

Sunrise Coal, LLC  
Bulldog Mine  
Permit No. 429

# ATTACHMENT III-1

EVALUATION OF POTENTIAL GROUNDWATER  
AQUIFERS AND EXPECTED YIELD

Exhibit 1

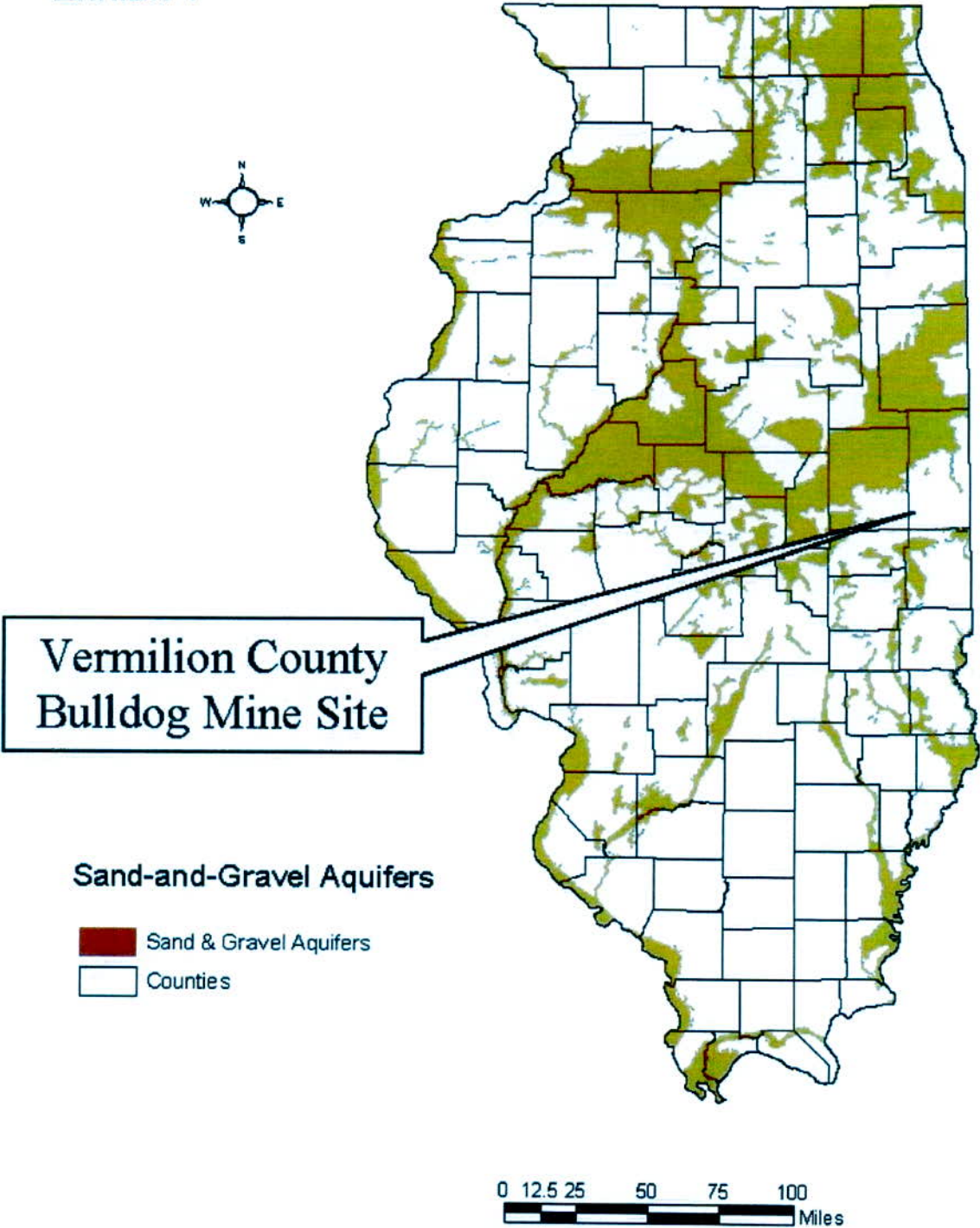


Exhibit 1. Principal sand and gravel aquifers in Illinois.

Exhibit 2

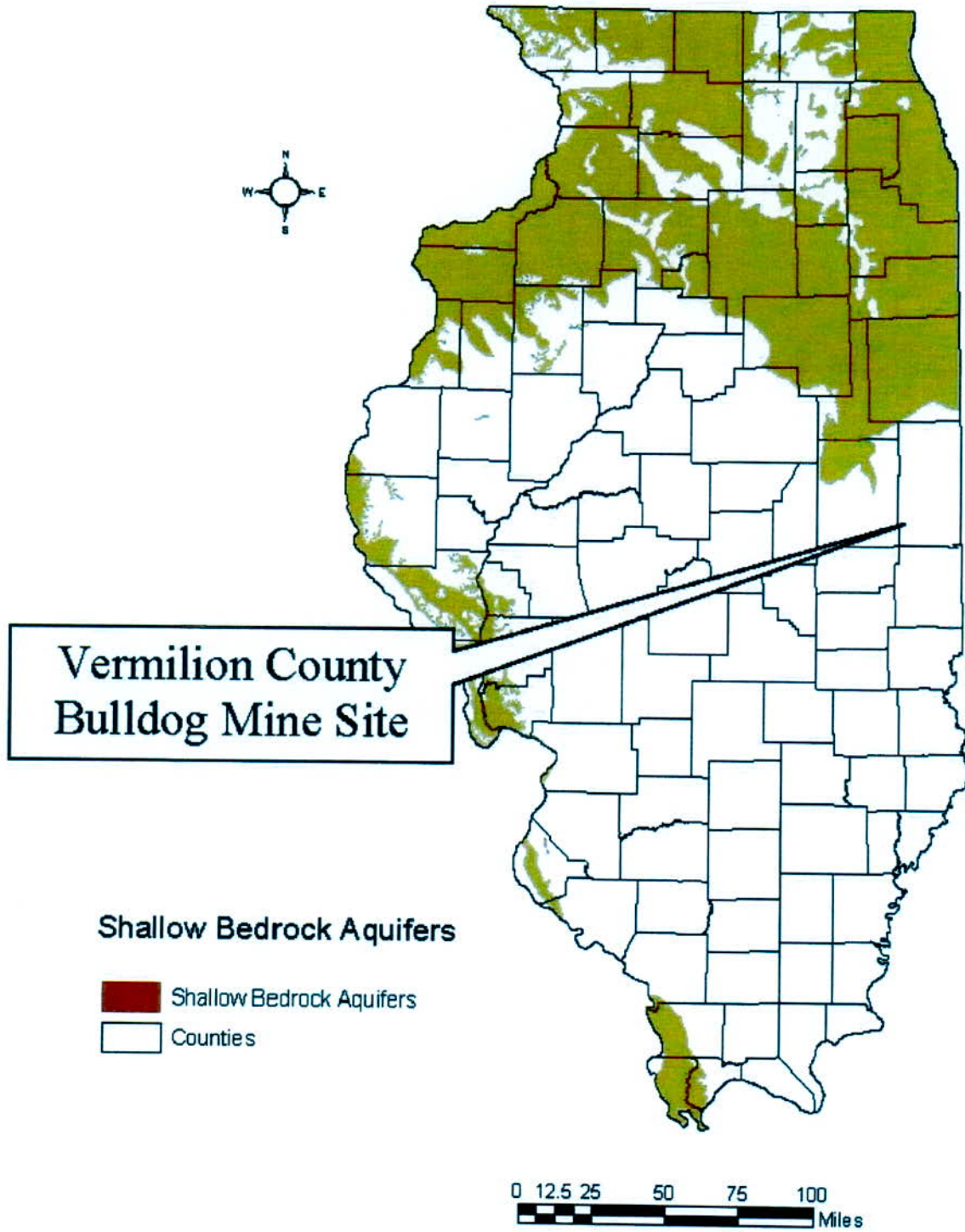


Exhibit 2. Principal shallow bedrock aquifers in Illinois.

Exhibit 3

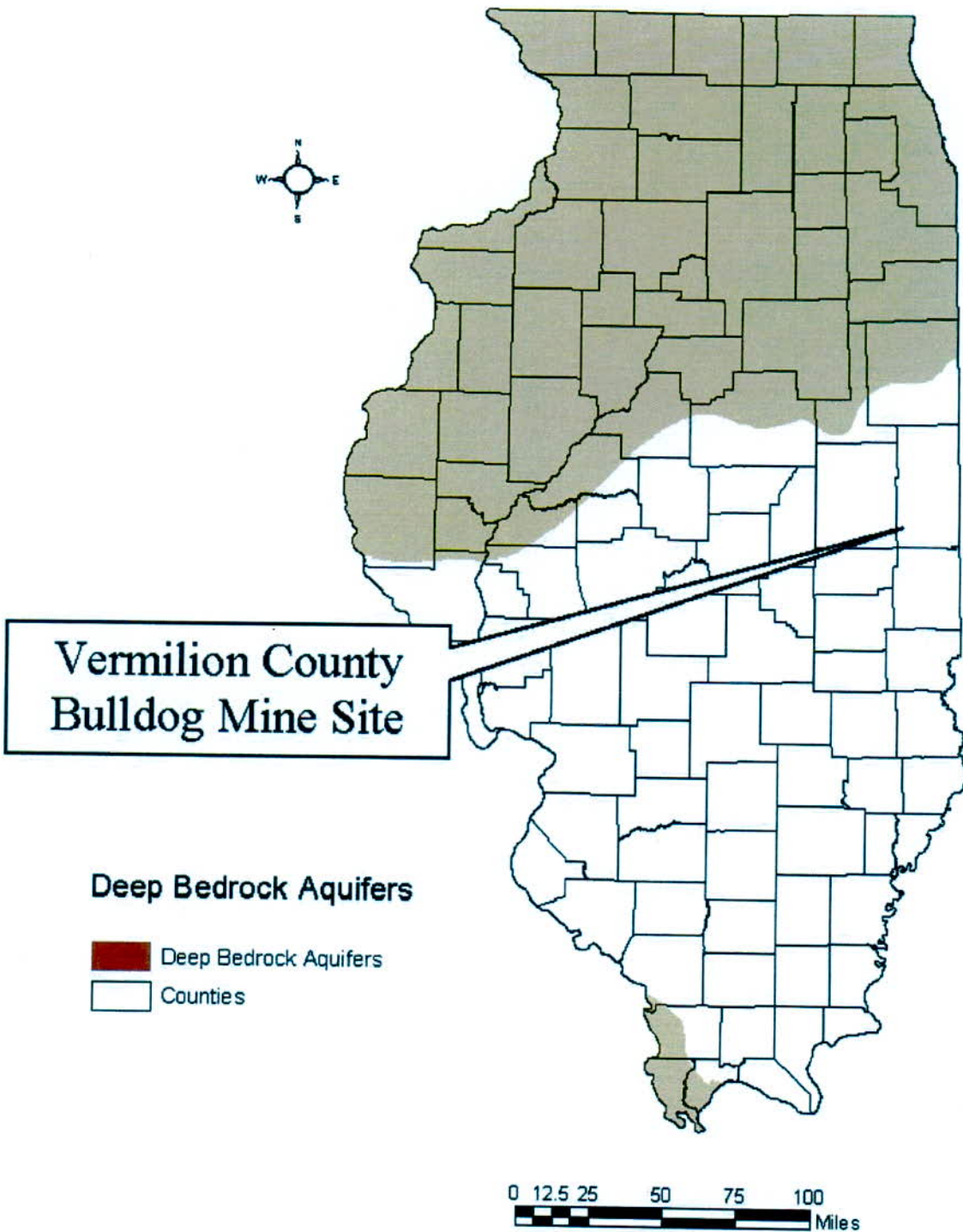


Exhibit 3. Principal deep bedrock aquifers in Illinois

Exhibit 7

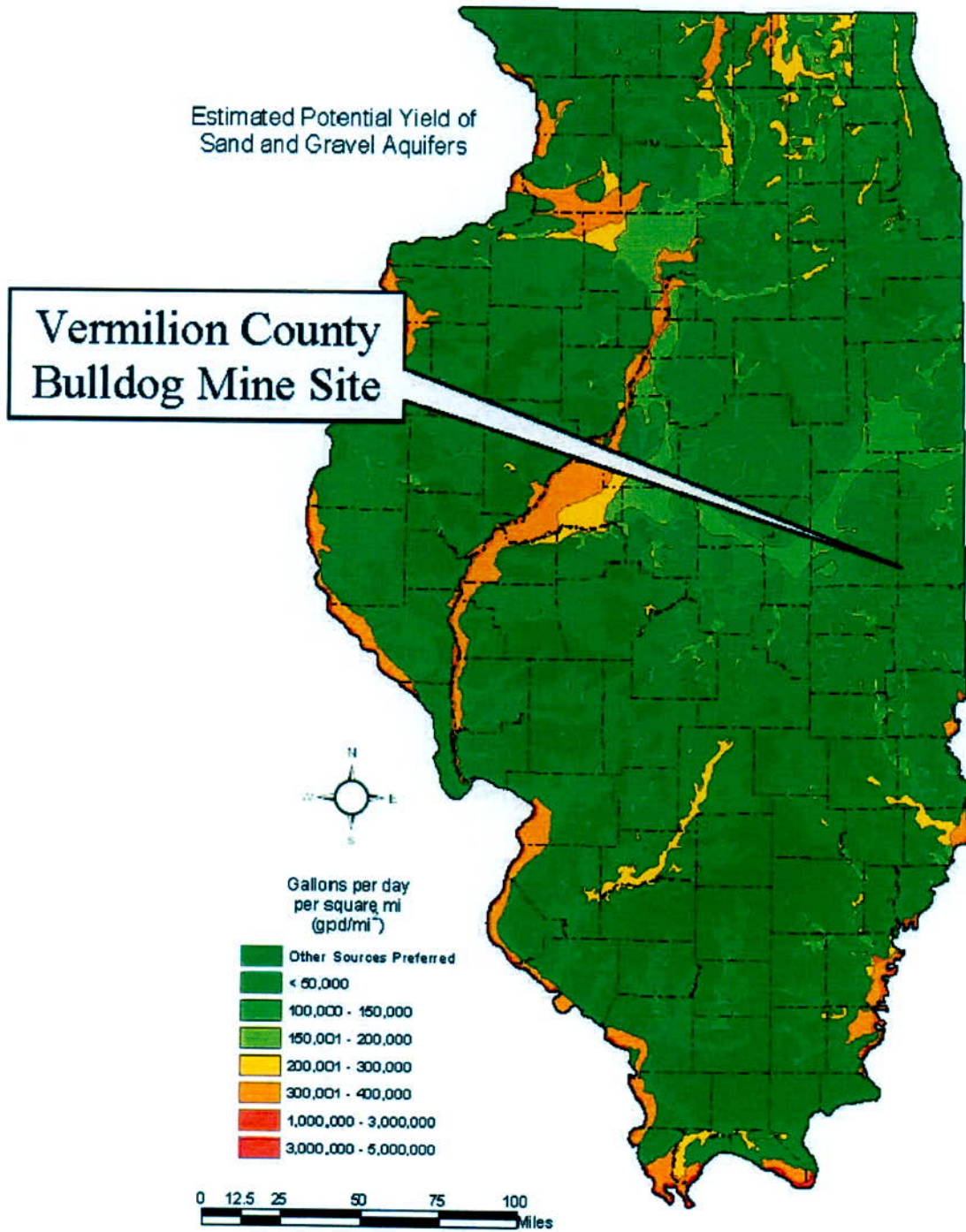


Exhibit 7. Estimated potential yield of sand and gravel aquifers in Illinois.

Exhibit 8

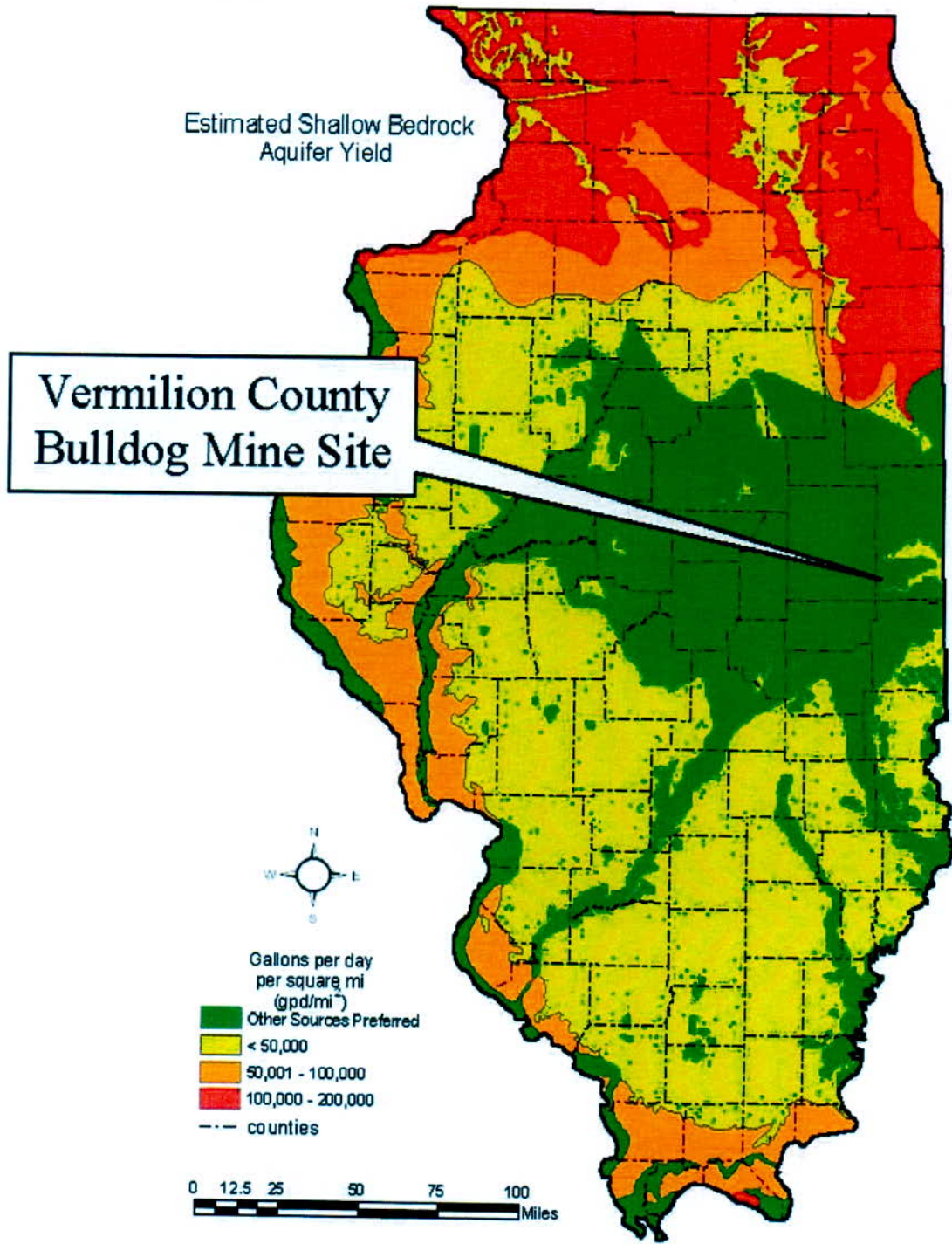


Exhibit 8. Estimated potential yield of shallow bedrock aquifers in Illinois

The following cited reference work was used to describe the surficial and bedrock aquifers in the study area, Kempton, Morse, and Visocky, 1982, Hydrogeologic Evaluation of Sand and Gravel Aquifers for Municipal Groundwater Supplies in East-Central Illinois: Illinois Department of Energy and Natural Resources, State Geological Survey Division. The study area covers nine counties, including southern Vermilion County.

### Drift Geology

The glacial sand and gravel aquifers have been identified stratigraphically and mapped in a 50- by 80-mile rectangular area of east-central Illinois as shown in Exhibit 1. The glacial drift of the study area is classified in Figure 5 of this work, and the areal distribution is shown in Figures 11 and 12.

Located within the area are several water-short communities as well as the cities of Danville, Champaign, Urbana, Decatur, Shelbyville, Mattoon, Charleston, and Paris. An evaluation of existing subsurface data indicated that only slightly more than half of the region is underlain by aquifers with a potential for yielding municipal groundwater supplies. As indicated in Figure 1, the Bulldog Mine site is surrounded by communities identified as having marginal or deficient groundwater supplies.

The principal aquifer in the east-central Illinois study area is the Mahomet Sand, a basal pre-Illinoian Banner Formation (Figure 10) aquifer partially filling the buried Mahomet Bedrock Valley located generally west of Champaign. The Mahomet Sand is more than 100 feet thick in many locations and averages just less than 10 miles wide over its approximately 30-mile length within east-central Illinois. Yields of individual wells from the aquifer are as high as 3500 gallons per minute. The Bulldog Mine site is located several miles east of the Mahomet Sand aquifer. Figure 9 of this work depicts the Banner Formation aquifers near and surrounding the Bulldog Mine Site.

The Glasford Formation (Illinoian) overlies the Banner and contains extensive sand and gravel aquifers, mainly at its base, throughout the western and northern parts of the east-central Illinois study area. Figure 6 of this work depicts the distribution of formations surrounding the study area and mine site. Although Glasford aquifers are second in significance to the Mahomet Sand, primarily because they are thinner and cover less area, the largest of these may still yield up to 1000 gallons per minute in local situations. The Bulldog Mine site is located several miles east of this aquifer. Exhibit 7 of this attachment shows a map of the estimated potential yield of sand and gravel aquifers in Illinois while Exhibit 8 shows a map of the estimated potential yield of the shallow bedrock aquifers in Illinois.

