-105.0	105.0-110.0	110.0-113.0			
Description	shale	shale	shale	shale	shale			
Acid-Base Account:						Measure	Date	Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	9.1	9.1	8.6	8.6	4.8	Units	See Notes	
Sulfur, Total (ASTM D4239C)	0.21	0.38	0.25	0.44	9.04	% as dstd	See Notes	
Sulfur, Pyritic (ASTM D2492)	0.21	0.38	0.25	0.44	6.86	% as dstd	See Notes	
Potential Acidity (EPA-600/2-78-054 1.3.1)	6.56	11.88	7.81	13.75	214.38	Ton CaCO3/T Ton	Calculated	
Fizz Rate (EPA-600/2-78-054 3.2.3)	1	1	0	1	1	Rating	See Notes	
Neutralization Potential (EPA-600/2-78-054 3.2.3)	64.95	74.88	31.82	48.65	10.66	Ton CaCO3/T Ton	See Notes	
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	58.39	63.00	24.01	34.90	-203.72	Ton CaCO3/T Ton	Calculated	
Saturated Paste:								
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	65	64	65	59	56	%	See Notes	
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	1767	2100	1300	2400	13240	mg/l	See Notes	
Calcium (EPA-600/2-78-054 3.2.19)	8.2	26.6	31.4	34.3		mg/l	See Notes	
Magnesium (EPA-600/2-78-054 3.2.19)	3.5	8.6	9.8	7.2		mg/l	See Notes	
Sodium (EPA-600/2-78-054 3.2.19)	511.0	552.0	843.0	889.0		mg/l	See Notes	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)	38	24	34	36			Calculated	
Iron (EPA-600/2-78-054 3.2.19)					1700	mg/l	See Notes	
Manganese (EPA-600/2-78-054 3.2.19)					193	mg/l	See Notes	
Aluminum (EPA-600/2-78-054 3.2.19)					0.56	mg/l	See Notes	

Notes:
pH analyzed by ASS 7/19/2005
Total Sulfur analyzed by ASS, MAS, 8/8/2005
Pyritic Sulfur analyzed by CGR 7/29-8/9/2005
Fizz analyzed by ASS 7/22/2005
Neutralization Potential analyzed by ASS 6/10-7/13/2005
Moisture at Saturation analyzed by ASG, TLK 7/14-26/2005
Total Dissolved Solids analyzed by CGR, TLK 7/25-28/2005
Ca, Mg, and Na analyzed by CGR 7/30/2005
Fe, Mn, and Al analyzed by CGR 7/30/2005

Respectfully Submitted,

FORM # 21

Permit ID S-00357
Attachment V.B.4
Rev Date 10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

Area: Seven Hills
Hole Number: 104C
Date Received: 06/30/05
Date Reported: 08/16/05
Ground Elevation: 429

Laboratory ID	2005-1495-21	2005-1495-22	2005-1495-23	2005-1495-24	2005-1495-25			
Interval, ft	116.0-118.0	125.0-127.0	127.0-127.75	127.75-128.0	128.0-128.25			
Description	shale	shale	limestone	shale	un-named coal			
Acid-Base Account:						Measure	Date	Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	6.7	6.6	8.1	6.4	7.2	Units	See Notes	
Sulfur, Total (ASTM D4239C)	1.99	7.44	1.40	5.55	2.81	% as detd	See Notes	
Sulfur, Pyritic (ASTM D2492)	1.92	6.11	1.40	5.55	1.84	% as detd	See Notes	
Potential Acidity (EPA-600/2-78-054 1.3.1)	60.00	190.94	43.75	173.44	57.50	Ton CaCO3/T Ton	Calculated	
Fizz Rate (EPA-600/2-78-054 3.2.3)	3	3	3	3	3	Rating	See Notes	
Neutralization Potential (EPA-600/2-78-054 3.2.3)	221.66	239.49	917.20	163.06	184.71	Ton CaCO3/T Ton	See Notes	
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	161.66	48.55	873.45	-10.38	127.21	Ton CaCO3/T Ton	Calculated	
Saturated Paste:								
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	66	54	28	61	77	%	See Notes	
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	5700	5550	2235	6260	3215	mg/l	See Notes	
Calcium (EPA-600/2-78-054 3.2.19)						mg/l	See Notes	
Magnesium (EPA-600/2-78-054 3.2.19)						mg/l	See Notes	
Sodium (EPA-600/2-78-054 3.2.19)						mg/l	See Notes	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)							Calculated	