A basal Wedron Formation (Wisconsinan) aquifer has been mapped in numerous, small scattered areas. Wells at some of these locations yield up to 500 gallons per minute. Similar yields are also obtained from some areas of the surficial Henry Formation, which is present as narrow fills of the principal river valleys and a narrow, discontinuous plain just outside the margin of the Wedron Formation.

Scattered aquifers have been documented throughout the region; however, there are probably no widespread, highly productive aquifers remaining to be identified.

The Wedron Formation covers most of the area, and in southern Vermilion County, the Batestown Till member forms the surface layer, lying directly below the soil. *The Handbook Of Illinois Stratigraphy*; IGS; 1975, states that "The Batestown is 14 feet thick and consists of olive brown to dark gray, calcareous, sandy to silty till that contains beds of sand and silt and one bed of boulders." Figure 5 shows it to be "mainly till, not an aquifer." Apparently, the lower members of the Wedron are attenuated here, because the top of the Robein Silt, a stratigraphic marker showing a boundary between the Wedron and the underlying Glasford Formation, lies at an elevation of about 630 msl, or 40'-50' below the surface of

the shadow area. The depth to bedrock in the shadow area is generally 40'-50', so it appears the drift is entirely Batestown and other lower Wedron members; however, localized well data indicate well yields are significantly less than the 500 gallons per minute reported in the east-central Illinois study area for the Wedron Formation.

The east-central Illinois study area authors' state, "Although the Wedron Formation is locally more than 150 feet thick and averages about 60 feet thick, the distribution of sand and gravel aquifers is quite limited within. The principal aquifer is the Ashmore (fig. 5) situated at the base of the Wedron in scattered locations throughout the region (fig. 11)." Well yields range from less than 10 to 485 gallons per minute in Wedron deposits. Figure 12 indicates the Ashmore Aquifer is not present near the Bulldog Mine site; however, the Henry Formation occurs along the margins of streams and rivers. Figure 11 shows the Henry occurs north of the mine site along the Salt Fork, and south of the mine site along the Little Vermilion River. Communities near the mine site that obtain their municipal water supply from the Henry include Homer, Fairmount, Allerton, and Sidell. Well yields from the Henry Formation aquifers vary from 25 to 550 gallons per minute.

In summary, water quality does not differ substantially from formation to formation and is generally of good quality for public use; however, the aquifers in east-central Illinois are unevenly distributed. All major aquifers, including the Mahomet Sand, are concentrated in the western half of the 50- by 80-mile rectangular study area of east-central Illinois. Where the Bulldog Mine site is located in the eastern half of the study area, the limited size and thickness of the aquifers, separated by large areas of no aquifers, restrict current and future development of public groundwater supplies.

Locally, the Bulldog Mine is located within a hydrologic area commissioned for study by the United States Department of the Interior, U.S. Geological Survey. The following cited reference work was used to describe the surficial aquifers in the area of the Bulldog mine, Wangsness, David J., and others, 1983, Hydrology of Area 30, Eastern Region, Interior Coal Province, Illinois and Indiana: U.S. Geological Survey Water-Resources Investigations Open-File Report 82-1005.

The Illinois coal basin is part of the Eastern Coal Region of the Interior Coal Province of the United States. The Eastern Coal Region is divided into 35 separate hydrologic reporting areas. The Bulldog Mine is located in southwest Vermilion County, Illinois. This portion of Vermilion County is located in the northern part of Hydrology Area 30.

The physiography of Hydrology Area 30 is characterized by lowland plains, except for small upland areas in the south and east of Area 30. Average elevations range from 400 feet above mean sea level (msl) in the south to 800 feet msl in the north.

At least three glaciers (the Kansan, Illinoian, and Wisconsin) advanced into Illinois and neighboring states during the Pleistocene Epoch. All of Area 30 was glaciated and covered with drift. Three physiographic regions in Area 30 are described by Walton (1965, p. 48-49): (1) the Bloomington Ridged Plain, (2) the Springfield Plain, and (3) the Mt. Vernon Hill Country. Bulldog Mine is located in the Bloomington Ridged Plain.

The Bloomington Ridged Plain in Illinois is a depositional plain of low relief underlain by thick till and modified only slightly by postglacial stream erosion. The plain is nearly flat to gently rolling and crossed by several low and poorly developed end moraines. The flatness of the plain is broken by low eskers, esker troughs, and melt water drainways that trend southeast.

The major rivers draining Area 30 are the Vermilion to the north and east, Embarrass to the west and south, and Wabash to the east. The Vermilion and Embarrass rivers are tributary to the Wabash River, which is tributary to the Ohio River.

The three glacial advances during the Pleistocene Epoch buried most of the bedrock surface under drift (Wayne, 1958). The first glacial advance into the area was the Kansan, followed by the Illinoian and then the Wisconsin. Each advance was followed by a warm interglacial period of plant growth, weathering, and erosion.

Wisconsin drift is the uppermost deposit in the northern two-thirds of Area 30, where glacial features shape the landscape. Thickness of the drift ranges from about 50 to 400 feet (Frye and Willman, 1975, p. 213). Deposits since the Wisconsin Glaciation have been assigned to the Holocene Epoch (Frye and Willman, 1975, p 230). They include alluvium, colluvium, sand dunes, and lake sediments that are primarily reworked and redistributed glacial deposits.

Sand and gravel units in the alluvial and glacial deposits are the predominant aquifers in Area 30. Alluvial deposits are associated with the Wabash and the Embarrass River valleys. Glacial deposits are widely dispersed. The most common glacial deposit is till, consisting of clay, silt, sand, and gravel. The sand and gravel units within the till generally form thin, discontinuous aquifers.

Yields from surficial sand and gravel aquifers are generally highest in the alluvial and outwash deposits along the Wabash and Embarras Rivers. These yields range from 5 to 3,000 gallons per minute. However, the Bulldog Mine permit area is located approximately 22 miles northeast of the Embarrass River and 25 miles west of the Wabash River alluvial and outwash deposits. The drift deposits generally provide the greatest yield in the area of the Bulldog Mine. The yield in this area ranges from 10 to 200 gallons per minute. The aquifers discharge by seepage into streams, evapotranspiration, springs, and pumping. The annual seepage rate during periods of normal precipitation is about 0.40 cubic foot per second per square mile of drainage area, or less.

Based on the discussion above, and information received from respondents to the water usage survey included in *Attachment III-2B1b*, it is apparent that the surficial aquifers in the area of the Bulldog Mine are generally the most reliable source of rural water for domestic usage. However, the limited quantity of groundwater available in the area generally restricts its usage to rural households and farmsteads. As evidenced by the water-short communities in the area, and the number of wells required to supply water to the less populated communities, it is believed that the limited surficial groundwater supplies are marginally sufficient to sustain widespread municipal water usage.

### Bedrock Geology

The bedrock formations in east-central Illinois (fig. 2) consist of a succession of sedimentary rocks several thousand feet thick, including sandstone, limestone, dolomite, shale, and coals. The sedimentary rocks were warped and tilted to form the Illinois Basin centered in southeastern Illinois and an arch-like structure, the La Salle Anticlinal Belt, which trends north-south through the approximate center of the east-central Illinois study area. Exhibits 2-3 depict the Principle Shallow and Principle Deep Bedrock Aquifers of Illinois, respectively.

Whereas the older, generally deeper rocks of east-central Illinois are, for the most part, composed of limestone, dolomite, and sandstone (frequently water yielding), the younger rocks that are at or within a few hundred feet of the bedrock surface are composed largely of nonwater-yielding shale interbedded

with a few, relatively thin layers of sandstone, limestone and coal. In addition, below depths of 200 to 400 feet, the water is generally too highly mineralized to be of use, both in the younger and older rocks. Therefore, groundwater resources are extremely limited in the shallow bedrock and normally available only in small quantities where permeable sandstone or fractured limestone is encountered.

The lack of any reliable bedrock aquifers is further substantiated by the absence of bedrock wells near the Bulldog Mine site. A review of the Illinois State Geological Survey website and responses received from local residents regarding groundwater well usage indicates there are no bedrock water wells located within the shadow area or within one-half mile of the shadow area. When one considers that surficial drift aquifers in the area are sporadic and yield only marginally adequate groundwater quantities it is reasonable to assume that reliable bedrock aquifers are either nonexistent or their existence is extremely limited in the east-central Illinois region.

#### References

- Frye, J. C., and Willman, H. B., 1975, Quaternary system, *in* Willman, H. B., and others, Handbook of Illinois stratigraphy: Illinois State Geological Survey Bulletin 95, p. 211-239.
- Kempton, Morse, and Visocky, 1982, Hydrogeologic Evaluation of Sand and Gravel Aquifers for Municipal Groundwater Supplies in East-Central Illinois: Illinois Department of Energy and Natural Resources, State Geological Survey Division.
- Walton, W. C., 1965, Ground-water recharge and runoff in Illinois: Illinois State Water Survey Report of Investigation 48, 55 p.
- Wangness, David J., and others, 1983, Hydrology of Area 30, Eastern Region, Interior Coal Province, Illinois and Indiana: U.S. Geological Survey Water-Resources Investigations Open-File Report 82-1005, 82 p.
- Wayne, W. J., 1958, Glacial geology of Indiana: Indiana Department of Conservation, Glacial Geology Map, scale: 1:1,000,000.

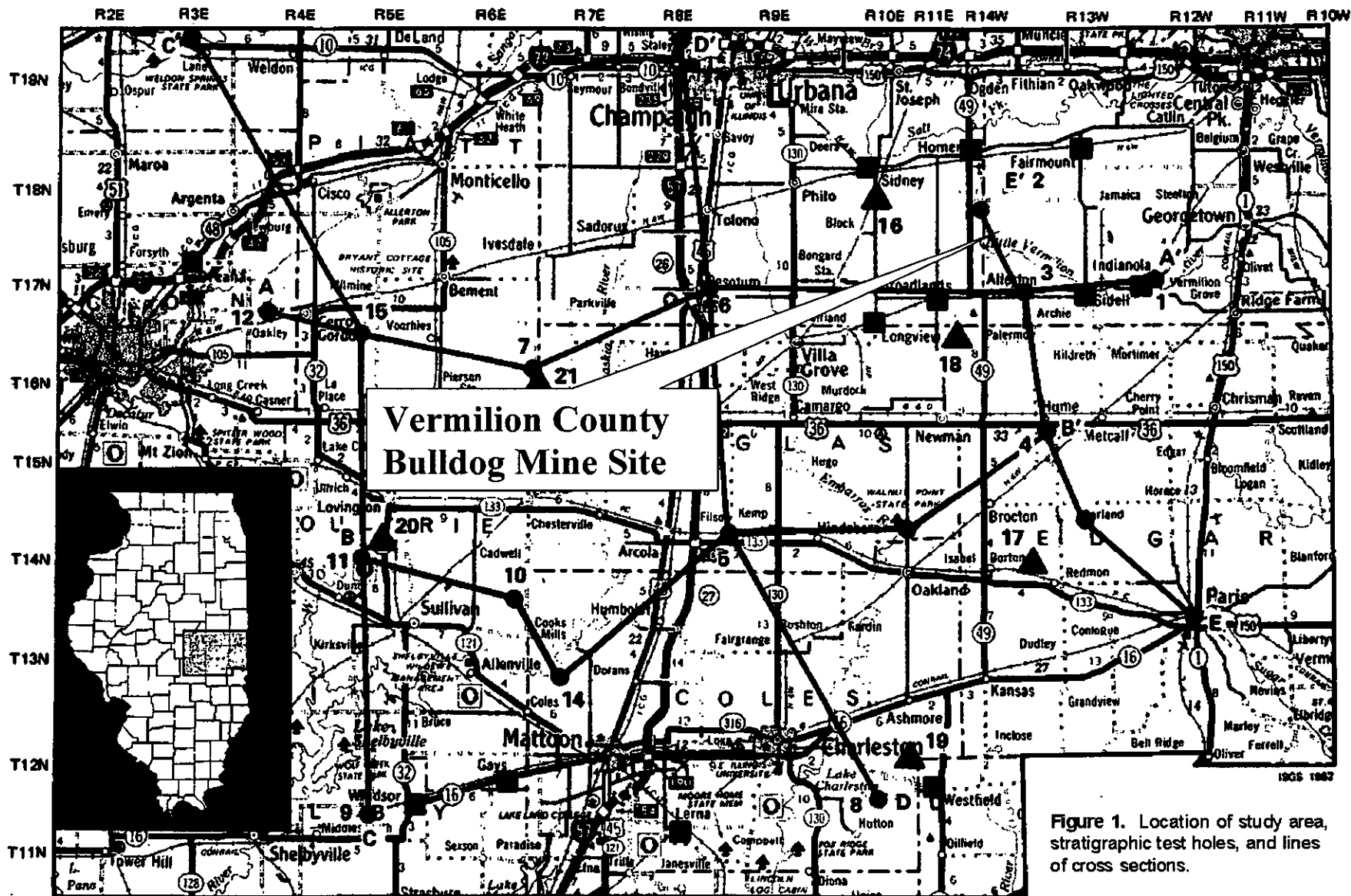


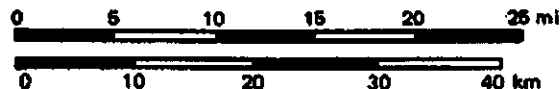
Figure 1. Location of study area, stratigraphic test holes, and lines of cross sections.

Stratigraphic tests

Communities identified as having marginal or deficient groundwater supplies.

▲ Test wells

A-A' Line of cross section



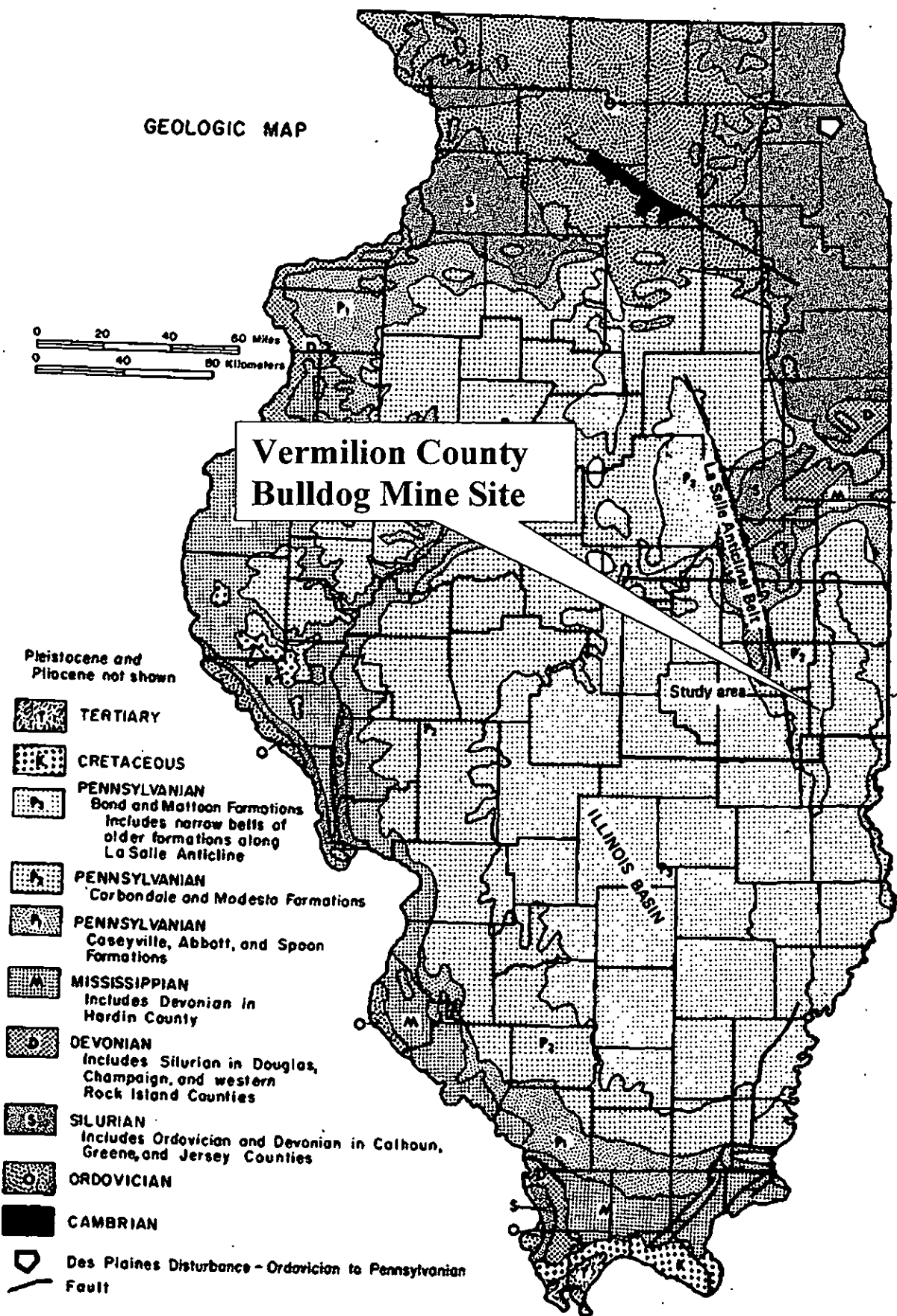


Figure 2. Bedrock geologic map of Illinois showing area of study, Illinois Basin, and La Salle Anticlinical Belt axis (modified from Willman and Frye, 1970).

Time Stratigraphy		Rock Stratigraphy		Material	
System, Series, Stage, Substage		Formation, Member		Potential as aquifer	
Quaternary System	Holocene Stage			Mostly fine-textured, some sand and gravel locally, not a source of large ground-water supplies	
		Wisconsinan Stage	Velderan Substage		Cahokia Alluvium
	Two-creekan Substage				
	Woodfordian Substage		Richland Loess		Clayey silt NA
			Henry Formation	Batestown Till Member	Mainly till NA
				Piatt Till Member	Till, some sand and gravel, very locally small municipal supplies
				Fairgrange Till Member	Mainly till NA
				Oakland Till Member	Small municipal supplies locally
	Ashmore Aquifer				
	Wedron Formation		Morton Loess	Silt NA	
	Farmchalian Substage		Robein Silt	Silt, organic silt NA	
	Altonian Substage	Roxana Silt	Silt, clayey silt NA		
	Sangamonian Stage	Berry Clay Member		Weathering, erosion Clay, silty clay NA	
	Illinoian Stage	Giasford Formation	Radnor Till Member	Till, local sand and gravel; basal sand and gravel local aquifer	
			Roby Silt M.		
			Vandalle Till Member	Till; basal sand and gravel aquifer locally significant	
			Hulick Till Member	Mainly till NA	
			Mulberry Grove Member	Mainly silt, some local sand and gravel	
	Linen Substage	Smithboro Till Member	Mainly till NA		
	Yarmouthian Stage	Lierle Clay Member		Weathering, erosion Organic silt, silty clay NA	
Pre-Illinoian	Barmer Formation	Tilton Till Member	Till, some basal sand and gravel local aquifer potential		
		Hillery Till Member	Mainly till NA		
		Hermattan Till Member	Till, basal sand and gravel a significant aquifer		
		Mahomet Sand Member	Undifferentiated till, silt and sand mainly in buried bedrock valleys	NA	
		Undifferentiated older deposits	NA		

NA - Not an aquifer

ISGS 1002

Figure 5. Stratigraphy of glacial and related deposits and their potential as aquifers.

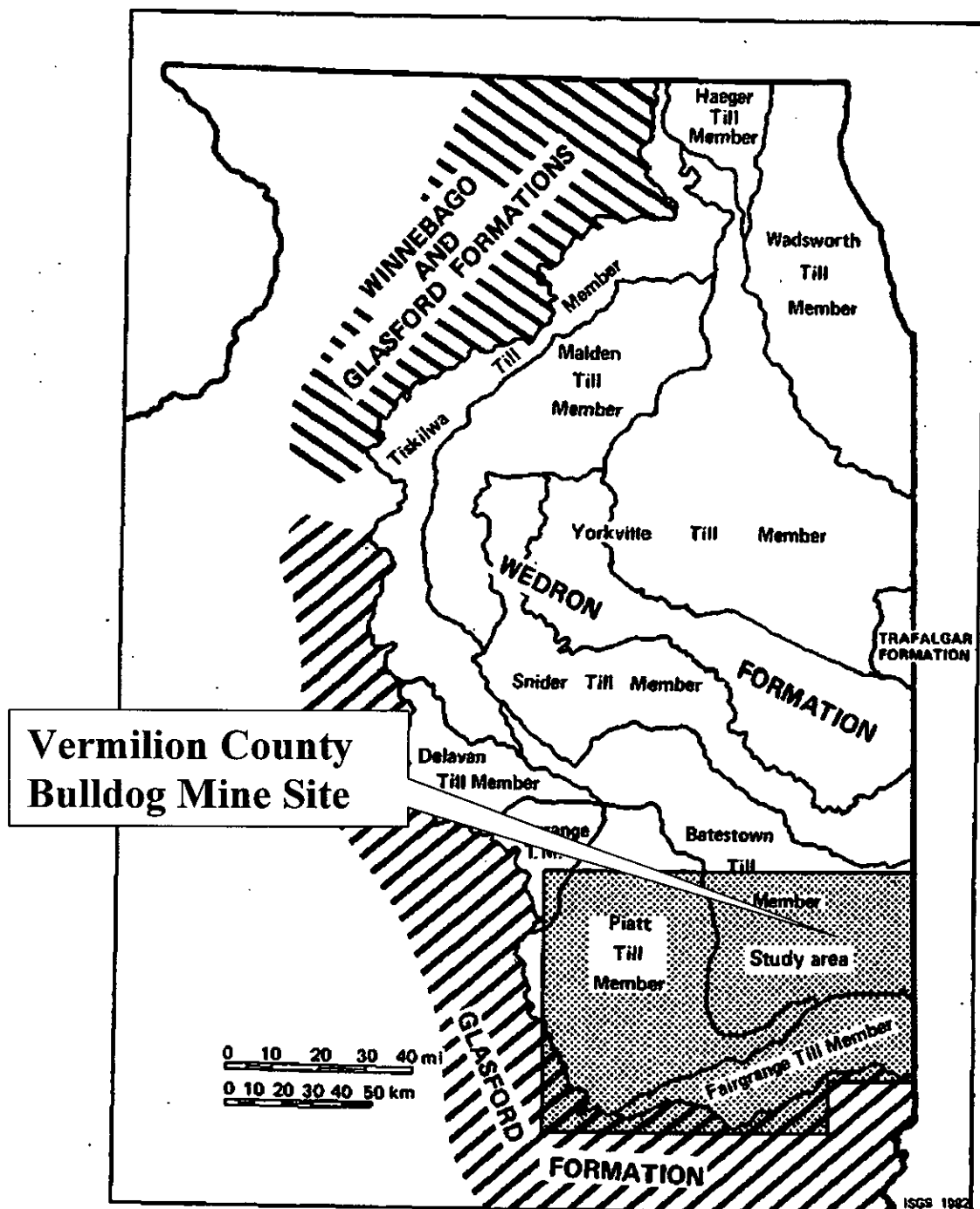


Figure 6. Areal distribution of the surficial till formations and members of Illinois (after Lineback, 1979).

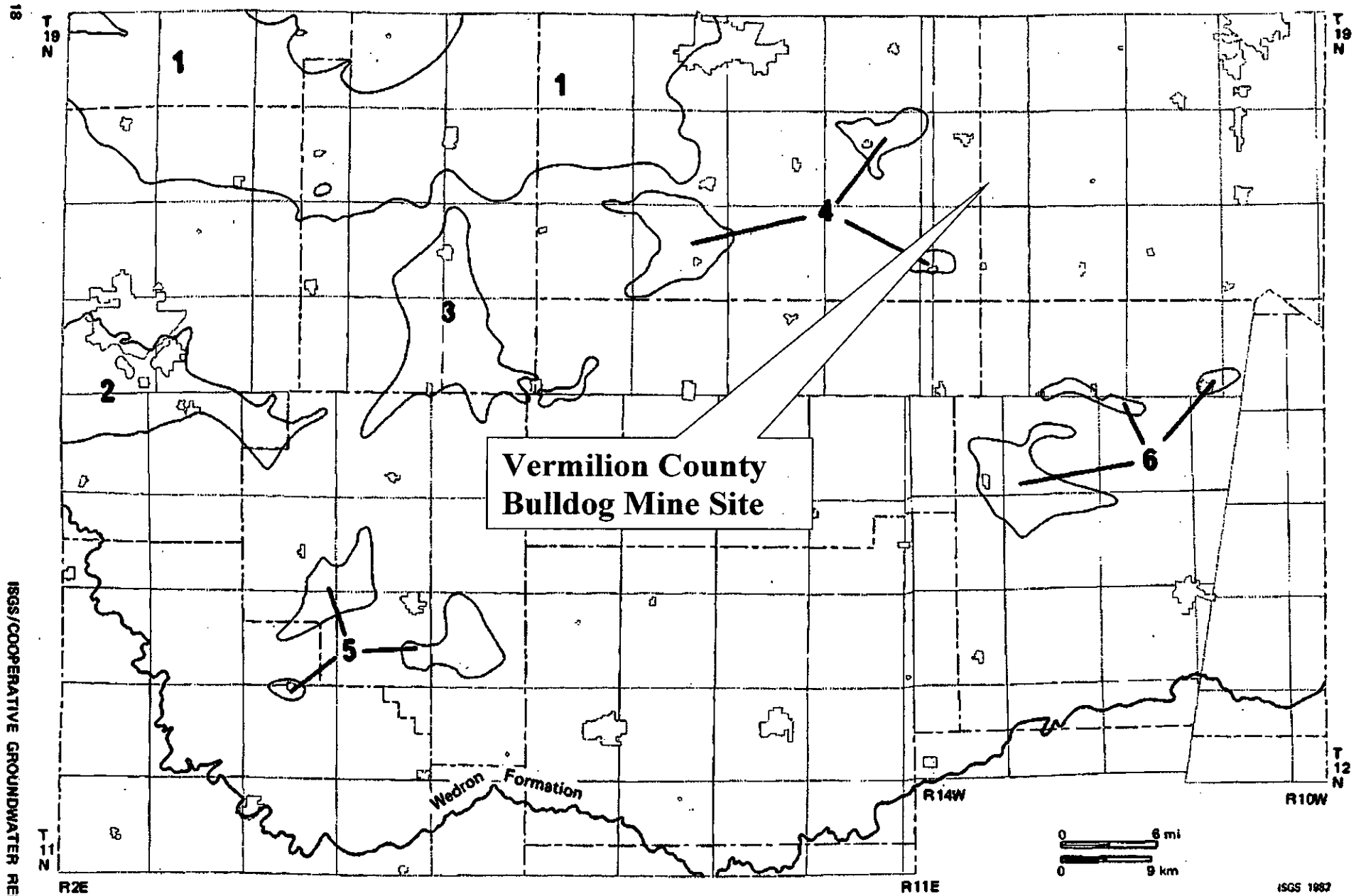


Figure 9. Banner Formation aquifers.

SAND AND GRAVEL AQUIFERS IN EAST-CENTRAL ILLINOIS

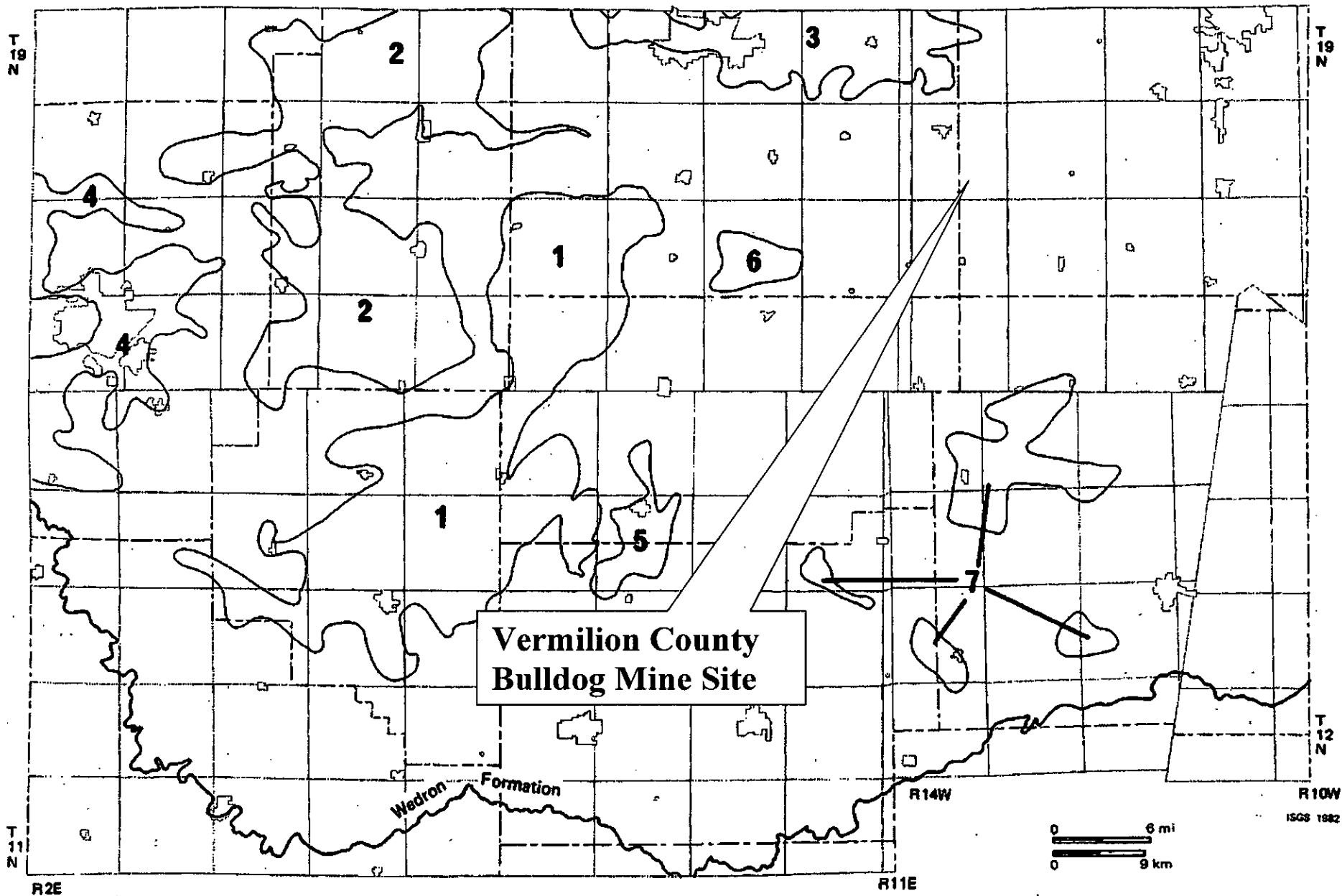


Figure 10. Glasford Formation aquifers.

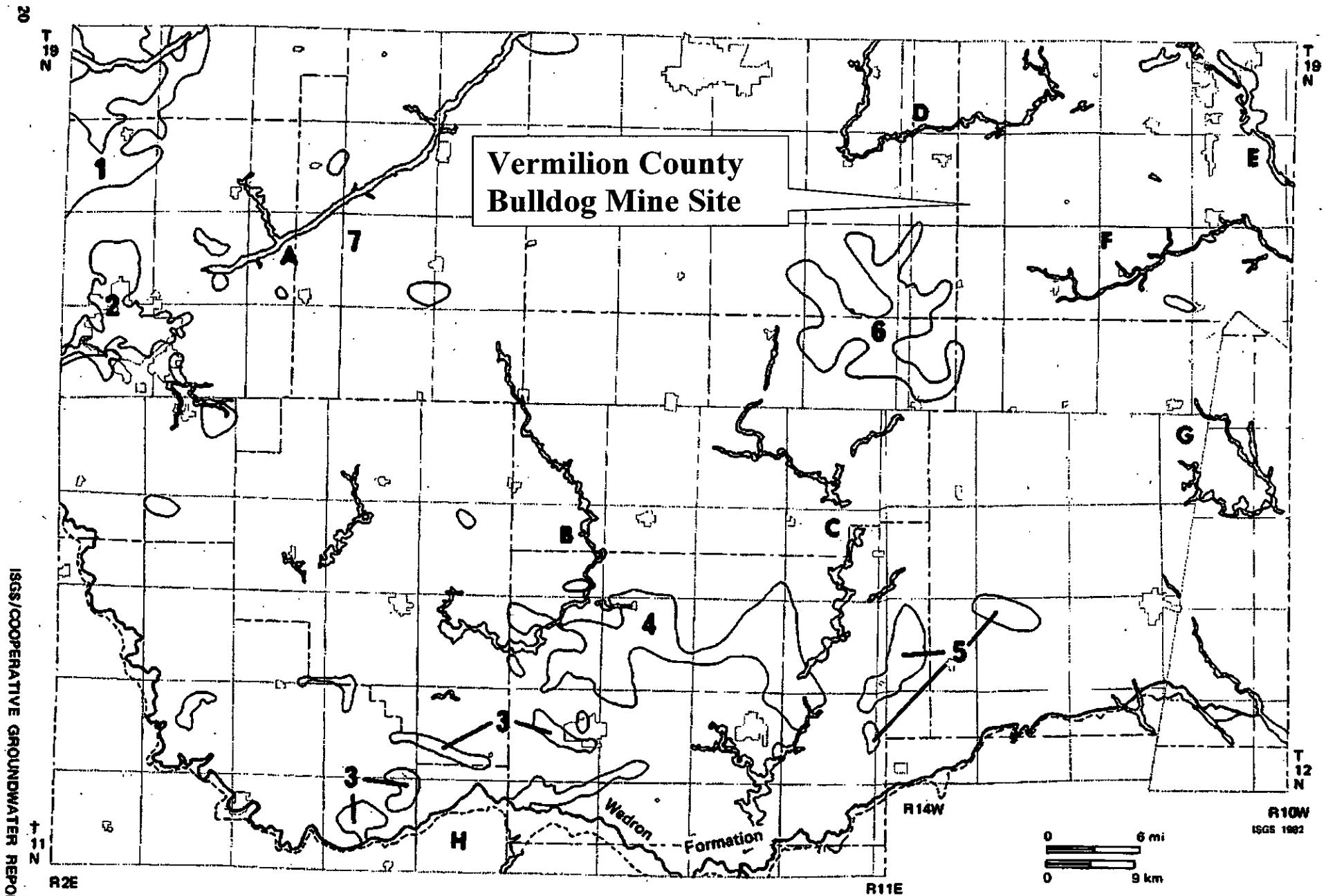


Figure 11. Aquifers in the Wedron Formation (map areas 1-7) and the Henry Formation (map areas A-H).

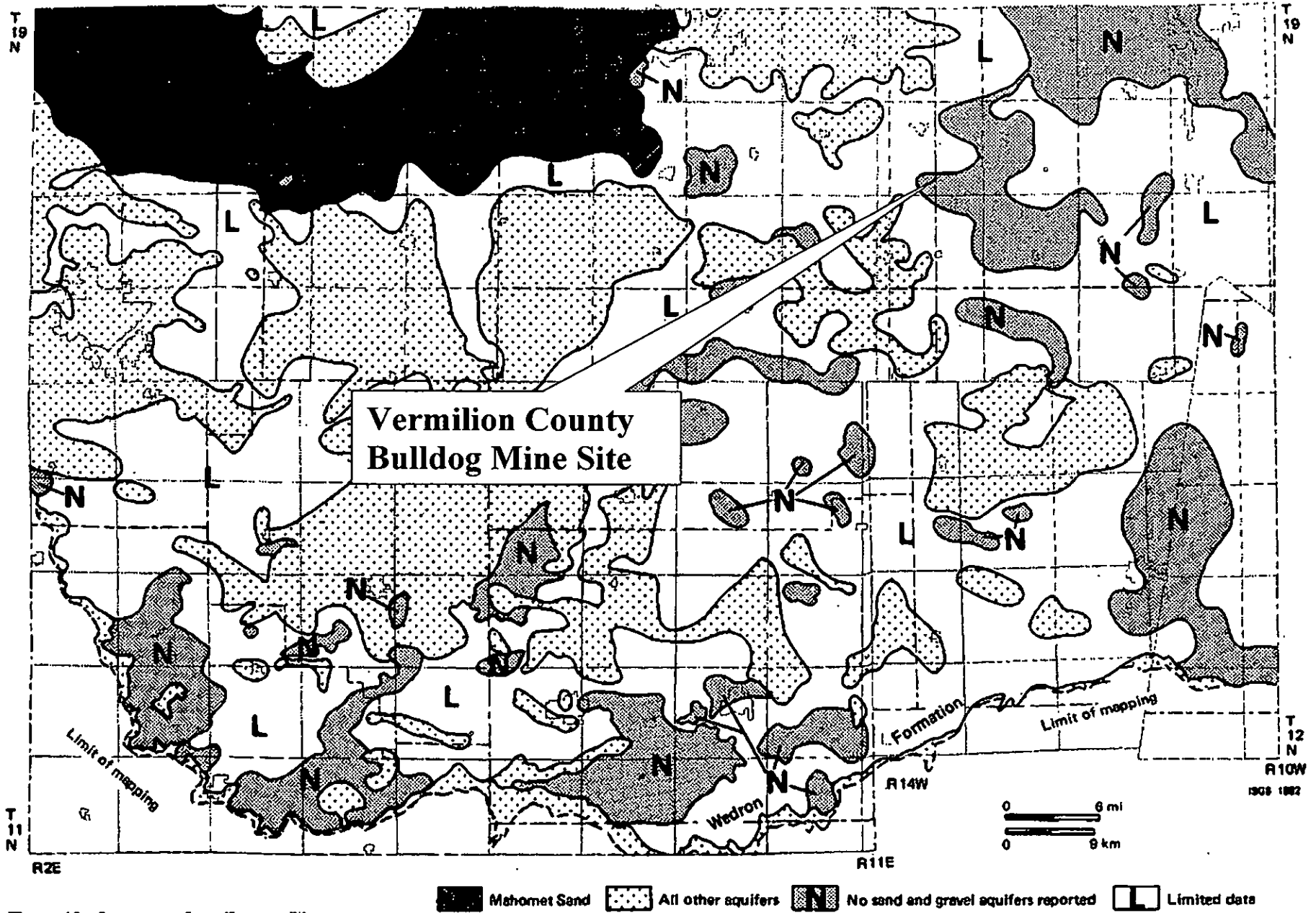


Figure 12. Summary of aquifer conditions.

Sunrise Coal, LLC  
Bulldog Mine  
Permit No. 429

# ATTACHMENT III-2A1

ANALYTICAL DATA COLLECTION DOCUMENTATION  
AND  
BORING LOGS USED TO  
CHARACTERIZE OVERBURDEN MATERIAL  
AND  
DEVELOP CROSS SECTIONS



***PATRIOT ENGINEERING  
and Environmental, Inc.***

*Engineering Value for Project Success  
Consulting Environmental, Geotechnical  
and Materials Engineers*

To: Mr. Stewart Boyd/Sunrise Coal, LLC

From: Tim Govert/Patriot Engineering

Date: June 5, 2014

Re: Technical Data Used In Application for Bulldog Mine

In response to the requirements of IDNR Reg 62 Ill. Adm. Code 1777.13(a) we offer the following as it pertains to our services provided for the mine permit application.

Our sampling, testing and evaluations performed during the preparation of the Geotechnical report and addenda have been conducted using personnel employed by Patriot Engineering and Environmental, Inc. (Patriot), with the sole exception being the drilling efforts, which were performed by Hoosier Drilling Contractors under direct contract with Patriot. Laboratory and field sampling and testing were performed using applicable ASTM Standards and during the time periods referenced on the various laboratory test reports and in our report narratives.

The following list provides the names and applicable functions of Patriot and Hoosier Drilling personnel that have serviced this project:














**Patriot Engineering Personnel:**

<b>Name</b>	<b>Title</b>	<b>General Functions</b>
William D. Dubois, PE	Senior Project Engineer	Report Review, Senior Geotechnical consultation
Salim Ilmudeen, PE	Senior Project Engineer	Geotechnical Data Review, Geotechnical Calculation, Slope Stability Analysis, Report generation
Timothy C. Govert	Senior Project Manager	Project Management, Field supervision of drill crews, sampling, Boring log development, Client meetings,
Brian Swenty PhD, PE	Senior Project Engineer	Hydrologic and Hydraulic Analysis
John Phillips	Operations Manager/Lab Manager	Laboratory coordination & Testing
Sean Smith, PE	Senior Project Manager	Geotechnical Data Review, Geotechnical Calculation, Geotechnical staff management
Eric Wenz, EI	Staff Engineer	Slope Stability & Seismic data input & calculation, CAD preparation, general engineer assistance
Sara Vaught	Geotechnical Lab Technician	Laboratory testing
Samantha Wilmann	Staff Engineer	Slope Stability & Seismic data input & calculation, CAD preparation, general engineer assistance
Ronal Price	Geophysical Technician	Slug Testing
John Marks	Geologist	Slug Testing
Brandon Sherfield	Environmental Technician	Slug Testing
Tyler Smith	Geotechnical Lab Technician	Laboratory testing
Lisa Atchison	Geotechnical Admin Assistant	Boring Log Generation; general administrative assistance
Rachel M. Elliott	Geotechnical Lab Technician	Laboratory testing

**Hoosier Drilling Personnel:**

Gary Taylor	Driller	Drilling Soil Borings; well installation; develop field logs
Joe Sizemore	Driller Assistant	Drilling activities; collect samples from split spoons
Jeremy Bush	Driller Assistant	Drilling activities; collect samples from split spoons

UNCONSOLIDATED OVERBURDEN  
BORING LOGS FOR  
LITHOLOGICAL CROSS SECTION A-A'

 <b>PATRIOT ENGINEERING</b> and Environmental Inc. Indianapolis, Terre Haute, Evansville, Fort Wayne, Lafayette, Louisville KY, Dayton OH, Nashville TN		<b>LOG OF BORING B-8</b>  (Page 1 of 1)										
<b>Allerton Mine</b> Homer - Allerton, Illinois		Client Name : Sunriss Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/9/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Cloudy, 55F Latitude : 39.9873230 Longitude : -87.9169591								
Depth in Feet	Surf. Elev. 674.8	Water Level	USCS	GRAPHIC	Water Levels		Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					▼ During Drilling: Dry ▼ After Completion: 10-ft (corewater)	DESCRIPTION						
0	674		OL		Dark Brown, moist, very stiff ORGANIC CLAY	1	67	3/4/3	3.0			
			OH		Dark Brown, moist, stiff CLAY with trace organics	2	100	5/5/8	4.25			
5	669		CL		Gray, dry, hard SANDY SILTY CLAY	3	56	2/3/3	2.25			
			CL		Gray, Tan & Brown mottled, moist, very stiff SANDY SILTY CLAY	4	100	5/4/5	1.75			
10	664		CL		Gray, moist, stiff to very stiff SILTY SANDY CLAY with trace small gravel	5	87	5/7/10	3.75			
15	659		CL		Gray, slightly moist, hard SANDY SILTY CLAY with some gravel (GLACIAL TILL)	6	100	10/11/12	>4.5			
20	654		CL			7	78	8/9/10	>4.5			
25	649		CL			8	100	10/10/13	>4.5			
30	644		CL			9	5	50-1'	>4.5			Borehole collapsed to 33-feet after auger removal.
35	639		SH		Light Gray, CALCAREOUS SHALE							
40	634		SH		Dark Gray, WEATHERED SHALE							RQD=80%
			LS		Light Gray, SHALEY LIMESTONE	10						
45	629											
50					Boring terminated at 48-ft.							