Notes:
pH analyzed by ASS 7/19/2005
Total Sulfur analyzed by ASS, MAS, 8/8/2005
Pyritic Sulfur analyzed by CGR 7/29-8/9/2005
Fizz analyzed by ASS 7/22/2005
Neutralization Potential analyzed by ASS 6/10-7/13/2005
Moisture at Saturation analyzed by ASG, TLK 7/14-26/2005
Total Dissolved Solids analyzed by CGR, TLK 7/25-28/2005
Ca, Mg, and Na analyzed by CGR 7/30/2005

Respectfully Submitted,

FORM # 21

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

Area: Seven Hills
Hole Number: 104C

Date Received: 06/30/05
Date Reported: 08/16/05

Ground Elevation: 429

Laboratory ID	2005-1495-26	2005-1495-27	2005-1495-28	2005-1495-29	2005-1495-30		
Interval, ft	128.25-129.25	129.25-130.0	130.0-130.50	130.50-130.75	130.75-131.66		
Description	shale	limestone	shale	limestone	shale		
Acid-Base Account:						Measure Units	Date Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	6.3	9.5	8.0	9.8	9.5		See Notes
Sulfur, Total (ASTM D4239C)	2.75	0.85	1.28	0.17	0.29	% as detd	See Notes
Sulfur, Pyritic (ASTM D2492)	1.87	0.85	0.96	0.14	0.29	% as detd	See Notes
Potential Acidity (EPA-600/2-78-054 1.3.1)	58.44	26.56	30.00	4.38	9.06	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	2	3	3	2	3	Rating	See Notes
Neutralization Potential (EPA-600/2-78-054 3.2.3)	20.10	526.11	51.59	25.75	189.81	Ton CaCO3/T Ton	See Notes
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	-38.34	499.55	21.59	21.37	180.75	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	66	38	63	54	66	%	See Notes
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	8720	2000	4000	940	1950	mg/l	See Notes
Calcium (EPA-600/2-78-054 3.2.19)		46.7		14.7	30.3	mg/l	See Notes
Magnesium (EPA-600/2-78-054 3.2.19)		8.5		2.2	5.5	mg/l	See Notes
Sodium (EPA-600/2-78-054 3.2.19)		598.0		313.0	640.0	mg/l	See Notes
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)		21		20	28		Calculated

Notes:
pH analyzed by ASS 7/19/2005
Total Sulfur analyzed by ASS, MAS, 8/8/2005
Pyritic Sulfur analyzed by CGR 7/29-8/9/2005
Fizz analyzed by ASS 7/22/2005
Neutralization Potential analyzed by ASS 6/10-7/13/2005
Moisture at Saturation analyzed by ASG, TLK 7/14-26/2005
Total Dissolved Solids analyzed by CGR, TLK 7/25-28/2005
Ca, Mg, and Na analyzed by CGR 7/30/2005

Respectfully Submitted,

FORM # 21

Permit ID S-00357
Attachment V.B.4
Rev Date 10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

Area: Seven Hills
Hole Number: 104C
Date Received: 06/30/05
Date Reported: 08/16/05
Ground Elevation: 429

Laboratory ID	2005-1495-31	2005-1495-32	2005-1495-33	2005-1495-34	2005-1495-35			
Interval, ft	131.66-137.83	137.83-139.0	139.0-143.0	143.0-148.0	148.0-153.0			
Description	limestone	shale	limestone	shale	shale			
Acid-Base Account:						Measure	Date	Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	9.7	9.5	9.8	9.4	8.9	Units	See Notes	
Sulfur, Total (ASTM D4239C)	0.21	0.23	0.18	0.34	0.75	% as detd	See Notes	
Sulfur, Pyritic (ASTM D2492)	0.21	0.20	0.18	0.34	0.75	% as detd	See Notes	
Potential Acidity (EPA-600/2-78-054 1.3.1)	6.56	6.25	5.63	10.63	23.44	Ton CaCO3/T Ton	Calculated	
Fizz Rate (EPA-600/2-78-054 3.2.3)	3	1	3	3	1	Rating	See Notes	
Neutralization Potential (EPA-600/2-78-054 3.2.3)	784.71	18.38	840.76	140.13	64.71	Ton CaCO3/T Ton	See Notes	
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	778.15	12.13	835.13	129.50	41.27	Ton CaCO3/T Ton	Calculated	
Saturated Paste:								
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	30	93	28	56	56	%	See Notes	
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	1367	800	1140	500	2100	mg/l	See Notes	
Calcium (EPA-600/2-78-054 3.2.19)	29.9	30.6	23.3	29.5	27.1	mg/l	See Notes	
Magnesium (EPA-600/2-78-054 3.2.19)	4.2	6.2	3.6	7.5	4.6	mg/l	See Notes	
Sodium (EPA-600/2-78-054 3.2.19)	446.0	585.0	451.0	664.0	793.0	mg/l	See Notes	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)	20	25	23	28	37		Calculated	