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville, Fort Wayne,  
Lafayette, Louisville KY, Dayton OH, Nashville TN

# LOG OF BORING B-11

(Page 1 of 2)

**Allerton Mine**  
**Homer - Allerton, Illinois**

Client Name : Sunrisa Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/7/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Cloudy, rain, 50F  
Latitude : 39.9857540  
Longitude : -87.9149610

Depth in Feet	Surf. Elev. 676.3	Water Level	USCS	GRAPHIC	Water Levels					REMARKS
					▼ During Drilling: 19-ft ▼ After Completion: 15-ft (corewater)					
DESCRIPTION					Samples	Rec %	SPT Results	Qp tsf	w %	
0	676		OL		Dark Brown, moist, very stiff ORGANIC CLAY (8")	1	100	3/4/5	3.75	
			CL		Brownish Gray, moist, very stiff SILTY CLAY with trace sand	2	100	5/5/6		
5	671		SC		Light Brown, slightly moist, medium dense, fine to medium SILTY CLAYEY SAND	3	100	5/6/8	2.75	
			CL		Grayish Brown, moist, very stiff SANDY SILTY CLAY	4	100	5/6/7	3.75	
10	666		CL		Brown, moist, very stiff SILTY CLAY with trace sand	5	78	15/16/19	>4.5	
15	661				Brownish Gray, dry, hard SANDY CLAYEY SILT with trace small gravel (GLACIAL TILL)	6	100	7/8/14	>4.5	
20	656	▼	ML			7	0	14/15/18	>4.5	Spoon driven twice; no recovery either attempt
25	651					8	67	10/11/14	>4.5	
30	646					9	100	9/14/24	>4.5	
35	641				Gray, slightly moist, hard SILTY SANDY CLAY with some gravel (GLACIAL TILL)	10	100	15/19/26	>4.5	
40	636		CL			11	100	13/16/27	>4.5	
45	631					12	67	17/23/26	>4.5	
50										



**PATRIOT ENGINEERING**  
and Environmental Inc.

Indianapolis, Terre Haute, Evansville, Fort Wayne,  
Lafayette, Louisville KY, Dayton OH, Nashville TN

**LOG OF BORING B-11**

(Page 2 of 2)

**Allerton Mine**  
Homer - Allerton, Illinois


Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/7/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Cloudy, rain, 50F  
Latitude : 39.9857540  
Longitude : -87.9149610

**Water Levels**

- ▼ During Drilling: 19-ft
- ▼ After Completion: 15-ft (corewater)

Depth in Feet	Surf. Elev. 676.3	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS	
50	626											
55	621		CL			13	100	10/12/17	>4.5			
60	616					14	17	13/16/26	>4.5			
65	611		ML		Dark Gray, moist, very stiff CLAYEY SILT - with trace fine sand	15	100	8/12/15	2.75			
70	606		ML		Dark Gray, moist, hard CLAYEY SANDY SILT	16	100	14/15/19	>4.5			
75	601		CH		Dark Gray, moist, hard CLAY	17	100	26/45/50-2"	>4.5		Borehole collapsed to 71-feet after auger removal.	
80	596		SH		Gray, WEATHERED SHALE with frequent mud seams	18	42	50-5"			Auger refusal at 80-ft	
85	591		SH		Dark Gray, soft SHALE, poorly cemented	19	100				RQD=75%	
90	586		SH		Gray, hard SHALE							
					Boring terminated at 90-ft.							
95	581											
100												

 <b>PATRIOT ENGINEERING</b> and Environmental Inc. Indianapolis, Terre Haute, Evansville, Fort Wayne, Lafayette, Louisville KY, Dayton OH, Nashville TN		<b>LOG OF BORING B-14</b>  (Page 1 of 2)													
<b>Allerton Mine</b> Homer - Allerton, Illinois		Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/2/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Mostly sunny, 60F Latitude : 39.9841848 Longitude : -87.9129631											
Depth in Feet	Surf. Elev. 678.1	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling: 35-ft ▽ After Completion: 14-ft (corewater)					Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					DESCRIPTION										
0	678		OL		Dark Brown, moist, very stiff ORGANIC CLAY										
			CL		Tan & Brown mottled, moist, very stiff SILTY CLAY	1	100	3/4/5	3.0						
5	673		CL		Tan & Brown mottled, moist, hard SILTY CLAY with trace fine sand	2	56	5/4/5	4.5						
			CL		Grayish Tan, moist, hard SILTY CLAY	3	100	5/8/7	4.5						
10	668		CL		Light Brown, slightly moist, hard SANDY SILTY CLAY	4	100	6/8/10	>4.5						
15	653		ML		Gray & Reddish Tan, slightly moist, hard SANDY CLAYEY SILT	5	100	9/8/10	4.0						
20	658				Gray, moist, very stiff CLAYEY SILT (GLACIAL TILL)	6	67	8/8/6	3.5						
25	653		CL		with trace small gravel	7	100	6/7/7	3.5						
30	648				Light Gray, SHALE and LIMESTONE in CLAY matrix (GLACIAL TILL)	8	100	6/9/12	4.5						
35	643	▼			Light Gray, SHALE and LIMESTONE in CLAY matrix (GLACIAL TILL)	9	27	50-5"							
40	638		GC		Light Gray, SHALE and LIMESTONE in CLAY matrix (GLACIAL TILL)	10	0	20/28/30							Borehole collapsed to 41-feet after auger removal.
45	633				Light Gray, SHALE and LIMESTONE in CLAY matrix (GLACIAL TILL)	11	67	18/50-5"							
50			LS		Light Gray, hard LIMESTONE	12	100								Auger refusal at 48-ft.

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**LOG OF BORING B-14**















(Page 2 of 2)

**Allerton Mine**  
**Homer - Allerton, Illinois**

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-03B3  
Logged By : T. Govert  
Start Date : 11/2/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly sunny, 60F  
Latitude : 39.9841849  
Longitude : -87.9129631

Depth in Feet	Surf. Elev. 678.1	Water Level	USCS	GRAPHIC	Water Levels		Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					▼ During Drilling: 35-ft	▼ After Completion: 14-ft (corewater)						
					DESCRIPTION							
50	828				thin, flat shale beds							RQD=75%
55	823		LS		appreciable wormholes.	12	100					
60	818	Boring terminated at 53-ft.										
65	813											
70	808											
75	803											
80	598											
85	593											
90	588											
95	583											
100												

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<b>Allerton Mine Homer - Allerton, Illinois</b>			Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/14/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Mostly Cloudy, 55F Latitude : 39.9810531 Longitude : -87.9089755									
Depth in Feet	Surf. Elev. 684.6	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling: Dry ▼ After Completion: 15-ft (corewater) ▲				Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					DESCRIPTION									
0	684		OL		Dark Brown, moist, very stiff ORGANIC CLAY (10")	1	100	4/5/5	4.0					
			CL		Tan & Brown Mottled, moist, very stiff SILTY CLAY	2	100	5/6/5	4.0					
5	679		CL		Light Brown, slightly moist, very stiff SILTY CLAY with trace fine sand	3	67	5/5/6	1.75					
			CL		Light Brown, moist, stiff to very stiff SILTY CLAY with trace to a little sand	4	100	4/5/7	3.0					
10	674		ML		Gray, slightly moist, hard CLAYEY SILT with trace sand (GLACIAL TILL)	5	100	9/8/9	>4.5					
15	669		CG		Gray, moist, medium dense, CLAYEY GRAVEL with trace sand (GLACIAL TILL)	6	67	9/10/10						
20	664		CL		Gray, moist, hard SILTY CLAY with trace sand and trace small gravel (GLACIAL TILL)	7	100	6/7/10	>4.5					
25	659		CL			8	100	9/11/12	4.5					
30	654		CL			9	100	9/7/9	>4.5					
35	649		CL			10	100	8/9/13	4.5					
40	644		CL			11	100	12/15/17	>4.5					
45	639		CL			12	100	16/15/18	>4.5					
50			CL		Bluish Gray, slightly moist, hard SILTY CLAY									

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## LOG OF BORING B-18

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**Allerton Mine**  
Homer - Allerton, Illinois

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/14/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly Cloudy, 55F  
Latitude : 39.9810531  
Longitude : -87.9089755

Depth in Feet	Surf. Elev. 884.6	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
<p><b>Water Levels</b></p> <p>▼ During Drilling: Dry</p> <p>▽ After Completion: 15-ft (corewater)</p> <p>◆</p>											
50	634		CL		Gray, slightly moist, hard CLAYEY SILT with trace sand	13	100	18/33/50-5*	>4.5		Borehole collapsed to 51-feet after auger removal.
55	629		ML			14	100	20/27/31	>4.5		
60	624				Bluish Gray, slightly moist, very stiff SILTY CLAY	15	100	11/17/18	3.5		
65	619		CL								
70	614		LS		Light Gray, heavily fractured LIMESTONE	16	85				Auger refusal at 68-ft. RQD=56%
75	609										
80	604				Boring terminated at 78-ft.						
85	599										
90	594										
95	589										
100											



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# LOG OF BORING B-20

(Page 1 of 2)

**Allerton Mine**  
Homer - Allerton, Illinois

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/16/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly Sunny, 60F  
Latitude : 39.9794776  
Longitude : -87.9069697

**Water Levels**

- ▼ During Drilling: 25-ft
- ▼ After Completion: 14-ft (corewater)
- ◆

Depth in Feet	Surf. Elev. 684.0	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
0			OL		Dark Brown, moist, very stiff ORGANIC CLAY (10")	1	100	3/4/4	2.5		
681			CL		Brown, moist, very stiff SILTY CLAY	2	78	4/5/6	2.0		
5			CL		Reddish Gray to Tan, very moist, stiff SILTY CLAY with trace fine sand	3	100	2/3/3	1.0		
678			CL		Gray, moist, hard SANDY SILTY CLAY with trace gravel	4	67	4/5/5	1.5		
671			CL		Gray, moist, medium dense, SILT with trace clay	5	100	8/8/9	4.5		
15			ML		Gray, moist, very stiff SILTY CLAY	6	100	5/6/13			
666			CL		Gray, moist, very stiff to hard CLAYEY SILT	7	100	13/11/8	2.75		
25		▼	ML		Reddish Brown, moist, hard SANDY SILTY CLAY with a little gravel (GLACIAL TILL)	8	100	3/6/7	4.0		
661			CL		Light Gray, WEATHERED LIMESTONE	9	100	5/11/14			
656			ML		Light Gray, hard LIMESTONE	10	100	6/8/13	4.5		Borehole collapsed to 36-feet after auger removal.
30			CL			11	28	50-5"			
651			LS			12	90				Auger refusal at 48-ft.
35			CL								
646			CL								
40			CL								
641			CL								
45			LS								
636			LS								
50			LS								

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## LOG OF BORING B-20

(Page 2 of 2)

**Allerton Mine**  
Homer - Allerton, Illinois

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/16/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly Sunny, 60F  
Latitude : 39.9794776  
Longitude : -87.9069697

Depth in Feet	Surf. Elev. 684.0	Water Level	USCS	GRAPHIC	Water Levels					REMARKS	
					▼ During Drilling: 25-ft	▼ After Completion: 14-ft (corewater)	◆	Samples	Rec %		SPT Results
DESCRIPTION					Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS	
50			CL		Brown, hard SILTY CLAY						
			CH		Dark Gray, hard CLAY						RQD=44%
631			SC		Brown, CLAYEY SAND	12	90				
55			OL		Dark Gray, ORGANIC SILT						
			SP		Dark Gray, ORGANIC SILT						
			CH		Light Brown, fine SAND						
626			CH		Gray, hard CLAY						
60			Boring terminated at 58-ft.								
621											
65											
616											
70											
611											
75											
606											
80											
601											
85											
596											
90											
591											
95											
586											
100											



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# LOG OF BORING B-23

(Page 1 of 2)

**Allerton Mine**  
**Homer - Allerton, Illinois**

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/1/11&11/17/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly Sunny, 55F  
Latitude : 39.9773797  
Longitude : -87.9042923

**Water Levels**











- ▼ During Drilling: 48-ft
- ▼ After Completion: 47-ft

Depth in Feet	Surf. Elev. 682.2	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
0	682		OL		Dark Brown, moist, very stiff ORGANIC CLAY (6")	1	100	4/4/4	2.75		Boring conducted to 60-ft on 11/1/11 then terminated. Boring continued to full depth on 11/17/11, offset 5-ft from initial boring.
			CL		Light Brown, moist, very stiff SILTY CLAY	2	100	4/3/4	3.0		
5	677					3	100	3/4/7	4.0		
			ML		Grayish Tan, slightly moist, hard CLAYEY SILT	4	93	7/9/11	4.5		
10	672					5	67	6/7/7	4.5		
			CL		Gray, moist to slightly moist, hard SILTY SANDY CLAY (GLACIAL TILL)	6	100	6/8/10	>4.5		
15	667					7	67	9/13/13	>4.5		
			CL			8	100	5/5/7	>4.5		
20	662					9	100	12/9/13	>4.5		
					with a little gravel	10	100	8/12/11	>4.5		
25	657					11	27	50-5*	>4.5		
			CL		Brown, slightly moist, hard SILTY SANDY CLAY with some gravel (GLACIAL TILL)	12	100				
30	652										
35	647										
40	642										
45	637				Granite Cobble						
50											

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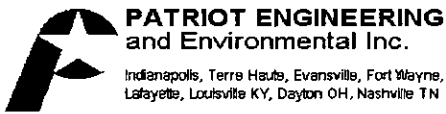
Borehole collapsed to 41-feet after auger removal.

Auger refusal at 45-ft. on 11/1/11 boring effort.

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<b>Allerton Mine</b> Homer - Allerton, Illinois			Client Name : Sunnise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/1/11&11/17/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Mostly Sunny, 55F Latitude : 39.9773797 Longitude : -87.9042923							
Depth in Feet	Surf. Elev. 682.2	Water Level	USCS	GRAPHIC	Water Levels		Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					▼ During Drilling: 48-ft ▼ After Completion: 47-ft ◆	DESCRIPTION						
50	832		CL				12	100				
55	827				Grayish Brown, hard SILTY CLAY with trace sand (GLACIAL TILL)		13	40				
60	822		CL									
65	817						14	0	50-5"			
70	812		ML		Gray, slightly moist, hard CLAYEY SILT with trace peat inclusions		15	100	17/21/31	>4.5		
75	807						16	100	6/10/11	4.5		
80	802		GP		GRANITE fragments		17	27	50-5"			
			LS		Gray, fractured LIMESTONE							
85	597		SH		Black, FISSILE SHALE							
			SH		Black, soft SHALE, weathered with mud seams		18	90				
90	592		OH		Dark Gray, hard ORGANIC CLAY							
			SH		Light Gray, WEATHERED SHALE							
			Boring terminated at 92-ft.									
95	587											Auger refusal at 82-ft. on 11/17/11 boring effort.
100												

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UNCONSOLIDATED OVERBURDEN  
BORING LOGS FOR  
LITHOLOGICAL CROSS SECTION B-B'



# LOG OF BORING B-7

(Page 1 of 2)

**Allerton Mine**  
**Homer - Allerton, Illinois**

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/8/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Cloudy, 55F  
Latitude : 39.9857620  
Longitude : -87.9189678

**Water Levels**

- ▼ During Drilling: Dry
- ▽ After Completion: 18-ft (corewater)

Depth in Feet	Surf. Elev. 674.4	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
0	674		OL		Dark Brown, moist, very stiff ORGANIC CLAY (10")						
			CL		Gray, moist, stiff SILTY CLAY	1	100	4/3/4	2.0		
					Light Gray & Tan Mottled, slightly moist, hard CLAYEY SILT with trace fine sand	2	100	3/4/4	4.0		
5	669		ML			3	100	5/8/10	4.5		
					Gray & Brown Mottled, moist, hard SILTY CLAY with trace fine sand	4	100	5/6/7	4.0		
10	664		CL			5	100	4/6/7	4.5		
					Gray, moist, hard SANDY SILTY CLAY with trace small gravel (GLACIAL TILL)	6	100	10/12/13	>4.5		
15	659					7	44	7/9/15	>4.5		
						8	56	11/29/43	>4.5		
20	654		CL			9	100	15/20/27	>4.5		
					Gray, slightly moist, hard SANDY CLAYEY SILT with trace small gravel (GLACIAL TILL)	10	100	21/33/50-5"	>4.5		
25	649					11	100	18/22/24	>4.5		
30	644					12	100	21/33/39	>4.5		
35	639										
40	634		ML								
45	629				Dark Gray, slightly moist, hard CLAYEY SILT with trace fine sand (GLACIAL TILL)						
50			ML								



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**LOG OF BORING B-7**

















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**Allerton Mine**  
Homer - Allerton, Illinois


Client Name	: Sunrise Coal, LLC	Driller	: Gary Taylor
Project Number	: 02-11-0383	Sampling	: Splitspoon; NQ core
Logged By	: T. Govert	Weather	: Cloudy, 55F
Start Date	: 11/8/11	Latitude	: 39.9857620
Drilling Method	: HSA	Longitude	: -87.9189678

Depth in Feet	Surf. Elev. 674.4	Water Level	USCS	GRAPHIC	Water Levels					REMARKS
					▼ During Drilling: Dry ▼ After Completion: 18-ft (corewater)					
DESCRIPTION					Samples	Rec %	SPT Results	Qp tsf	w %	
50	624									
55	619		ML		trace small gravel	13	67	10/14/15	>4.5	
60	614					14	100	25/28/20	>4.5	
65	609		CL		Dark Gray & Brown, moist, hard SANDY CLAY (GLACIAL TILL)	15	58	19/22/21	>4.5	
70	604		GR		GRANITE cobble					
70	604		SH		Gray, WEATHERED SHALE with clay seams	16	70			Borehole collapsed to 69-feet after auger removal.  RQD=37%
75	599		SH		Gray & Dark Gray SANDY SHALE					
80	584				Boring terminated at 78-ft.					
85	589									
90	584									
95	578									
100										







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 <b>PATRIOT ENGINEERING and Environmental Inc.</b> Indianapolis, Terre Haute, Evansville, Fort Wayne, Lafayette, Louisville KY, Dayton OH, Nashville TN		<b>LOG OF BORING B-10</b> (Page 1 of 2)								
<b>Allerton Mine Homer - Allerton, Illinois</b>		Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/9/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Cloudy, 50F Latitude : 39.9641931 Longitude : -87.9168697						
Depth in Feet	Surf. Elev. 674.3	Water Level	USCS	GRAPHIC	Water Levels ▽ During Drilling: Dry ▽ After Completion: 11-ft (corewater)					REMARKS
					DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	
0	674		OL		Dark Brown, moist, very stiff ORGANIC CLAY					
			CL		Gray, moist, very stiff SANDY CLAY with trace to a little sand	1	44	3/3/3	2.5	
5	669		ML		Grayish Tan, moist, very stiff CLAYEY SANDY SILT	2	78	4/4/4	2.0	
			ML		Grayish Tan, moist, very stiff CLAYEY SANDY SILT	3	100	4/5/4	3.0	
10	664		CL		Gray, moist, very stiff SILTY CLAY with a little fine sand	4	100	6/7/12	3.25	
			ML		Light Gray, moist, hard SANDY CLAYEY SILT (GLACIAL TILL)	5	67	15/12/13	4.5	
15	659		ML		Light Gray, moist, hard SANDY CLAYEY SILT (GLACIAL TILL)	6	67	15/12/13	4.5	
			CL		Gray, moist, hard SILTY CLAY with trace sand (GLACIAL TILL)	7	78	5/8/12	4.5	
20	654		CL		Gray, moist, hard SILTY CLAY with trace sand (GLACIAL TILL)	8	78	5/8/12	4.5	
25	649		CL		Gray, moist, hard SILTY CLAY with trace sand (GLACIAL TILL)	9	100	4/5/8	4.5	
30	644		CL		Gray, moist, hard SILTY CLAY with trace sand (GLACIAL TILL)	10	0	29/40/41	4.5	
35	639		CL		Gray, moist, hard SILTY CLAY with trace sand (GLACIAL TILL)	11	100	16/19/22	4.5	
40	634		CL		Gray, moist, hard SILTY CLAY with trace sand (GLACIAL TILL)	12	100	12/17/19	4.5	
45	629		CL		Gray, moist, hard SILTY CLAY with trace sand (GLACIAL TILL)	13	56	22/28/49	4.5	
50			CL		Bluish Gray, moist, hard SANDY CLAY (GLACIAL TILL)	14	67	17/19/39	4.5	


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 <p><b>PATRIOT ENGINEERING and Environmental Inc.</b> Indianapolis, Terre Haute, Evansville, Fort Wayne, Lafayette, Louisville KY, Dayton OH, Nashville TN</p>	<h2 style="margin: 0;">LOG OF BORING B-10</h2> <p style="text-align: right;">(Page 2 of 2)</p>
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<p><b>Allerton Mine</b> <b>Homer - Allerton, Illinois</b></p>	<p>Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/9/11 Drilling Method : HSA</p>	<p>Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Cloudy, 50F Latitude : 39.9841931 Longitude : -87.9169697</p>
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Depth in Feet	Surf. Elev. 674.3	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					<p><b>Water Levels</b>                      ▼ During Drilling: Dry                      ▼ After Completion: 11-ft (corewater)</p>						
50	624		CL		Bluish Gray, slightly moist, hard CLAY (GLACIAL TILL)	13	100	7/9/12	>4.5		
55	619		CH								
60	614				Brownish Gray, slightly moist, hard SANDY CLAYEY SILT (GLACIAL TILL)	14	100	12/13/16	>4.5		
65	609		ML			15	100	9/12/15	>4.5		
70	604					16	100	9/15/18	>4.5		Borehole collapsed to 69-feet after auger removal.
75	599		ML		Gray, dry, hard CLAYEY SILT	17	100	17/33/49	>4.5		
80	594		SH		Light Gray, WEATHERED SHALE	18	95				Auger refusal at 78-ft. RQD=69%
85	589		SH		Gray, to Dark Gray, slightly SANDY SHALE with weakly cemented beds						
90	584				Boring terminated at 88-ft.						
95	579										
100											

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 <b>PATRIOT ENGINEERING and Environmental Inc.</b> Indianapolis, Terre Haute, Evansville, Fort Wayne, Lafayette, Louisville KY, Dayton OH, Nashville TN		<b>LOG OF BORING B-11</b> (Page 1 of 2)								
<b>Allerton Mine</b> <b>Homer - Allerton, Illinois</b>		Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/7/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Cloudy, rain, 5DF Latitude : 39.9857540 Longitude : -87.9149610						
Depth in Feet	Surf. Elev. 876.3	Water Level	USCS	GRAPHIC	Water Levels ▼ During Drilling: 19-ft ▼ After Completion: 15-ft (corewater)					REMARKS
					DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	
0	876		OL		Dark Brown, moist, very stiff ORGANIC CLAY (8")	1	100	3/4/5	3.75	
			CL		Brownish Gray, moist, very stiff SILTY CLAY with trace sand	2	100	5/5/6		
5	871		SC		Light Brown, slightly moist, medium dense, fine to medium SILTY CLAYEY SAND	3	100	5/6/6	2.75	
			CL		Grayish Brown, moist, very stiff SANDY SILTY CLAY	4	100	5/6/7	3.75	
10	866		CL		Brown, moist, very stiff SILTY CLAY with trace sand	5	78	15/16/19	>4.5	
15	861				Brownish Gray, dry, hard SANDY CLAYEY SILT with trace small gravel (GLACIAL TILL)	6	100	7/8/14	>4.5	
20	858		ML			7	0	14/15/18	>4.5	Spoon driven twice; no recovery either attempt
25	851					8	67	10/11/14	>4.5	
30	848					9	100	9/14/24	>4.5	
35	841				Gray, slightly moist, hard SILTY SANDY CLAY with some gravel (GLACIAL TILL)	10	100	15/19/26	>4.5	
40	838		CL			11	100	13/16/27	>4.5	
45	831					12	67	17/23/26	>4.5	
50										

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**LOG OF BORING B-11**

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**Allerton Mine**  
**Homer - Allerton, Illinois**

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/7/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Cloudy, rain, 50F  
Latitude : 39.9857540  
Longitude : -87.9149810


**Water Levels**

- ▼ During Drilling: 19-ft
- ▼ After Completion: 15-ft (corewater)

Depth in Feet	Surf. Elev. 676.3	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS

50	626										
55	621		CL			13	100	10/12/17	>4.5		
60	616					14	17	13/16/26	>4.5		
65	611		ML		Dark Gray, moist, very stiff CLAYEY SILT with trace fine sand	15	100	8/12/15	2.75		
70	606		ML		Dark Gray, moist, hard CLAYEY SANDY SILT	16	100	14/15/19	>4.5		
75	601		CH		Dark Gray, moist, hard CLAY	17	100	26/45/50-2"	>4.5		Borehole collapsed to 71-feet after auger removal.
80	596		SH		Gray, WEATHERED SHALE with frequent mud seams	18	42	50-5"			Auger refusal at 80-ft
85	591		SH		Dark Gray, soft SHALE, poorly cemented	19	100				RQD=75%
90	586		SH		Gray, hard SHALE						
Boring terminated at 90-ft.											
95	581										
100											

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<b>Allerton Mine</b> <b>Homer - Allerton, Illinois</b>		Client Name : Sunrise Coal, LLC Project Number : D2-11-0383 Logged By : T. Govert Start Date : 11/4/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Partly cloudy, 55F Latitude : 39.9873149 Longitude : -87.9129523								
Depth in Feet	Surf. Elev. 676.3	Water Level	USCS	GRAPHIC	Water Levels		Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					▼ During Drilling: Dry ▼ After Completion: 14-ft (corewater)	DESCRIPTION						
0	676		OL		Dark Brown, moist, very stiff ORGANIC CLAY							
			CL		Dark Brown, moist, very stiff SILTY CLAY	1	67	3/4/6	2.75			
5	671		CL		Light Brown, moist, very stiff SILTY CLAY with trace to some sand	2	42	4/5/6	4.0			
					Tannish Gray, moist, hard SANDY CLAYEY SILT with trace small gravel	3	78	3/5/9	4.25			
10	666		ML		Tannish Gray, moist, hard SANDY CLAYEY SILT with trace small gravel	4	78	7/8/7	4.5			
					Light Gray, moist, hard to very stiff CLAYEY SILT with trace fine sand and trace gravel	5	100	5/7/9	4.25			
15	661				Light Gray, moist, hard to very stiff CLAYEY SILT with trace fine sand and trace gravel	6	100	5/7/9	4.5			
20	656		ML		Light Gray, moist, hard to very stiff CLAYEY SILT with trace fine sand and trace gravel	7	100	6/6/6	3.5			
25	651				Gray, dry, hard SANDY CLAYEY SILT with a little coarse gravel (GLACIAL TILL)	8	78	36/27/29	>4.5			
30	646		ML		Gray, dry, hard SANDY CLAYEY SILT with a little coarse gravel (GLACIAL TILL)	9	17	19/50-5*	>4.5			
35	641				Light Gray, hard LIMESTONE, slightly wormholed 38' - 42'							Auger refusal at 38-ft.
40	636		LS		Light Gray, hard LIMESTONE, slightly wormholed 38' - 42'	10	95					Borehole collapsed to 40-feet after auger removal.
45	631				Light Gray, hard LIMESTONE, slightly wormholed 38' - 42'							RQD=85%
50					Boring terminated at 48-ft.							

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**LOG OF BORING B-15**

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**Alerton Mine**  
**Homer - Alerton, Illinois**

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0393  
Logged By : T. Govert  
Start Date : 11/4/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Sunny, 40F  
Latitude : 39.9857458  
Longitude : -87.9109543

**Water Levels**

▼ During Drilling: 34-ft  
▽ After Completion: Dry

Depth in Feet	Surf. Elev. 679.4	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
0	679		OL		Dark Brown, moist, very stiff ORGANIC CLAY						
			CL		Grayish Brown, moist, very stiff SILTY CLAY	1	93	3/4/4	2.25		
			CL		Light Brown, slightly moist, hard SILTY CLAY with trace fine sand	2	33	4/7/7	4.5		
5	674		CL		Light Brown, moist, very stiff SILTY CLAY with trace sand	3	100	4/4/6	2.5		
			CL		Light Brown, moist, very stiff SILTY CLAY with trace sand	4	100	4/8/7	3.5		
			ML		Light Gray, moist, very stiff CLAYEY SILT with trace fine sand	5	78	6/12/10	4.0		
			CL		Gray, slightly moist, very stiff SANDY SILTY CLAY with trace gravel	6	33	9/11/15	4.0		
20	659		CL		Gray, slightly moist, hard SANDY SILTY CLAY with trace gravel (GLACIAL TILL)	7	100	6/7/8	4.5		
			CL		Gray, slightly moist, hard SANDY SILTY CLAY with trace gravel (GLACIAL TILL)	8	100	6/9/16	>4.5		Borehole collapsed to 30-feet after auger removal.
30	649		ML		Gray, dry, hard CLAYEY SANDY SILT (GLACIAL TILL)	9	67	29/50-5"			
			SH		Light Gray, calcareous SHALE	10	17	50-5"			Auger refusal at 40-ft.
40	639		MS		Gray, MUDSTONE						
			LS		Light Gray, LIMESTONE						
			CH		Dark Gray, hard CLAY						
45	634		LS		Light Gray, LIMESTONE with frequent cross-bedded shale seams	11	100				RQD=36% Lost water return at 46'
			SP		Tan, fine to medium SAND						
50			LS		Dark Gray, LIMESTONE						Boring terminated at 50-ft.

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UNCONSOLIDATED OVERBURDEN  
BORING LOGS FOR  
LITHOLOGICAL CROSS SECTION C-C'



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**LOG OF BORING B-19**






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**Allerton Mine**  
**Homer - Allerton, Illinois**

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/15/11  
Drilling Method : HSA


Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly Cloudy, 55F  
Latitude : 39.9779168  
Longitude : -87.9089784

Depth in Feet	Surf. Elev. 661.3	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
<p><b>Water Levels</b></p> <p>▼ During Drilling: Dry</p> <p>▼ After Completion: 11-ft (corewater)</p> <p>◆</p>											
0	661		OL		Dark Brown, moist, very stiff ORGANIC CLAY	1	56	3/3/4			
			CL		Grayish Tan, moist, stiff SILTY CLAY	2	22	3/3/3	1.75		
5	676		CL		Tan, very moist, stiff SILTY CLAY with trace sand	3	100	3/3/4	1.5		
			CL			4	100	3/5/5	2.0		
10	671		CL		Gray, moist, stiff to very stiff SANDY SILTY CLAY	5	78	5/4/5	1.25		
15	666		CL			6	100	4/5/7	3.0		
20	661		ML		Gray, moist, medium dense, SANDY SILT with trace clay	7	100	8/9/11			
25	656		CL		Gray, slightly moist, very stiff SILTY CLAY with trace sand	8	100	4/5/8	2.5		
30	651				Brown to Gray, slightly moist, hard SANDY SILTY CLAY with trace gravel (GLACIAL TILL)	9	0	50-5*			
35	646					10	22	13/14/16	>4.5		
40	641		CL			11	100	8/14/22	>4.5		
45	636					12	100	10/16/24	>4.5		
50											

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<b>Allerton Mine Homer - Allerton, Illinois</b>		Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/15/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Mostly Cloudy, 55F Latitude : 39.9779168 Longitude : -87.9089784								
Depth in Feet	Surf. Elev. 681.3	Water Level	USCS	GRAPHIC	<b>Water Levels</b> ▼ During Drilling: Dry ▽ After Completion: 11-ft (corewater) ◆					REMARKS		
					DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf		w %	
50	631		CL		13	0	16/14/17			Borehole collapsed to 72-feet after auger removal.		
55	626				14	33	11/14/15	4.5				
60	621				15	100	9/9/17	4.25				
65	616				16	67	8/11/17	4.0				
70	611				17	67	22/17/28	4.5				
75	606				18	78	11/15/19	3.75				
80	601				ML		19	0	10/11/14			
85	596						20	100	10/12/17		3.25	
90	591				CL		21	100	8/17/22		3.0	
95	586						22	100				
100					SG							Auger refusal at 98-ft.

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Depth in Feet		Surf. Elev.	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
100		581				<b>Water Levels</b> ▼ During Drilling: Dry ▽ After Completion: 11-ft (corewater) ◆						
105		578		SH		soft clay seam Gray, SANDY SHALE, heavily fractured at mud seams and silt seams	22	100				RQD=71%
108		576		SH		Gray, hard SHALE, occasional loose silt beds						
110		571	Boring terminated at 108-ft.									
115		566										
120		561										
125		556										
130		551										
135		546										
140		541										
145		536										
150												




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## LOG OF BORING B-19



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**Allerton Mine**  
**Homer - Allerton, Illinois**

Client Name	: Sunrise Coal, LLC	Driller	: Gary Taylor
Project Number	: 02-11-0303	Sampling	: Splitspoon; NQ core
Logged By	: T. Govert	Weather	: Mostly Cloudy, 55F
Start Date	: 11/15/11	Latitude	: 39.9779168
Drilling Method	: HSA	Longitude	: -87.9089784


 <b>PATRIOT ENGINEERING and Environmental Inc.</b> Indianapolis, Terre Haute, Evansville, Fort Wayne, Lafayette, Louisville KY, Dayton OH, Nashville TN		<h2 style="text-align: center;">LOG OF BORING B-22</h2> <p style="text-align: right;">(Page 1 of 3)</p>										
<b>Allerton Mine</b> <b>Homer - Allerton, Illinois</b>		Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/1/11 & 11/17/11 Drilling Method : HSA			Driller : Gary Taylor Sampling : Spiltspoon; NQ core Weather : Mostly Sunny, 55F Latitude : 39.9758633 Longitude : -87.8063575							
Depth in Feet	Surf. Elev. 682.6	Water Level	USCS	GRAPHIC	Water Levels		Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					▼ During Drilling: 48-ft ▼ After Completion: 47-ft ◆	DESCRIPTION						
0	682		OL		Dark Brown, moist, very stiff ORGANIC CLAY (8")		1	93	3/3/4	2.25		Boring conducted to 100-ft on 11/1/11 then terminated. Boring continued to full depth on 11/17/11
			CL		Grayish Tan, moist, very stiff SILTY CLAY		2	100	5/5/5			
5	677		ML		Tannish Gray, slightly moist, loose, CLAYEY SANDY SILT		3	100	7/5/6	2.5		
			ML		Tan, moist, very stiff CLAYEY SILT with trace fine sand and trace small gravel		4	100	3/4/8	2.25		
10	672		ML				5	89	4/14/21			
			SC		Gray, moist, dense, CLAYEY SAND with a little gravel		6	100	5/7/8	4.5		
15	667		SC		Gray, slightly moist, hard SILTY CLAY with trace sand (GLACIAL TILL)		7	100	5/6/9	>4.5		
20	662		CL				8	100	7/7/9	4.5		
25	657		CL				9	0	50-5"			
30	652		CL				10	100	14/18/19	>4.5		
35	647		CL				11	100	14/23/28	>4.5		
40	642		CL		turning brown		12	27	14/14/19	>4.5		
45	637											
50												

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<b>Alerton Mine</b> <b>Homer - Alerton, Illinois</b>				Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/1/11&11/17/11 Drilling Method : HSA			Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Mostly Sunny, 55F Latitude : 39.9758633 Longitude : -87.9063575					
Depth in Feet	Surf. Elev. 682.6	Water Level	USCS	GRAPHIC	Water Levels		Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					▼ During Drilling: 48-ft	▼ After Completion: 47-ft						
50	632		CL									
55	627		CH		Bluish Gray, moist, very stiff CLAY with trace sand		13	67	23/24/24	2.75		
60	622				Gray, slightly moist, hard CLAYEY SILT with trace sand (GLACIAL TILL)		14	100	20/27/32	4.5		
65	617						15	100	14/20/29	>4.5		
70	612		ML				16	100	7/14/18	>4.5		
75	607				trace small gravel		17	100	7/14/21	>4.5		
80	602						18	100	9/13/18	>4.5		
85	597				Dark Gray, slightly moist, hard CLAYEY SILT		19	100	13/19/28	4.25		Borehole collapsed to 81-feet after auger removal.
90	592		ML				20	100	18/38/49	4.5		
95	587		CL		Gray, slightly moist, hard SILTY CLAY with trace sand		21	100	15/16/21	>4.54.5		
100			ML		Gray, slightly moist, hard CLAYEY SILT with trace fine sand		22	100	12/19/19	4.5		

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Depth in Feet		Surf. Elev. 682.6	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
<b>Water Levels</b> ▼ During Drilling: 48-ft ▼ After Completion: 47-ft ◆												
100		582		ML		Bluish Gray, moist, very stiff CLAY	23	100	21/29/19	2.75		
105		577		CH								
110		572		SH		Light Gray, WEATHERED SHALE with loose silt beds	24	11	50-2"			Auger refusal at 111-ft.
115		567		SH		Gray, hard SANDY SHALE becoming light and dark gray bedded	25	99				RQD=75%
			SH		Light and Dark Gray bedded, moderately fractured SANDY SHALE							
			SH		Light and Dark Gray, becoming all gray, hard SHALE							
120		562				Boring terminated at 121-ft.						
125		557										
130		552										
135		547										
140		542										
145		537										
150												

 <b>PATRIOT ENGINEERING and Environmental Inc.</b> Indianapolis, Terre Haute, Evansville, Fort Wayne, Lafayette, Louisville KY, Dayton OH, Nashville TN		<b>LOG OF BORING B-20</b> (Page 1 of 2)									
<b>Allerton Mine Homer - Allerton, Illinois</b>		Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 11/16/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon; NQ core Weather : Mostly Sunny, 60F Latitude : 39.9794776 Longitude : -87.9069697							
Depth in Feet	Surf. Elev. 684.0	Water Level	USCS	GRAPHIC	Water Levels	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					▼ During Drilling: 25-ft ▼ After Completion: 14-ft (corewater) ◆						
0			OL		Dark Brown, moist, very stiff ORGANIC CLAY (10")	1	100	3/4/4	2.5		
681			CL		Brown, moist, very stiff SILTY CLAY	2	78	4/5/6	2.0		
5			CL		Reddish Gray to Tan, very moist, stiff SILTY CLAY with trace fine sand	3	100	2/3/3	1.0		
676			CL			4	87	4/5/5	1.5		
10			CL		Gray, moist, hard SANDY SILTY CLAY with trace gravel	5	100	8/8/9	4.5		
671			CL			6	100	5/8/13			
15			ML		Gray, moist, medium dense, SILT with trace clay	7	100	13/11/8	2.75		
666			ML			8	100	3/6/7	4.0		
20			CL		Gray, moist, very stiff SILTY CLAY	9	100	5/11/14			
661		▼	CL			10	100	8/8/13	4.5		
25			ML		Gray, moist, very stiff to hard CLAYEY SILT	11	28	50-5"			
656			ML			12	90				
30			CL		Reddish Brown, moist, hard SANDY SILTY CLAY with a little gravel (GLACIAL TILL)						Borehole collapsed to 36-feet after auger removal.
651			CL								
35			LS		Light Gray, WEATHERED LIMESTONE						
646			LS								
40			LS		Light Gray, hard LIMESTONE						
641			LS								
45			LS								
636			LS								Auger refusal at 48-ft.
50			LS								

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**LOG OF BORING B-20**

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**Allerton Mine**  
Homer - Allerton, Illinois

Client Name : Sunrisc Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/16/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly Sunny, 60F  
Latitude : 39.9794776  
Longitude : -87.9069897

Depth in Feet	Surf. Elev. 684.0	Water Level	USCS	GRAPHIC	Water Levels		Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
					▼ During Drilling: 25-ft ▼ After Completion: 14-ft (corewater) ◆							
					DESCRIPTION							
50			CL		Brown, hard SILTY CLAY							
			CH		Dark Gray, hard CLAY							RQD=44%
631			SC		Brown, CLAYEY SAND	12	90					
55			OL		Dark Gray, ORGANIC SILT							
			SP		Light Brown, fine SAND							
			CH		Gray, hard CLAY							
626			Boring terminated at 58-ft.									
60												
621												
65												
616												
70												
611												
75												
606												
80												
601												
85												
596												
90												
591												
95												
586												
100												





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**LOG OF BORING B-23**

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**Allerton Mine**  
**Homer - Allerton, Illinois**

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/1/11&11/17/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly Sunny, 55F  
Latitude : 39.9773797  
Longitude : -87.9042923

Depth in Feet	Surf. Elev. 682.2	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
<p><b>Water Levels</b>                      ▼ During Drilling: 48-ft                      ▼ After Completion: 47-ft                      ▲</p>											
50	632		CL			12	100				
55	627				Grayish Brown, hard SILTY CLAY with trace sand (GLACIAL TILL)	13	40				
60	622		CL								
65	617					14	0	50-5*			
70	612		ML		Gray, slightly moist, hard CLAYEY SILT with trace peat inclusions	15	100	17/21/31	>4.5		
75	607					16	100	6/10/11	4.5		
80	602		GP		GRANITE fragments	17	27	50-5*			
85	597		LS		Gray, fractured LIMESTONE						Auger refusal at 82-ft on 11/17/11 boring effort.
			SH		Black, FISSILE SHALE						
			SH		Black, soft SHALE, weathered with mud seams	18	90				
			OH		Dark Gray, hard ORGANIC CLAY						
			SH		Light Gray, WEATHERED SHALE						
<p>Boring terminated at 92-ft.</p>											
95	587										
100											

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**PATRIOT ENGINEERING**  
and Environmental Inc.  
Indianapolis, Terre Haute, Evansville, Fort Wayne,  
Lafayette, Louisville KY, Dayton OH, Nashville TN

**LOG OF BORING B-21**

(Page 1 of 2)

**Allerton Mine**  
Homer - Allerton, Illinois

Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/18/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly Sunny, 45F  
Latitude : 39.9810384  
Longitude : -87.9049609

Depth in Feet	Surf. Elev. 883.6	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
<p><b>Water Levels</b></p> <p>▼ During Drilling: 19-ft</p> <p>▼ After Completion: 12-ft (corewater)</p> <p>◆</p>											
0	883		OL		Dark Brown, moist, very stiff ORGANIC CLAY (10")	1	100	3/4/4	2.0		
					Brown, moist, very stiff SILTY CLAY	2	100	4/4/4	2.0		
5	878		CL		with trace sand and small gravel	3	100	3/4/5	2.5		
						4	100	5/8/7	2.25		
10	873		CL		Gray, moist, very stiff SILTY CLAY with trace sand	5	100	5/5/5	2.0		
15	868		ML		Gray, moist, medium dense, SILT with trace clay	6	100	11/8/9			
20	863		CL		Gray, very moist, stiff SILTY CLAY with trace fine sand	7	100	4/5/5	1.0		
25	858		CL		Gray, moist, hard SILTY CLAY with sand and small gravel (GLACIAL TILL)	8	100	6/9/12	4.5		
30	853		CL		with limestone fragments	9	100	6/7/11			Borehole collapsed to 33-feet after auger removal.
35	848		GR		GRANITE cobble						
40	843		LS		Light Gray, LIMESTONE						Auger refusal at 43-ft.
45	838		SH		Gray, soft SHALE and MUDSTONE	11	80				RQD=35%
50											

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and Environmental Inc.