Notes:
- pH analyzed by ASS 7/19/2005
- Total Sulfur analyzed by ASS, MAS, 8/8/2005
- Pyritic Sulfur analyzed by CGR 7/29-8/9/2005
- Fizz analyzed by ASS 7/22/2005
- Neutralization Potential analyzed by ASS 6/10-7/13/2005
- Moisture at Saturation analyzed by ASG, TLK 7/14-26/2005
- Total Dissolved Solids analyzed by CGR, TLK 7/25-28/2005
- Ca, Mg, and Na analyzed by CGR 7/30/2005

Respectfully Submitted,

FORM # 21

Permit ID S-00357
Attachment V.B.4
Rev Date 10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.
1530 North Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

Area: Seven Hills
Hole Number: 104C
Ground Elevation: 429

Date Received: 06/30/05
Date Reported: 08/16/05

Laboratory ID	2005-1495-36	2005-1495-37	2005-1495-38	2005-1495-39	2005-1495-40		
Interval, ft	153.0-158.0	158.0-163.0	163.0-168.0	168.0-173.0	173.0-178.0		
Description	shale	shale	shale	shale	shale		
Acid-Base Account:						Measure Units	Date Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	9.2	8.7	6.4	8.3	8.8		See Notes
Sulfur, Total (ASTM D4239C)	0.66	1.86	1.43	0.55	1.42	% as dstd	See Notes
Sulfur, Pyritic (ASTM D2492)	0.66	1.86	1.43	0.54	1.42	% as dstd	See Notes
Potential Acidity (EPA-600/2-78-054 1.3.1)	20.63	58.13	44.69	16.88	44.38	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	2	2	1	2	3	Rating	See Notes
Neutralization Potential (EPA-600/2-78-054 3.2.3)	104.27	92.96	20.34	94.85	184.71	Ton CaCO3/T Ton	See Notes
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	83.64	34.83	-24.35	77.97	140.33	Ton CaCO3/T Ton	Calculated
Saturated Paste:							
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	37	56	64	33	58	%	See Notes
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	1600	2300	4530	3740	2600	mg/l	See Notes
Calcium (EPA-600/2-78-054 3.2.19)	28.2	26.9			33.4	mg/l	See Notes
Magnesium (EPA-600/2-78-054 3.2.19)	5.2	5.2			6.6	mg/l	See Notes
Sodium (EPA-600/2-78-054 3.2.19)	861.0	904.0			898.0	mg/l	See Notes
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)	39	42			37		Calculated

Notes:
pH analyzed by ASS 7/19/2005
Total Sulfur analyzed by ASS, MAS, 8/8/2005
Pyritic Sulfur analyzed by CGR 7/29-8/9/2005
Fizz analyzed by ASS 7/22/2005
Neutralization Potential analyzed by ASS 6/10-7/13/2005
Moisture at Saturation analyzed by ASG, TLK 7/14-26/2005
Total Dissolved Solids analyzed by CGR, TLK 7/25-28/2005
Ca, Mg, and Na analyzed by CGR 7/30/2005

Respectfully Submitted,

FORM # 21

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

FOR:

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

Area: Seven Hills
Hole Number: 104C

Date Received: 06/30/05
Date Reported: 08/16/05

Ground Elevation: 429

Laboratory ID	2005-1495-41	2005-1495-42	2005-1495-43			
Interval, ft	178.0-178.83	178.83-180.0	184.33-188.0			
Description	limestone	black shale	underclay			
Acid-Base Account:				Measure	Date	Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	7.7	8.2	6.7	Units	See Notes	
Sulfur, Total (ASTM D4239C)	6.33	1.76	2.53	% as dstd	See Notes	
Sulfur, Pyritic (ASTM D2492)	6.33	1.76	2.25	% as dstd	See Notes	
Potential Acidity (EPA-600/2-78-054 1.3.1)	197.81	55.00	70.31	Ton CaCO3/T Ton	Calculated	
Fizz Rate (EPA-600/2-78-054 3.2.3)	3	3	2	Rating	See Notes	
Neutralization Potential (EPA-600/2-78-054 3.2.3)	230.57	28.03	67.84	Ton CaCO3/T Ton	See Notes	
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	32.76	-26.97	-2.47	Ton CaCO3/T Ton	Calculated	
Saturated Paste:						
Moisture at Saturation (EPA-600/2-78-054 3.2.18)	52	65	56	%	See Notes	
Total Dissolved Solids (EPA-600/2-78-054 3.2.18 mod)	7030	4000	8850	mg/l	See Notes	
Calcium (EPA-600/2-78-054 3.2.19)				mg/l	See Notes	
Magnesium (EPA-600/2-78-054 3.2.19)				mg/l	See Notes	
Sodium (EPA-600/2-78-054 3.2.19)				mg/l	See Notes	
SAR - Sodium Adsorption Ratio (EPA-600/2-78-054 3.2.19)					Calculated	

Notes:

pH analyzed by ASS 7/19/2005
Total Sulfur analyzed by ASS, MAS, 8/8/2005
Pyritic Sulfur analyzed by CGR 7/29-8/9/2005
Fizz analyzed by ASS 7/22/2005
Neutralization Potential analyzed by ASS 6/10-7/13/2005
Moisture at Saturation analyzed by ASG, TLK 7/14-26/2005
Total Dissolved Solids analyzed by CGR, TLK 7/25-28/2005
Ca, Mg, and Na analyzed by CGR 7/30/2005

Respectfully Submitted,

FORM # 21

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

CORE OVB-1394
COAL LAB REPORT
COAL-7

LAB NO. 2012-331-15

DATE REC'D 09/01/11

STANDARD LABORATORIES, INC.

1530 N. Cullen Avenue
Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

SAMPLE IDENTIFICATION

SEVEN HILLS
OVB 1394
80-81.83
Coal-7

DATE REPORTED: 03/21/12

	% MOISTURE	% ASH	% VOLATILE	% FIXED CARBON	BTU/LBS	% SULFUR
AS REC'D	6.93	12.52	XXXX	XXXX	11178	5.26
DRY BASIS	------	13.45	XXXX	XXXX	12010	5.65
M-A-FREE					13876	

FORMS OF SULFUR	% DRY BASIS
TOTAL	5.65
PYRITIC	2.76
SULFATE	0.52
ORGANIC	2.37

NOTE: XXXX INDICATES ANALYSIS WAS NOT PERFORMED

Respectfully Submitted

Judith W. Snider

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

CORE OVB-1394
COAL LAB REPORT
COAL-6 RIDER

STANDARD LABORATORIES, INC.

LAB NO. 2012-331-21

DATE REC'D 09/01/11

1530 N. Cullen Avenue
Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

SAMPLE IDENTIFICATION

SEVEN HILLS
OVB 1394
104.0-104.33
Coal-6

DATE REPORTED: 03/21/12

	% MOISTURE	% ASH	% VOLATILE	% FIXED CARBON	BTU/LBS	% SULFUR
AS REC'D	6.80	40.64	XXXX	XXXX	6306	10.27
DRY BASIS	------	43.61	XXXX	XXXX	6766	11.02
M-A-FREE					11999	

FORMS OF SULFUR	% DRY BASIS
TOTAL	11.02
PYRITIC	7.02
SULFATE	1.39
ORGANIC	2.61

NOTE: XXXX INDICATES ANALYSIS WAS NOT PERFORMED

Respectfully Submitted

Judith W. Snider

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

CORE OVB-1394
COAL LAB REPORT
COAL-6

STANDARD LABORATORIES, INC.

LAB NO. 2012-331-24

DATE REC'D 09/01/11

1530 N. Cullen Avenue
Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

SAMPLE IDENTIFICATION

SEVEN HILLS
OVB 1394
110.0-116.75
Coal-6

DATE REPORTED: 03/21/12

	% MOISTURE	% ASH	% VOLATILE	% FIXED CARBON	BTU/LBS	% SULFUR
AS REC'D	5.41	10.39	XXXX	XXXX	11500	1.80
DRY BASIS	------	10.98	XXXX	XXXX	12158	1.90
M-A-FREE					13658	

FORMS OF SULFUR	% DRY BASIS
TOTAL	1.90
PYRITIC	0.70
SULFATE	0.12
ORGANIC	1.08

NOTE: XXXX INDICATES ANALYSIS WAS NOT PERFORMED

Respectfully Submitted

Judith W. Snider

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

CORE OVB-1394
COAL LAB REPORT
COAL-5

STANDARD LABORATORIES, INC.