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Lafayette, Louisville KY, Dayton OH, Nashville TN

## LOG OF BORING B-21








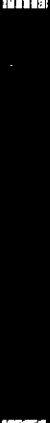

(Page 2 of 2)

**Allerton Mine**  
**Homer - Allerton, Illinois**

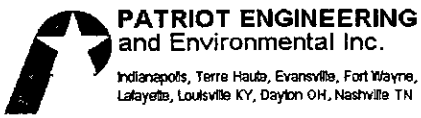
Client Name : Sunrise Coal, LLC  
Project Number : 02-11-0383  
Logged By : T. Govert  
Start Date : 11/16/11  
Drilling Method : HSA

Driller : Gary Taylor  
Sampling : Splitspoon; NQ core  
Weather : Mostly Sunny, 45F  
Latitude : 39.9810384  
Longitude : -87.9049609

Depth in Feet	Surf. Elev. 883.8	Water Level	USCS	GRAPHIC	Water Levels					REMARKS	
					▽ During Drilling: 19-ft ▽ After Completion: 12-ft (corewater) ▲	Samples	Rec %	SPT Results	Qp tsf		w %
DESCRIPTION											
50	633		SH			11	60				
			LS		Light Gray, LIMESTONE						
					Boring terminated at 53-ft.						
55	628										
60	623										
65	618										
70	613										
75	608										
80	603										
85	598										
90	593										
95	588										
100											

 <b>PATRIOT ENGINEERING</b> and Environmental Inc. Indianapolis, Terre Haute, Evansville, Fort Wayne, Lafayette, Louisville KY, Dayton OH, Nashville TN		<b>LOG OF BORING B-24</b>  (Page 1 of 2)								
<b>Allerton Mine</b> Homer - Allerton, Illinois		Client Name : Sunrise Coal, LLC Project Number : 02-11-0383 Logged By : T. Govert Start Date : 10/31/11 Drilling Method : HSA		Driller : Gary Taylor Sampling : Splitspoon, NQ core Weather : Sunny, 60F Latitude : 39.9788961 Longitude : -87.9022270						
Depth in Feet	Surf. Elev. 681.2	Water Level	USCS	GRAPHIC	Water Levels ▽ During Drilling: Dry ▽ After Completion: 7-ft (corewater) ▲					REMARKS
					DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	
0	681		OL		Dark Brown, moist, very stiff ORGANIC CLAY (18")	1	33	3/4/6	2.0	
			CL		Dark Gray, moist, very stiff SILTY CLAY	2	33	3/3/4	3.0	
5	678		CL		Light Brown, moist, very stiff SILTY CLAY with trace sand	3	100	5/5/7	3.5	
		4				89	4/5/7	4.0		
10	671					5	56	7/7/7	4.5	
15	666					6	33	7/8/9		
			ML		Gray, moist, hard SANDY CLAYEY SILT with trace gravel	7	33	8/9/10	3.0	
20	661		SM		Light Brown, slightly moist, medium dense, fine SILTY SAND	8	27	9/9/13	4.0	
			ML		Grayish Tan, moist, very stiff SANDY SILTY CLAY	9	0	40/40/35		
25	656		ML		Gray & Brown, dry, hard SANDY CLAYEY SILT with some gravel (GLACIAL TILL)	10	33	26/28/33	>4.5	
30	651					11	100	28/36/28		
35	646					12	100	12/15/16	4.0	
40	641		CL		Tannish Gray, moist, very stiff SILTY CLAY with trace fine sand (GLACIAL TILL)					
45	636									
50										

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LOG OF BORING B-24

(Page 2 of 2)

**Allerton Mine  
Homer - Allerton, Illinois**

Client Name : Sunrise Coal, LLC  
 Project Number : 02-11-0383  
 Logged By : T. Govert  
 Start Date : 10/31/11  
 Drilling Method : HSA

Driller : Gary Taylor  
 Sampling : Splitspoon; NQ core  
 Weather : Sunny, 60F  
 Latitude : 39.9788961  
 Longitude : -87.9022270

Depth in Feet	Surf. Elev. 681.2	Water Level	USCS	GRAPHIC	Water Levels					REMARKS	
					▼ During Drilling: Dry	▽ After Completion: 7-ft (corewater)	◆	Samples	Rec %		SPT Results
DESCRIPTION											
50	831		CL								Borehole collapsed to 51-feet after auger removal.
55	828		SS		WEATHERED SANDSTONE	13	33	10/8/15	4.5		Auger refusal at 56-ft. tool drop (void) 57' - 58'
60	821		LS		Light Gray, LIMESTONE, appreciable wormholes	14	80				RQD=52%
65	816		LS		Light Gray, LIMESTONE						
			LS		Light Gray, highly fractured, friable LIMESTONE						
					Boring terminated at 66-ft.						
70	811										
75	808										
80	801										
85	598										
90	591										
95	586										
100											

CONSOLIDATED OVERBURDEN  
BORING LOGS FOR  
LITHOLOGICAL CROSS SECTION D-D'

## Geologic Materials Descriptions of Abbreviated Geologic Descriptions on Boring Logs

UNC	Unconsolidated Glacial/Surficial Deposits
LS	Limestone
SH	Shale
LSH	Limey Shale
SSH	Sandy Shale
BSH	Black Shale
SS	Sandstone
COAL	Unidentified Coal Seam
UCLY	Underclay (Fireclay)
7	Danville No. 7 Coal
6	Herrin No. 6 Coal



SUNRISE COAL DRILL LOG

RIG: Sunrise

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.																						
	CUT	REC	FROM	TO	THICK																									
			0.00	54.73	54.73	UNC																								
			54.73	56.67	1.94	COAL																								
			56.67	58.00	1.33	UCLY																								
			58.00	66.00	8.00	SH																								
			66.00	128.00	62.00	SSH																								
			128.00	141.00	13.00	SS																								
			141.00	170.00	29.00	SH																								
			170.00	185.00	15.00	SSH																								
			185.00	214.00	29.00	SS																								
			214.00	228.00	14.00	SSH																								
			228.00	248.00	20.00	SS																								
			248.00	303.42	55.42	SH																								
			303.42	308.00	4.58	7																								
			308.00	312.65	4.65	UCLY																								
			312.65	319.40	6.75	SH																								
			319.40	319.95	0.55	LS																								
			319.95	328.23	8.28	SSH																								
			328.23	333.86	5.63	SH																								
			333.86	340.31	6.45	6																								
			340.31	342.00	1.69	UCLY																								
			342.00	342.00	0.00	TD																								
<table border="0" style="width:100%"> <tr> <td style="width:50%">HYDROLOGICAL DATA:</td> <td style="width:50%">DEPTH OF WATER:</td> </tr> <tr> <td>DRILL HOLE DATA SA-54-181410</td> <td>LOCATION Wolfe</td> </tr> <tr> <td>DATE DRILLED: 10/5/2010</td> <td>SECTION: 10</td> </tr> <tr> <td>DATE COMPLETED: 10/8/2010</td> <td>COUNTY: Vermilion</td> </tr> <tr> <td>DRILLER: Kevin</td> <td>STATE: ILL.</td> </tr> <tr> <td>HELPER: Travis</td> <td>TOWNSHIP: 18N</td> </tr> <tr> <td>TOTAL DEPTH: 342.0 ft.</td> <td>RANGE: 14W</td> </tr> <tr> <td>CORE SIZE: 3"</td> <td>QUAD:</td> </tr> <tr> <td>CASING DEPTH: 80.0 ft</td> <td>NORTHING: 1220739.72 Surface</td> </tr> <tr> <td># OF CEMENT BAGS: Truck</td> <td>EASTING: 1099927.08 665.0</td> </tr> <tr> <td>NOTES:</td> <td>EXPECTED TOP OF COAL:</td> </tr> </table>							HYDROLOGICAL DATA:	DEPTH OF WATER:	DRILL HOLE DATA SA-54-181410	LOCATION Wolfe	DATE DRILLED: 10/5/2010	SECTION: 10	DATE COMPLETED: 10/8/2010	COUNTY: Vermilion	DRILLER: Kevin	STATE: ILL.	HELPER: Travis	TOWNSHIP: 18N	TOTAL DEPTH: 342.0 ft.	RANGE: 14W	CORE SIZE: 3"	QUAD:	CASING DEPTH: 80.0 ft	NORTHING: 1220739.72 Surface	# OF CEMENT BAGS: Truck	EASTING: 1099927.08 665.0	NOTES:	EXPECTED TOP OF COAL:	E-LOGGED: Yes	GEO HOLE: _____
HYDROLOGICAL DATA:	DEPTH OF WATER:																													
DRILL HOLE DATA SA-54-181410	LOCATION Wolfe																													
DATE DRILLED: 10/5/2010	SECTION: 10																													
DATE COMPLETED: 10/8/2010	COUNTY: Vermilion																													
DRILLER: Kevin	STATE: ILL.																													
HELPER: Travis	TOWNSHIP: 18N																													
TOTAL DEPTH: 342.0 ft.	RANGE: 14W																													
CORE SIZE: 3"	QUAD:																													
CASING DEPTH: 80.0 ft	NORTHING: 1220739.72 Surface																													
# OF CEMENT BAGS: Truck	EASTING: 1099927.08 665.0																													
NOTES:	EXPECTED TOP OF COAL:																													





















CONSOLIDATED OVERBURDEN  
BORING LOGS FOR  
LITHOLOGICAL CROSS SECTION E-E'

## Geologic Materials Descriptions of Abbreviated Geologic Descriptions on Boring Logs

UNC	Unconsolidated Glacial/Surficial Deposits
LS	Limestone
SH	Shale
LSH	Limey Shale
SSH	Sandy Shale
BSH	Black Shale
SS	Sandstone
COAL	Unidentified Coal Seam
UCLY	Underclay (Fireclay)
7	Danville No. 7 Coal
6	Herrin No. 6 Coal

PAGE 1 OF 1							SUNRISE COAL DRILL LOG		RIG: Sunrise	
RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.		
	CUT	REC	FROM	TO	THICK					
			0.00	25.00	25.00	UNC				
			25.00	38.00	13.00	LS				
			38.00	51.00	13.00	SS				
			51.00	71.00	20.00	SH				
			71.00	92.00	21.00	SS				
			92.00	94.00	2.00	LS				
			94.00	118.00	24.00	SH				
			118.00	169.00	51.00	SS				
			169.00	180.00	11.00	SSH				
			180.00	215.00	35.00	SS				
			215.00	226.00	11.00	SH				
			226.00	234.79	8.79	SS				
			234.79	237.05	2.26	COAL				
			237.05	242.00	4.95	UCLY				
			242.00	313.22	71.22	SH				
			313.22	317.75	4.53	7				
			317.75	320.00	2.25	UCLY				
			320.00	329.02	9.02	SH				
			329.02	331.98	2.96	LSH				
			331.98	334.87	2.89	LS				
			334.87	347.18	12.31	SH				
			347.18	353.49	6.31	6				
			353.49	356.64	3.15	UCLY				
			356.64	359.00	2.36	SSH				
			359.00	359.00	0.00	TD				
HYDROLOGICAL DATA:							DEPTH OF WATER:			
DRILL HOLE DATA			SA-58-181422		LOCATION		O'Neil		E-LOGGED: Yes	
DATE DRILLED:			10/25/2010		SECTION:		22		GEO HOLE: _____	
DATE COMPLETED:			10/26/2010		COUNTY:		Vermilion			
DRILLER:			Kevin		STATE:		ILL.			
HELPER:			Travis		TOWNSHIP:		18N			
TOTAL DEPTH:			359.0 ft.		RANGE:		14W			
CORE SIZE:			3"		QUAD:		Homer			
CASING DEPTH:			40.0 ft.		NORTHING:		1212996.00		Surface	
# OF CEMENT BAGS:			Truck		EASTING:		1098663.00		683.0 ?	
NOTES:					EXPECTED TOP OF COAL:					

PAGE 1 OF 1							SUNRISE COAL DRILL LOG				RIG: Sunrise	
RUN #	CORE			DESCRIPTION OF ROCK NOTE				CORE DESC.	CORE GRAPH.			
	CUT	REC	FEET	FROM	TO	THICK						
			0.00	35.00		35.00	UNC					
			35.00	61.00		26.00	LS					
			61.00	151.00		90.00	SH					
			151.00	163.00		12.00	LSH					
			163.00	166.00		3.00	SSH					
			166.00	173.00		7.00	SH					
			173.00	177.00		4.00	LSH					
			177.00	193.00		16.00	SH					
			193.00	198.00		5.00	BSH					
			198.00	200.34		2.34	COAL					
			200.34	207.00		6.66	SH					
			207.00	213.00		6.00	LSH					
			213.00	224.00		11.00	SH					
			224.00	239.00		15.00	LSH					
			239.00	251.00		12.00	SH					
			251.00	256.00		5.00	LSH					
			256.00	317.17		61.17	SH					
			317.17	320.77		3.60	BSH					
			320.77	321.39		0.62	UCLY					
			321.39	325.92		4.53	7					
			325.92	330.25		4.33	UCLY					
			330.25	336.00		5.75	CORELOSS					
			336.00	337.50		1.50	UCLY					
			337.50	342.30		4.80	LS					
			342.30	352.90		10.60	SSH					
			352.90	353.45		0.55	LS					
			353.45	355.28		1.83	SSH					
			355.28	356.28		1.00	SH					
			356.28	362.81		6.53	6					
			362.81	364.15		1.34	UCLY					
			364.15	365.00		0.85	CORELOSS					
			365.00	365.00		0.00	TD					
HYDROLOGICAL DATA:							DEPTH OF WATER:					
DRILL HOLE DATA			SA-43-181423		LOCATION		O'Neil		E-LOGGED: Yes			
DATE DRILLED:			5/30/2010		SECTION:		23		GEO HOLE: _____			
DATE COMPLETED:			5/31/2010		COUNTY:		Vermilion					
DRILLER:			Kevin S.		STATE:		ILL.					
HELPER:			Travis K.		TOWNSHIP:		18N					
TOTAL DEPTH:			365.0 ft.		RANGE:		14W					
CORE SIZE:			3"		QUAD:		Allerton					
CASING DEPTH:			40.0 ft.		NORTHING:		1213760.32		Surface			
# OF CEMENT BAGS:			Truck		EASTING:		1100308.56		672			
NOTES:					EXPECTED TOP OF COAL:							









CONSOLIDATED OVERBURDEN  
BORING LOGS FOR  
LITHOLOGICAL CROSS SECTION F-F'

## Geologic Materials Descriptions of Abbreviated Geologic Descriptions on Boring Logs

UNC	Unconsolidated Glacial/Surficial Deposits
LS	Limestone
SH	Shale
LSH	Limey Shale
SSH	Sandy Shale
BSH	Black Shale
SS	Sandstone
COAL	Unidentified Coal Seam
UCLY	Underclay (Fireclay)
7	Danville No. 7 Coal
6	Herrin No. 6 Coal

PAGE 1 OF 1						SUNRISE COAL DRILL LOG				RIG: Magnum Drilling	
RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.			
	CUT	REC	FROM	TO	THICK						
			0.00	28.00	28.00	UNC					
			28.00	55.00	27.00	LS					
			55.00	89.00	34.00	SSH					
			89.00	117.00	28.00	SS					
			117.00	131.00	14.00	UCLY					
			131.00	137.00	6.00	SSH					
			137.00	138.60	1.60	COAL					
			138.60	144.00	5.40	UCLY					
			144.00	147.50	3.50	LS					
			147.50	150.00	2.50	LSH					
			150.00	158.00	8.00	LS					
			158.00	164.00	6.00	SSH					
			164.00	177.00	13.00	UCLY					
			177.00	180.00	3.00	LS					
			180.00	182.00	2.00	BSH					
			182.00	205.00	23.00	SH					
			205.00	218.00	13.00	LS					
			218.00	233.00	15.00	SH					
			233.00	244.00	11.00	SSH					
			244.00	310.00	66.00	SH					
			310.00	313.35	3.35	BSH					
			313.35	318.95	5.60	7					
			318.95	328.30	9.35	UCLY					
			328.30	331.15	2.85	LS					
			331.15	333.45	2.30	SH					
			333.45	340.80	7.35	LS					
			340.80	344.55	3.75	SSH					
			344.55	346.20	1.65	BSH					
			346.20	350.40	4.20	6					
			350.40	353.50	3.10	UCLY					
			353.50	364.70	11.20	SSH					
			364.70	364.70	0.00	TD					
HYDROLOGICAL DATA:						DEPTH OF WATER:					
DRILL HOLE DATA		SA-31-181330		LOCATION		Catlett		E-LOGGED: Yes			
DATE DRILLED:		5/13/2010		SECTION:		30		GEO HOLE: _____			
DATE COMPLETED:		5/13/2010		COUNTY:		Vermilion					
DRILLER:		Joey		STATE:		ILL.					
HELPER:		Dan/Josh		TOWNSHIP:		18N					
TOTAL DEPTH:		364.7 ft.		RANGE:		13W					
CORE SIZE:		3"		QUAD:		Homer					
CASING DEPTH:		30.0 ft.		NORTHING:		1213089.52 Surface					
# OF CEMENT BAGS:		35		EASTING:		1112374.56 674.4					
NOTES:				EXPECTED TOP OF COAL:							











CONSOLIDATED OVERBURDEN  
BORING LOGS FOR  
LITHOLOGICAL CROSS SECTION G-G'

## Geologic Materials Descriptions of Abbreviated Geologic Descriptions on Boring Logs

UNC	Unconsolidated Glacial/Surficial Deposits
LS	Limestone
SH	Shale
LSH	Limey Shale
SSH	Sandy Shale
BSH	Black Shale
SS	Sandstone
COAL	Unidentified Coal Seam
UCLY	Underclay (Fireclay)
7	Danville No. 7 Coal
6	Herrin No. 6 Coal

PAGE 1 OF 1						SUNRISE COAL DRILL LOG		RIG: Sunrise	
RUN #	CORE		FEET			DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.	
CUT	REC	FROM	TO	THICK					
		0.00	150.00	150.00	UNC				
		150.00	167.00	17.00	SH				
		167.00	185.00	18.00	SSH				
		185.00	200.00	15.00	SS				
		200.00	230.00	30.00	SSH				
		230.00	250.00	20.00	SS				
		250.00	288.00	38.00	SSH				
		288.00	344.37	56.37	SH				
		344.37	349.47	5.10	7				
		349.47	349.67	0.20	SSH				
		349.67	349.87	0.20	SH				
		349.87	357.12	7.25	UCLY				
		357.12	359.52	2.40	SSH				
		359.52	364.85	5.33	LS				
		364.85	381.73	16.88	SH				
		381.73	387.93	6.20	6				
		387.93	390.38	2.45	UCLY				
		390.38	396.00	5.62	LS				
		396.00	396.00	0.00	TD				
HYDROLOGICAL DATA:						DEPTH OF WATER:			
DRILL HOLE DATA	SA-2-171414		LOCATION	Beck		E-LOGGED:	Yes		
DATE DRILLED:	11/11/2009		SECTION:	14		GEO HOLE:			
DATE COMPLETED:	11/12/2009		COUNTY:	Vermilion					
DRILLER:	Kevin		STATE:	ILL.					
HELPER:	Bob		TOWNSHIP:	17N					
TOTAL DEPTH:	396.0 ft.		RANGE:	14W					
CORE SIZE:	3"		QUAD:	Allerton					
CASING DEPTH:	160.0 ft.		NORTHING:	1191453.00	Surface				
# OF CEMENT BAGS:			EASTING:	1104086.00	680.3				
NOTES:			EXPECTED TOP OF COAL:						