LAB NO. 2012-331-49

DATE REC'D 09/01/11

1530 N. Cullen Avenue
Evansville, IN 47715

UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400
ATTN: Robert Dyer

SAMPLE IDENTIFICATION

SEVEN HILLS
OVB 1394
219.0-226.9
Coal-5

DATE REPORTED: 03/21/12

	% MOISTURE	% ASH	% VOLATILE	% FIXED CARBON	BTU/LBS	% SULFUR
AS REC'D	5.65	16.18	XXXX	XXXX	10930	6.32
DRY BASIS	------	17.15	XXXX	XXXX	11585	6.70
M-A-FREE					13983	

FORMS OF SULFUR	% DRY BASIS
TOTAL	6.70
PYRITIC	3.10
SULFATE	0.30
ORGANIC	3.30

NOTE: XXXX INDICATES ANALYSIS WAS NOT PERFORMED

Respectfully Submitted

Judith W. Snider

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

CORE 104C
COAL LAB REPORT
COAL-7

STANDARD LABORATORIES, INC.

1530 N. Cullen Avenue, Evansville, IN 47715

SAMPLE ID:

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

ANALYSIS OF RAW COAL

Area: SEVEN HILLS
Hole Number: SHS104C
Seam: 6 UPPER (7-COAL)
Depth, feet: 113
Thickness, inches: 36

LAB NO.: 2004-1069-7
DATE REC'D: 05/14/04
DATE SAMPLED: --------
SAMPLED BY: CLIENT
DATE REPORTED: 06/22/04

PROXIMATE ANALYSIS

	(% AS RECD)	(% DRY)
MOISTURE	10.56	
ASH	13.36	14.94
VOLATILE	33.99	38.00
FIXED CARBON	42.09	47.06
SULFUR	3.36	3.76
BTU/LB	10803	12079
M-A-FREE		14201

FORMS OF SULFUR

	(% DRY BASIS)
TOTAL	3.76
PYRITIC	2.27
SULFATE	0.08
ORGANIC	1.41

Respectfully Submitted, JUDITH W. SNIDER

FORM NO. 20

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

CORE 104C
COAL LAB REPORT
COAL-6

STANDARD LABORATORIES, INC.

1530 N. Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

ANALYSIS OF RAW COAL

SAMPLE ID:

Area:	SEVEN HILLS
Hole Number:	SHS104C
Seam:	6 LOWER
Depth, feet:	118
Thickness, inches:	84

LAB NO.:	2004-1069-1
DATE REC'D:	05/14/04
DATE SAMPLED:	--------
SAMPLED BY:	CLIENT
DATE REPORTED:	06/22/04

PROXIMATE ANALYSIS

	(% AS RECD)	(% DRY)
MOISTURE	9.95	
ASH	11.06	12.28
VOLATILE	35.39	39.30
FIXED CARBON	43.60	48.42
SULFUR	4.66	5.17
BTU/LB	11145	12376
M-A-FREE		14109

FORMS OF SULFUR

	(% DRY BASIS)
TOTAL	5.17
PYRITIC	3.42
SULFATE	0.08
ORGANIC	1.67

Respectfully Submitted, JUDITH W. SNIDER

FORM NO. 20

Permit ID	S-00357
Attachment	V.B.4
Rev Date	10/03/12

CHEMICAL ANALYSES OF OVERBURDEN AND COAL

CORE 104C
COAL LAB REPORT
COAL-5

STANDARD LABORATORIES, INC.

1530 N. Cullen Avenue, Evansville, IN 47715

FOR:
UNITED MINERALS CO., LLC
P.O. BOX 400
HUNTINGBURG, IN 47542-0400

ANALYSIS OF RAW COAL

SAMPLE ID:

Area:	SEVEN HILLS
Hole Number:	SHS104C
Seam:	5
Depth, feet:	180
Thickness, inches:	52

LAB NO.:	2004-1069-4
DATE REC'D:	05/14/04
DATE SAMPLED:	--------
SAMPLED BY:	CLIENT
DATE REPORTED:	06/22/04

PROXIMATE ANALYSIS

	(% AS RECD)	(% DRY)
MOISTURE	9.94	
ASH	9.20	10.22
VOLATILE	35.53	39.45
FIXED CARBON	45.33	50.33
SULFUR	2.74	3.04
BTU/LB	11609	12890
M-A-FREE		14357

FORMS OF SULFUR

	(% DRY BASIS)
TOTAL	3.04
PYRITIC	1.30
SULFATE	0.03
ORGANIC	1.71

Respectfully Submitted, JUDITH W. SNIDER

FORM NO. 20