PAGE 1 OF 1						SUNRISE COAL DRILL LOG		RIG: Sunrise	
RUN #	CORE		FEET			DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.	
	CUT	REC	FROM	TO	THICK				
			0.00	52.00	52.00	UNC			
			52.00	62.00	10.00	LS			
			62.00	68.90	6.90	BSH			
			68.90	69.36	0.46	COAL			
			69.36	84.00	14.64	SH			
			84.00	130.00	46.00	SSH			
			130.00	146.00	16.00	SH			
			146.00	150.00	4.00	SSH			
			150.00	246.00	96.00	SS			
			246.00	260.00	14.00	LSH			
			260.00	266.00	6.00	UCLY			
			266.00	269.00	3.00	LS			
			269.00	321.29	52.29	SH			
			321.29	326.26	4.97	7			
			326.26	326.51	0.25	SH			
			326.51	328.81	2.30	UCLY			
			328.81	342.41	13.60	LS			
			342.41	353.99	11.58	SH			
			353.99	357.92	3.93	6			
			357.92	360.00	2.08	UCLY			
			360.00	360.00	0.00	TD			
HYDROLOGICAL DATA:						DEPTH OF WATER:			
DRILL HOLE DATA		SA-4-171402		LOCATION		Beck		E-LOGGED: Yes	
DATE DRILLED:		11/17/2009		SECTION:		2		GEO HOLE: _____	
DATE COMPLETED:		11/19/2009		COUNTY:		Vermilion			
DRILLER: Kevin				STATE:		ILL.			
HELPER: Bob				TOWNSHIP:		17N			
TOTAL DEPTH:		360.0 ft.		RANGE:		14W			
CORE SIZE: 3"				QUAD:		Allerton			
CASING DEPTH:		60.0 ft.		NORTHING:		1202276.17 Surface			
# OF CEMENT BAGS:				EASTING:		1105446.66 680.2			
NOTES:				EXPECTED TOP OF COAL:					









**REMAINING CONSOLIDATED  
OVERBURDEN BORING LOGS USED TO  
PREPARE SUBSIDENCE CONTROL PLAN**

## Geologic Materials Descriptions of Abbreviated Geologic Descriptions on Boring Logs

UNC	Unconsolidated Glacial/Surficial Deposits
LS	Limestone
SH	Shale
LSH	Limey Shale
SSH	Sandy Shale
BSH	Black Shale
SS	Sandstone
COAL	Unidentified Coal Seam
UCLY	Underclay (Fireclay)
7	Danville No. 7 Coal
6	Herrin No. 6 Coal







SUNRISE COAL DRILL LOG					RIG: Sunrise		
RUN #	CORE		DESCRIPTION OF ROCK NOTE			CORE DESC.	CORE GRAPH.
FEET							
CUT	REC	FROM	TO	THICK			
		0.00	24.30	24.30	UNC		
		24.30	39.30	15.00	LS		
		39.30	59.71	20.41	SSH		
		59.71	61.51	1.80	COAL		
		61.51	63.30	1.79	SH		
		63.30	89.30	26.00	SSH		
		89.30	155.30	66.00	SH		
		155.30	210.30	55.00	SSH		
		210.30	226.30	16.00	SS		
		226.30	232.30	6.00	SH		
		232.30	250.30	18.00	SSH		
		250.30	315.59	65.29	SH		
		315.59	320.27	4.68	7		
		320.27	329.52	9.25	UNCLY		
		329.52	332.37	2.85	SSH		
		332.37	334.97	2.60	LS		
		334.97	335.72	0.75	SH		
		335.72	337.62	1.90	LS		
		337.62	346.27	8.65	SSH		
		346.27	348.27	2.00	LS		
		348.27	357.22	8.95	SSH		
		357.22	359.66	2.44	SH		
		359.66	366.27	6.61	6		
		366.27	366.70	0.43	UNCLY		
		366.70	366.70	0.00	TD		
HYDROLOGICAL DATA:							DEPTH OF WATER:
DRILL HOLE DATA	SA-26-181434		LOCATION	Hageman		E-LOGGED:	Yes
DATE DRILLED:	5/5/2010		SECTION:	34		GEO HOLE:	
DATE COMPLETED:	5/6/2010		COUNTY:	Vermilion			
DRILLER:	Kevin S.		STATE:	ILL.			
HELPER:	Travis K.		TOWNSHIP:	18N			
TOTAL DEPTH:	374.4 ft.		RANGE:	14W			
CORE SIZE:	3"		QUAD:	Allerton			
CASING DEPTH:	40.0 ft.		NORTHING:	1207739.13	Surface		
# OF CEMENT BAGS:	40		EASTING:	1108142.78	678.3		
NOTES:							EXPECTED TOP OF COAL:

PAGE 1 OF 1						SUNRISE COAL DRILL LOG			RIG: Sunrise	
RUN #	CORE		FEET			DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.		
	CUT	REC	FROM	TO	THICK					
			0.00	35.70	35.70	UNC				
			35.70	57.70	22.00	LS				
			57.70	84.70	27.00	SH				
			84.70	124.70	40.00	SS				
			124.70	152.70	28.00	SH				
			152.70	157.70	5.00	SSH				
			157.70	193.70	36.00	SH				
			193.70	218.70	25.00	SS				
			218.70	243.70	25.00	SH				
			243.70	249.70	6.00	LS				
			249.70	334.15	84.45	SH				
			334.15	338.92	4.77	7				
			338.92	347.87	8.95	UNCLY				
			347.87	349.72	1.85	SSH				
			349.72	356.07	6.35	LS				
			356.07	366.70	10.63	SSH				
			366.70	371.92	5.22	6				
			371.92	374.70	2.78	UNCLY				
			374.70		0.00	TD				
HYDROLOGICAL DATA:						DEPTH OF WATER:				
DRILL HOLE DATA		SA-33-181426		LOCATION		N. Ready		E-LOGGED: Yes		
DATE DRILLED:		5/20/2010		SECTION:		26		GEO HOLE: _____		
DATE COMPLETED:		5/21/2010		COUNTY:		Vermilion				
DRILLER:		Dusty L.		STATE:		ILL.				
HELPER:		Kevin L.		TOWNSHIP:		18N				
TOTAL DEPTH:		380.0 ft.		RANGE:		14W				
CORE SIZE:		3"		QUAD:		Allerton				
CASING DEPTH:		40.0 ft.		NORTHING:		1204950.14 Surface				
# OF CEMENT BAGS:		Truck		EASTING:		1100921.63 672.7				
NOTES:		EXPECTED TOP OF COAL:								





SUNRISE COAL DRILL LOG

RIG: Sunrise  
CORE DESC.  
CORE GRAPH.

RUN #	CORE					DESCRIPTION OF ROCK NOTE
	FEET					
	CUT	REC	FROM	TO	THICK	
			0.00	28.00	28.00	UNC
			28.00	42.00	14.00	LS
			42.00	49.00	7.00	LSH
			49.00	51.00	2.00	BSH
			51.00	59.00	8.00	SH
			59.00	77.00	18.00	SSH
			77.00	83.00	6.00	SH
			83.00	87.00	4.00	SSH
			87.00	96.00	9.00	SS
			96.00	99.00	3.00	LS
			99.00	118.00	19.00	SS
			118.00	128.00	10.00	SH
			128.00	144.00	16.00	SSH
			144.00	160.00	16.00	SH
			160.00	192.00	32.00	SS
			192.00	202.00	10.00	SH
			202.00	206.00	4.00	SSH
			206.00	210.00	4.00	SH
			210.00	211.83	1.83	BSH
			211.83	213.47	1.64	COAL
			213.47	219.00	5.53	LS
			219.00	225.00	6.00	SSH
			225.00	236.37	11.37	SH
			236.37	237.90	1.53	COAL
			237.90	241.00	3.10	UCLY
			241.00	243.00	2.00	LS
			243.00	246.00	3.00	SS
			246.00	253.00	7.00	SH
			253.00	254.00	1.00	LS
			254.00	295.00	41.00	SH
			295.00	298.00	3.00	LS
			298.00	317.00	19.00	SH
			317.00	320.09	3.09	BSH
			320.09	325.25	5.16	7
			325.25	336.00	10.75	SH
			336.00	340.75	4.75	LSH
			340.75	342.11	1.36	LS
			342.11	357.73	15.62	SH
			357.73	358.32	0.59	LS
			358.32	359.35	1.03	SH
			359.35	365.51	6.16	6
			365.51	367.44	1.93	UCLY
			367.44	371.18	3.74	SH
			371.18	372.86	1.68	LS
			372.86	373.00	0.14	CORELOSS
			373.00	373.00	0.00	TD

HYDROLOGICAL DATA:		DEPTH OF WATER:	
DRILL HOLE DATA	SA-67-181426	LOCATION	Children's Home
DATE DRILLED:	6/20/2011	SECTION:	26
DATE COMPLETED:	6/22/2011	COUNTY:	Vermilion
DRILLER:	Kevin S.	STATE:	Ill.
HELPER:	Travis K.	TOWNSHIP:	Vance 18N
TOTAL DEPTH:	373.0 ft.	RANGE:	
CORE SIZE:	3"	QUAD:	Allerton
CASING DEPTH:	42.0 ft.	NORTHING:	1210331.80 Surface
# OF CEMENT BAGS:	Truck	EASTING:	1100188.14 675.6
NOTES:	Temp # 301 18/14/26	EXPECTED TOP OF COAL:	

E-LOGGED: Yes  
GEO HOLE:



SUNRISE COAL DRILL LOG

RIG: Sunrise

RUN #	CORE	FEET			DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
		CUT	REC	THICK			
			0.00	30.00	30.00	UNC	
			30.00	37.00	7.00	LS	
			37.00	48.00	11.00	SH	
			48.00	58.00	10.00	SS	
			58.00	61.00	3.00	SH	
			61.00	68.00	7.00	SS	
			68.00	74.00	6.00	SSH	
			74.00	79.00	5.00	SH	
			79.00	92.00	13.00	SS	
			92.00	98.00	6.00	SH	
			98.00	108.00	10.00	SS	
			108.00	119.00	11.00	SH	
			119.00	138.00	19.00	SS	
			138.00	140.00	2.00	SSH	
			140.00	168.00	28.00	SS	
			168.00	175.00	7.00	SSH	
			175.00	241.00	66.00	SS	
			241.00	244.00	3.00	SH	
			244.00	248.00	4.00	SSH	
			248.00	261.00	13.00	SS	
			261.00	295.00	34.00	SH	
			295.00	300.00	5.00	SSH	
			300.00	302.00	2.00	SS	
			302.00	305.00	3.00	LS	
			305.00	306.00	1.00	SS	
			306.00	326.10	20.10	SH	
			326.10	330.15	4.05	7	
			330.15	333.00	2.85	UCLY	
			333.00	336.00	3.00	SSH	
			336.00	338.00	2.00	SS	
			338.00	340.40	2.40	SH	
			340.40	346.54	6.14	LS	
			346.54	346.74	0.20	SH	
			346.74	346.91	0.17	LS	
			346.91	371.53	24.62	SH	
			371.53	378.53	7.00	6	
			378.53	380.01	1.48	SH	
			380.01	381.77	1.76	LS	
			381.77	386.25	4.48	SH	
			386.25	388.00	1.75	CORELOSS	
			388.00		0.00	TD	

HYDROLOGICAL DATA:

DEPTH OF WATER:

DRILL HOLE DATA	SA-75-181427	LOCATION	Edgar Kizer
DATE DRILLED:	7/22/2011	SECTION:	27
DATE COMPLETED:	7/26/2011	COUNTY:	Vermilion
DRILLER:	Kevin S.	STATE:	ILL.
HELPER:	Travis K.	TOWNSHIP:	Vance 18N
TOTAL DEPTH:	388.0 ft.	RANGE:	14W
CORE SIZE:	3"	QUAD:	Allerton
CASING DEPTH:	50.0 ft.	NORTHING:	1207712.73 Surface
# OF CEMENT BAGS:	Truck	EASTING:	1098388.02 686.3
NOTES:	Temp #308 18/14/27	EXPECTED TOP OF COAL:	

E-LOGGED: Yes  
GEO HOLE: \_\_\_\_\_

SUNRISE COAL DRILL LOG

RIG: Sunrise

RUN #	CORE	FEET				DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
		CUT	REC	FROM	TO			
				0.00	34.00	34.00	UNC	
				34.00	48.00	14.00	LS	
				48.00	68.00	20.00	SH	
				68.00	70.39	2.39	BSH	
				70.39	71.20	0.81	COAL	
				71.20	74.00	2.80	SSH	
				74.00	81.00	7.00	SS	
				81.00	85.00	4.00	SH	
				85.00	101.00	16.00	SS	
				101.00	124.00	23.00	SH	
				124.00	136.00	12.00	SSH	
				136.00	159.00	23.00	SH	
				159.00	168.00	9.00	SSH	
				168.00	180.00	12.00	SH	
				180.00	261.00	81.00	SS	
				261.00	310.00	49.00	SH	
				310.00	313.00	3.00	SSH	
				313.00	328.00	15.00	SH	
				328.00	329.00	1.00	BSH	
				329.00	333.40	4.40	7	
				333.40	336.00	2.60	UCLY	
				336.00	337.00	1.00	SSH	
				337.00	338.00	1.00	SS	
				338.00	340.98	2.98	SH	
				340.98	345.41	4.43	LS	
				345.41	346.44	1.03	SH	
				346.44	348.42	1.98	LS	
				348.42	372.14	23.72	SH	
				372.14	379.24	7.10	6	
				379.24	381.80	2.56	UCLY	
				381.80	382.40	0.60	LS	
				382.40	384.10	1.70	LSH	
				384.10	384.80	0.70	SH	
				384.80	385.43	0.63	BSH	
				385.43	386.00	0.57	SH	
				386.00	386.00	0.00	TD	

HYDROLOGICAL DATA:

DEPTH OF WATER:

DRILL HOLE DATA	SA-78-181434	LOCATION	Hageman	E-LOGGED:	Yes
DATE DRILLED:	8/3/2011	SECTION:	34	GEO HOLE:	
DATE COMPLETED:	8/5/2011	COUNTY:	Vermilion		
DRILLER:	Kevin S.	STATE:	ILL.		
HELPER:	Travis K.	TOWNSHIP:	Vance 18N		
TOTAL DEPTH:	386.0 ft.	RANGE:	14W		
CORE SIZE:	3"	QUAD:	Allerton		
CASING DEPTH:	40.0 ft.	NORTHING:	1206243.06	Surface	
# OF CEMENT BAGS:	Truck	EASTING:	1100084.30	680.6	
NOTES:	Temp #308 18/14/34	EXPECTED TOP OF COAL:			





PAGE 1 OF 1						SUNRISE COAL DRILL LOG			RIG: Sunrise	
RUN #	CORE	FEET			DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.			
		CUT	REC	THICK						
			0.00	49.00	49.00	UNC				
			49.00	52.00	3.00	LS				
			52.00	54.00	2.00	SS				
			54.00	65.00	11.00	LSH				
			65.00	68.00	3.00	SS				
			68.00	69.45	1.45	BSH				
			69.45	71.10	1.65	COAL				
			71.10	73.00	1.90	SH				
			73.00	81.00	8.00	SS				
			81.00	87.00	6.00	SH				
			87.00	118.00	31.00	SS				
			118.00	123.00	5.00	SSH				
			123.00	173.00	50.00	SS				
			173.00	178.00	5.00	SH				
			178.00	258.00	80.00	SS				
			258.00	260.00	2.00	SH				
			260.00	274.00	14.00	SS				
			274.00	304.00	30.00	SH				
			304.00	305.00	1.00	SS				
			305.00	325.00	20.00	SH				
			325.00	329.64	4.64	SS				
			329.64	333.84	4.20	7				
			333.84	335.76	1.92	SH				
			335.76	336.01	0.25	LS				
			336.01	336.21	0.20	LSH				
			336.21	337.03	0.82	SH				
			337.03	339.58	2.55	LSH				
			339.58	349.36	9.78	LS				
			349.36	355.79	6.43	SH				
			355.79	362.73	6.94	BSH				
			362.73	368.53	5.80	E				
			368.53	370.00	1.47	UCLY				
			370.00	373.20	3.20	SH				
			373.20	373.69	0.49	LS				
			373.69	377.98	4.29	SH				
			377.98	379.30	1.32	CORELOSS				
			379.30	379.30	0.00	TD				
HYDROLOGICAL DATA:						DEPTH OF WATER:				
DRILL HOLE DATA		SA-85-181435		LOCATION		Joan Allen Trust		E-LOGGED: <u>Yes</u>		
DATE DRILLED:		9/16/2011		SECTION:		35		GEO HOLE: _____		
DATE COMPLETED:		9/26/2011		COUNTY:		Vermilion				
DRILLER:		Kevin S.		STATE:		ILL.				
HELPER:		Travis K.		TOWNSHIP:		Sidell 18N				
TOTAL DEPTH:		379.3 ft.		RANGE:		14W				
CORE SIZE:		3"		QUAD:		Allerton				
CASING DEPTH:		62.0 ft.		NORTHING:		1203693.53 Surface				
# OF CEMENT BAGS:		Truck		EASTING:		1104145.49 682.5				
NOTES:				EXPECTED TOP OF COAL:						

SUNRISE COAL DRILL LOG						RIG: Sunrise	
RUN #	CORE			DESCRIPTION OF ROCK NOTE		CORE DESC.	CORE GRAPH.
	CUT	REC	FROM	TO	THICK		
			0.00	66.00	66.00	UNC	
			66.00	70.00	4.00	BSH	
			70.00	78.00	8.00	SH	
			78.00	85.00	7.00	SSH	
			85.00	139.00	54.00	SS	
			139.00	148.00	9.00	LSH	
			148.00	156.00	8.00	SH	
			156.00	160.00	4.00	SSH	
			160.00	178.00	18.00	SS	
			178.00	200.00	22.00	SH	
			200.00	258.00	58.00	SS	
			258.00	260.00	2.00	LS	
			260.00	279.00	19.00	SS	
			279.00	314.00	35.00	SH	
			314.00	328.00	14.00	SSH	
			328.00	342.00	14.00	SH	
			342.00	347.90	5.90	7	
			347.90	348.00	0.10	UCLY	
			348.00	349.78	1.78	SH	
			349.78	354.37	4.59	LS	
			354.37	356.17	1.80	LSH	
			356.17	356.83	0.66	LS	
			356.83	357.32	0.49	LSH	
			357.32	359.73	2.41	LS	
			359.73	362.18	2.45	SH	
			362.18	363.44	1.26	LS	
			363.44	363.67	0.23	SH	
			363.67	363.82	0.15	LS	
			363.82	364.95	1.13	LSH	
			364.95	383.25	18.30	SH	
			383.25	389.95	6.70	6	
			389.95	392.20	2.25	UCLY	
			392.20	393.52	1.32	LSH	
			393.52	395.03	1.51	SH	
			395.03	395.59	0.56	LS	
			395.59	396.32	0.73	SH	
			396.32	397.32	1.00	LSH	
			397.32	399.40	2.08	SH	
			399.40	400.00	0.60	CORELOSS	
			400.00	400.00	0.00	TD	
HYDROLOGICAL DATA:						DEPTH OF WATER:	
DRILL HOLE DATA SA-86-181435			LOCATION Warter			E-LOGGED: Yes	
DATE DRILLED: 9/28/2011			SECTION: 35			GEO HOLE: _____	
DATE COMPLETED: 10/3/2011			COUNTY: Vermillion				
DRILLER: Kevin S.			STATE: ILL.				
HELPER: Travis K.			TOWNSHIP: Sidell 18N				
TOTAL DEPTH: 400.0 ft.			RANGE: 14W				
CORE SIZE: 3"			QUAD: Allerton				
CASING DEPTH: 70.0 ft.			NORTHING: 1205637.85 Surface				
# OF CEMENT BAGS: Truck			EASTING: 1102826.68 688				
NOTES:			EXPECTED TOP OF COAL:				



SUNRISE COAL DRILL LOG

RIG: Magnum Drilling

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	CUT	REC	FROM	TO	THICK			
	FEET							
			0.00	33.00	33.00	UNC		
			33.00	54.00	21.00	LS		
			54.00	70.00	16.00	SSH		
			70.00	72.40	2.40	COAL		
			72.40	80.00	7.60	SS		
			80.00	158.00	78.00	SSH		
			158.00	160.00	2.00	SS		
			160.00	181.00	21.00	SSH		
			181.00	185.00	4.00	SS		
			185.00	188.00	3.00	SSH		
			188.00	189.00	1.00	BSH		
			189.00	189.50	0.50	COAL		
			189.50	213.00	23.50	UCLY		
			213.00	213.40	0.40	COAL		
			213.40	222.00	8.60	SH		
			222.00	233.00	11.00	LS		
			233.00	268.00	35.00	SH		
			268.00	273.00	5.00	SSH		
			273.00	310.00	37.00	SH		
			310.00	313.60	3.60	7		
			313.60	315.00	1.40	UCLY		
			315.00	329.50	14.50	SSH		
			329.50	331.50	2.00	LS		
			331.50	352.50	21.00	SSH		
			352.50	359.10	6.60	6		
			359.10	363.80	4.70	UCLY		
			363.80	364.30	0.50	LS		
			364.30	367.20	2.90	SSH		
			367.20	367.40	0.20	BSH		
			367.40	371.20	3.80	UCLY		
			371.20	377.90	6.70	SS		
			377.90	377.90	0.00	TD		

HYDROLOGICAL DATA:		DEPTH OF WATER:		E-LOGGED: <u>Yes</u>	GEO HOLE: _____
DRILL HOLE DATA	SA-93-181434	LOCATION	hageman		
DATE DRILLED:	10/11/2011	SECTION:	34		
DATE COMPLETED:	10/12/2011	COUNTY:	Vermilion		
DRILLER:	Mike	STATE:	ILL.		
HELPER:	Pup	TOWNSHIP:	Sidell 18N		
TOTAL DEPTH:	377.9 ft.	RANGE:	14W		
CORE SIZE:	3"	QUAD:	Allerton		
CASING DEPTH:	35.0 ft.	NORTHING:	1204934.48	Surface	
# OF CEMENT BAGS:	Truck	EASTING:	1098836.74	690.6	
NOTES:		EXPECTED TOP OF COAL:			

Sunrise Coal, LLC  
Bulldog Mine  
Permit No. 429

# ATTACHMENT III-2A2

ANALYTICAL DATA COLLECTION DOCUMENTATION  
AND  
UNCONSOLIDATED AND CONSOLIDATED MATERIAL  
BORING LOGS,  
ACID-BASE ACCOUNTING LABORATORY ANALYSIS  
AND  
CROSS-REFERENCE KEY TO CORRELATE BORING  
LOGS WITH LAB ANALYSIS



***PATRIOT ENGINEERING  
and Environmental, Inc.***

*Engineering Value for Project Success  
Consulting Environmental, Geotechnical  
and Materials Engineers*

To: Mr. Stewart Boyd/Sunrise Coal, LLC

From: Tim Govert/Patriot Engineering

Date: June 5, 2014

Re: Technical Data Used In Application for Bulldog Mine

In response to the requirements of IDNR Reg 62 Ill. Adm. Code 1777.13(a) we offer the following as it pertains to our services provided for the mine permit application.

Our sampling, testing and evaluations performed during the preparation of the Geotechnical report and addenda have been conducted using personnel employed by Patriot Engineering and Environmental, Inc. (Patriot), with the sole exception being the drilling efforts, which were performed by Hoosier Drilling Contractors under direct contract with Patriot. Laboratory and field sampling and testing were performed using applicable ASTM Standards and during the time periods referenced on the various laboratory test reports and in our report narratives.

The following list provides the names and applicable functions of Patriot and Hoosier Drilling personnel that have serviced this project:

**Patriot Engineering Personnel:**

<b>Name</b>	<b>Title</b>	<b>General Functions</b>
William D. Dubois, PE	Senior Project Engineer	Report Review, Senior Geotechnical consultation
Salim Ilmudeen, PE	Senior Project Engineer	Geotechnical Data Review, Geotechnical Calculation, Slope Stability Analysis, Report generation
Timothy C. Govert	Senior Project Manager	Project Management, Field supervision of drill crews, sampling, Boring log development, Client meetings,
Brian Swenty PhD, PE	Senior Project Engineer	Hydrologic and Hydraulic Analysis
John Phillips	Operations Manager/Lab Manager	Laboratory coordination & Testing
Sean Smith, PE	Senior Project Manager	Geotechnical Data Review, Geotechnical Calculation, Geotechnical staff management
Eric Wenz, EI	Staff Engineer	Slope Stability & Seismic data input & calculation, CAD preparation, general engineer assistance
Sara Vaught	Geotechnical Lab Technician	Laboratory testing
Samantha Wilmann	Staff Engineer	Slope Stability & Seismic data input & calculation, CAD preparation, general engineer assistance
Ronal Price	Geophysical Technician	Slug Testing
John Marks	Geologist	Slug Testing
Brandon Sherfield	Environmental Technician	Slug Testing
Tyler Smith	Geotechnical Lab Technician	Laboratory testing
Lisa Atchison	Geotechnical Admin Assistant	Boring Log Generation; general administrative assistance
Rachel M. Elliott	Geotechnical Lab Technician	Laboratory testing

**Hoosier Drilling Personnel:**

Gary Taylor	Driller	Drilling Soil Borings; well installation; develop field logs
Joe Sizemore	Driller Assistant	Drilling activities; collect samples from split spoons
Jeremy Bush	Driller Assistant	Drilling activities; collect samples from split spoons



**PATRIOT ENGINEERING  
and Environmental Inc.**

Indianapolis, Terre Haute, Evansville, Fort Wayne,  
Lafayette, Louisville KY, Dayton OH, Nashville TN

**LOG OF BORING B-6**

(Page 1 of 1)

**Allerton Mine  
Preliminary Investigation  
Homer - Allerton, Illinois**

Client Name: **Sunrise Coal, LLC**  
Project Number: **02-11-0383**  
Logged By: **T. Govert**  
Start Date: **4/13/11**  
Drilling Method: **HSA**

Driller: **Gary Taylor**  
Sampling: **Splitspoon**  
Weather: **Sunny, 60F**  
Latitude: **39 08187**  
Longitude: **-87 91650**

**Water Levels**

- ▼ During Drilling 12-ft
- ▼ After Completion 14-ft

Depth in Feet	Surf Elev 876.2	Water Level	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	SPT Results	Qp tsf	w %	REMARKS
0	876		OL		Dark Brown, moist, very stiff ORGANIC CLAY	1	56	4/4/7	2.9	23	
			CL		Tannish Gray, moist, stiff SILTY CLAY with trace fine sand	2	67	4/5/4	1.0	24	
5	871		CL		Grayish Tan, moist, stiff SANDY SILTY CLAY	3	78	3/4/4	1.5	18	
			CL			4	100	3/4/5	1.5	18	
10	866	▼	SP-SM		Light Brown, very moist, medium dense, fine to medium SAND with a little silt trace small gravel	5	78	6/6/10			
		▼	CL		Gray, moist, very stiff SILTY CLAY with trace fine sand and small gravel	6	78	9/10/12	3.0	13	
			CL		Gray, slightly moist, hard to very stiff SANDY SILTY CLAY with trace small gravel (GLACIAL TILL)	7	78	6/7/9	4.5	12	
20	856		CL			8	100	17/16/16	>4.5	13	
			CL			9	88	18/17/17	>4.5	11	
			CL			10	100	7/8/11	2.5	14	
25	851		CL			11	100	9/13/12	4.5	11	
			CL		Gray, moist, very stiff SILTY CLAY with trace fine sand and small gravel (GLACIAL TILL)	12	100	5/7/9	2.5	12	
			CL			13	88	6/8/9	1.75	13	
30	846		CL			14	87	26/31/25	>4.5	15	Bore hole collapsed to 33-feet after auger removal
			CL		Brown, slightly moist, hard SILTY CLAY with limestone fragments (GLACIAL TILL)	15	87	21/33/22	>4.5		
35	841		SH		Dark Gray, WEATHERED SHALE	16	17	50.5'			
40	836				Auger Refusal at 40-ft.						



STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISK COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Allerton Mine  
Hole Number: B-6  
Date Sampled: April 2011  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-238-1	2012-238-2	2012-238-3	2012-238-4	2012-238-5		
Sample Interval, ft	1-2.5	3.5-5.0	6-7.5	8.5-10	11-12.5		
Description	organic clay	silty clay	sandy silty clay	sandy silty clay	sand		
						Units of	
Acid-Base Account:						Measure	Analyzed Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	7.5	7.8	8.0	8.2	8.1	Units	03/01/12 SJN
Sulfur, Total (ASTM D4239C)	0.10	0.13	0.25	0.12	<0.10	% as detd	03/06/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.10	0.13	0.10	0.12	0.08	% as detd	02/28/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	3.13	4.06	3.13	3.75	2.50	Ton CaCO3/T Ton	Calculated
Fixx Rate (EPA-600/2-78-054 3.2.3)	1	0	2	2	3	Rating	02/27/12 SJN
Neutralization Potential (EPA-600/2-78-054 3.2.3)	26.80	25.25	206.98	230.67	286.43	Ton CaCO3/T Ton	02/29/12 SJN
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	23.67	21.19	203.85	226.92	283.93	Ton CaCO3/T Ton	Calculated

Respectfully Submitted,

  
Judith W. Spider



## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

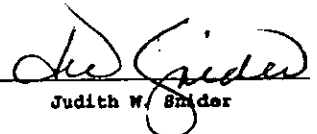
1530 North Cullen Avenue, Evansville, IN 47715

Area: Allerton Mine  
Hole Number: B-6  
Date Sampled: April 2011  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-238-6	2012-238-7	2012-238-8	2012-238-9	2012-238-10	Units of	
Sample Interval, ft	13.5-15	16-17.5	18.5-20.0	31-32.5	23.5-25		
Description	silty clay	sandy silty clay	sandy silty clay	sandy silty clay	sandy silty clay		
<b>Acid-Base Account:</b>						<b>Measure</b>	<b>Analyzed Tech</b>
pH, Paste (EPA-600/2-78-054 3.2.2)	7.9	8.1	8.2	7.9	8.0	Units	03/01/12 SJH
Sulfur, Total (ASTM D4239C)	0.27	0.16	0.14	0.33	0.24	% as detd	03/06/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.27	0.16	0.14	0.30	0.24	% as detd	02/28/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	8.44	5.00	4.38	9.38	7.50	Ton CaCO <sub>3</sub> /T Ton	Calculated
Fixx Rate (EPA-600/2-78-054 3.2.3)	2	2	2	2	2	Rating	02/27/12 SJH
Neutralization Potential (EPA-600/2-78-054 3.2.3)	280.55	223.19	234.41	239.40	229.43	Ton CaCO <sub>3</sub> /T Ton	03/01/12 SJH
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	272.11	218.19	230.03	230.02	221.93	Ton CaCO <sub>3</sub> /T Ton	Calculated

Respectfully Submitted,

  
Judith W. Snider



STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Allerton Mine  
Hole Number: B-6  
Date Sampled: April 2011  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-238-11	2012-238-12	2012-238-13	2012-238-14	2012-238-15	Units of	
Sample Interval, ft	26-27.5	28.5-30	33.5-35	36-37.5	38.5-40	Measure	Analyzed Tech
Description	sandy silty clay	silty clay	silty clay	silty clay	silty clay	Units	
Acid-Base Account:							
pH, Paste (EPA-600/2-78-054 3.2.2)	9.0	8.0	8.3	8.1	8.2		03/01/12 SJW
Sulfur, Total (ASTM D4239C)	0.60	0.34	<0.10	<0.10	0.11	% as detd	03/06/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.58	0.34	0.09	0.08	0.11	% as detd	02/28/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	18.13	10.63	2.81	2.50	3.44	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	2	2	2	1	2	Rating	02/27/12 SJW
Neutralization Potential (EPA-600/2-78-054 3.2.3)	252.49	258.10	248.13	51.86	318.58	Ton CaCO3/T Ton	03/01/12 SJW
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	234.36	247.47	245.32	49.36	315.14	Ton CaCO3/T Ton	Calculated

Respectfully Submitted,


  
Judith W. Snider

Allerton Mine  
 Summary of Unconsolidated Overburden Net Neutralization Potential and  
 Correlation of Log of Boring B6 and Standard Labs Analysis Laboratory ID

Boring Log Sample ID #	Standard Labs Laboratory ID #	Depth to Top of Strata	Depth to Bottom of Strata	Strata Thickness	Strata Description	Tons CaCO <sub>3</sub> Equiv. per 1000 Tons Material			
						Potential Acidity	Neutralization Potential	Net Neutralization Potential Needed	Excess
1	2012-238-1	1.00	2.50	1.50	organic clay	3.13	26.80	-	23.67
2	2012-238-2	3.50	5.00	1.50	silty clay	4.06	25.25	-	21.19
3 & 4	2012-238-3 to 2012-238-4	6.00	7.50	1.50	sandy silty clay	3.13	206.98	-	203.85
3 & 4	2012-238-3 to 2012-238-4	8.50	10.00	1.50	sandy silty clay	3.75	230.67	-	226.92
5	2012-238-5	11.00	12.50	1.50	sand	2.50	286.43	-	283.93
6	2012-238-6	13.50	15.00	1.50	silty clay	8.44	280.55	-	272.11
7 to 11	2012-238-7 to 2012-238-11	16.00	17.50	1.50	sandy silty clay	5.00	223.19	-	218.19
7 to 11	2012-238-7 to 2012-238-11	18.50	20.00	1.50	sandy silty clay	4.38	234.41	-	230.03
7 to 11	2012-238-7 to 2012-238-11	23.50	25.00	1.50	sandy silty clay	7.50	229.43	-	221.93
7 to 11	2012-238-7 to 2012-238-11	26.00	27.50	1.50	sandy silty clay	18.13	252.49	-	234.36
12 & 13	2012-238-12 to 2012-238-13	28.50	30.00	1.50	silty clay	10.63	258.10	-	247.47
12 & 13	2012-238-12 to 2012-238-13	31.00	32.50	1.50	sandy silty clay	9.38	239.40	-	230.02
14 & 15	2012-238-14 to 2012-238-15	33.50	35.00	1.50	silty clay	2.81	248.13	-	245.32
14 & 15	2012-238-14 to 2012-238-15	36.00	37.50	1.50	silty clay	2.50	51.86	-	49.36
14 & 15	2012-238-14 to 2012-238-15	38.50	40.00	1.50	silty clay	3.44	318.58	-	315.14
Total Sum of Data						88.78	3,112.27	0.00	3,023.49





1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Vermilion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-1	2012-239-2	2012-239-3	2012-239-4	2012-239-5	Units of	
Sample Interval, ft	38.0-46.0	46.0-46.40	46.0- ?	58.0-68.0	68.0-78.0		
Description	limestone	underclay	underclay	silt shale	silt shale		
<b>Acid-Base Account:</b>						<b>Measure</b>	<b>Analyzed Tech</b>
pH, Paste (EPA-600/2-78-054 3.2.2)	8.6	7.8	7.6	8.5	8.5	Units	02/21/12 SJM
Sulfur, Total (ASTM D4239C)	0.10	0.94	1.74	1.54	0.68	% as detd	03/07/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.10	0.67	1.37	1.24	0.68	% as detd	02/28/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	3.13	20.94	42.81	38.75	21.25	Ton CaCO3/T Ton	Calculated
Fixx Rate (EPA-600/2-78-054 3.2.3)	3	2	2	1	2	Rating	02/20/12 SJM
Neutralization Potential (EPA-600/2-78-054 3.2.3)	953.92	114.09	60.95	53.24	101.62	Ton CaCO3/T Ton	03/06/12 SJM
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	950.79	93.15	18.14	14.49	80.37	Ton CaCO3/T Ton	Calculated

Respectfully Submitted,

  
Judith W. Shider



STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Vermilion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-6	2012-239-7	2012-239-8	2012-239-9	2012-239-10		
Sample Interval, ft	78.0-86.0	86.0-88.05	88.05-99.35	99.35-100.7	100.7-110.7		
Description	silt shale	silt shale	sandy shale	inter-laminated silt shale and sandstone	mudstone		Units of
Acid-Base Account:						Measure	Analysed Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	8.7	8.6	9.6	9.6	9.7	Units	02/21/12 SJH
Sulfur, Total (ASTM D4239C)	0.85	1.14	0.18	0.18	0.16	% as detd	03/10/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.85	1.14	0.18	0.18	0.16	% as detd	03/01/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	26.56	35.63	5.63	5.63	5.00	Ton CaCO3/T Ton	Calculated
Fire Rate (EPA-600/2-78-054 3.2.3)	2	1	1	0	0	Rating	02/20/12 SJH
Neutralization Potential (EPA-600/2-78-054 3.2.3)	94.76	67.33	25.93	8.66	15.35	Ton CaCO3/T Ton	03/05/12 SJH
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	68.20	31.70	20.30	3.03	10.35	Ton CaCO3/T Ton	Calculated

Respectfully Submitted,

  
Judith W. Snider



STANDARD LABORATORIES, INC.

1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Vermilion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-11	2012-239-12	2012-239-13	2012-239-14	2012-239-15		
Sample Interval, ft	110.7-114.40	114.4-117.7	117.70-127.70	127.7-137.7	137.7-147.7		
Description	mudstone	inter-laminated silt shale and sandstone	silt shale	silt shale	silt shale	Units of	
Acid-Base Account:						Measure	Analyzed Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	9.8	9.6	9.5	9.8	9.8	Units	02/21/12 SJM
Sulfur, Total (ASTM D4239C)	0.16	0.15	0.26	0.24	0.29	% as detd	03/07/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.16	0.15	0.26	0.24	0.29	% as detd	03/01/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	5.00	4.69	8.13	7.50	9.06	Ton CaCO3/T Ton	Calculated
Fixx Rate (EPA-600/2-78-054 3.2.3)	0	0	1	1	1	Rating	02/20/12 SJM
Neutralization Potential (EPA-600/2-78-054 3.2.3)	18.07	33.04	49.50	52.85	56.82	Ton CaCO3/T Ton	02/22/12 SJM
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	13.07	28.35	41.37	45.35	47.76	Ton CaCO3/T Ton	Calculated

Respectfully Submitted,

Judith W. Snider



## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

1530 North Cullen Avenue, Evansville, IN 47715

Area: Vermilion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-16	2012-239-17	2012-239-18	2012-239-19	2012-239-20		
Sample Interval, ft	147.7-152.8	152.8-162.8	162.8-169.5	169.5-175.1	175.1-176.9		
Description	sandy shale	inter-bedded silt shale and sandstone	inter-bedded silt shale and sandstone	inter-bedded silt shale and sandstone	inter-bedded silt shale and sandstone		Units of
Acid-Base Account:						Measure	Analyzed Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	9.6	9.6	9.6	9.7	9.1	Units	02/21/12 SJW
Sulfur, Total (ASTM D4239C)	0.15	0.11	0.14	0.17	0.16	% as detd	03/07/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.15	0.11	0.14	0.17	0.16	% as detd	03/01/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	4.69	3.44	4.38	5.31	5.00	Ton CaCO <sub>3</sub> /T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	0	0	0	0	1	Rating	02/20/12 SJW
Neutralization Potential (EPA-600/2-78-054 3.2.3)	30.57	28.34	27.48	26.24	67.00	Ton CaCO <sub>3</sub> /T Ton	02/22/12 SJW
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	25.89	24.90	23.10	20.93	62.00	Ton CaCO <sub>3</sub> /T Ton	Calculated

Respectfully Submitted,

  
Judith W. Shider



1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Vermillion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-21	2012-239-22	2012-239-23	2012-239-24	2012-239-25	Units of	
Sample Interval, ft	176.9-178.0	178.0-182.0	182.0-192.0	192.0-202.6	202.6-206.25		
Description	sandy shale	sandstone	sandstone	sandstone	clay, shale		
<b>Acid-Base Account:</b>						<b>Measure</b>	<b>Analyzed Tech</b>
pH, Paste (EPA-600/2-78-054 3.2.2)	9.7	9.2	9.1	9.4	9.8	Units	02/21/12 SJW
Sulfur, Total (ASTM D4239C)	0.19	0.33	0.17	<0.10	0.39	% as detd	03/07/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.19	0.33	0.17	0.08	0.39	% as detd	03/01/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	5.94	10.31	5.31	2.50	12.19	Ton CaCO <sub>3</sub> /T Ton	Calculated
Fixx Rate (EPA-600/2-78-054 3.2.3)	0	1	1	1	1	Rating	02/20/12 SJW
Neutralization Potential (EPA-600/2-78-054 3.2.3)	16.50	63.28	75.19	37.59	47.89	Ton CaCO <sub>3</sub> /T Ton	02/23/12 SJW
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	10.56	52.97	69.88	35.09	35.70	Ton CaCO <sub>3</sub> /T Ton	Calculated

Respectfully Submitted,

  
Judith W. Snyder



## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

1530 North Cullen Avenue, Evansville, IN 47715

Area: Vermilion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-26	2012-239-27	2012-239-28	2012-239-29	2012-239-30		
Sample Interval, ft	206.25-212.70	212.70-217.25	217.25-223.35	223.35-236.0	235.7-241.6		
Description	sandy shale	sandstone	interbedded shale and sandstone	sandstone	sandstone, limestone		Units of
Acid-Base Account:						Measure	Analyzed Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	9.8	9.7	9.7	9.1	9.1	Units	02/21/12 SJW
Sulfur, Total (ASTM D4239C)	0.13	0.15	0.13	0.28	0.59	% as detd	03/09/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.13	0.15	0.13	0.28	0.59	% as detd	03/01/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	4.06	4.69	4.06	8.75	18.44	Ton CaCO <sub>3</sub> /T Ton	Calculated
Fixx Rate (EPA-600/2-78-054 3.2.3)	1	1	0	1	3	Rating	02/21/12 SJW
Neutralization Potential (EPA-600/2-78-054 3.2.3)	36.72	54.84	30.15	50.50	559.15	Ton CaCO <sub>3</sub> /T Ton	02/29/12 SJW
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	32.66	50.15	26.09	41.75	540.71	Ton CaCO <sub>3</sub> /T Ton	Calculated

Respectfully Submitted,

  
Judith W. Spider



1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1193 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Vermillion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-31	2012-239-32	2012-239-33	2012-239-34	2012-239-35		
Sample Interval, ft	241.7-247.1	247.10-250.55	250.6-256.0	256.0-266.9	266.9-268.9		
Description	claystone	claystone	limestone and silt shale silt shale	limestone and silt shale	interbedded limestone and shale	Units of	
Acid-Base Account:						Measure	Analyzed Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	10.1	9.9	9.7	9.6	9.7	Units	02/21/12 SJW
Sulfur, Total (ASTM D4239C)	0.39	0.26	0.19	0.30	0.25	% as detd	03/09/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.39	0.26	0.19	0.30	0.25	% as detd	03/02/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	12.19	8.13	5.94	9.38	7.81	Ton CaCO3/T Ton	Calculated
Fizz Rate (EPA-600/2-78-054 3.2.3)	2	1	3	1	3	Rating	02/21/12 SJW
Neutralization Potential (EPA-600/2-78-054 3.2.3)	108.48	124.69	528.64	19.85	465.71	Ton CaCO3/T Ton	03/05/12 SJW
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	96.29	116.56	522.70	10.47	457.90	Ton CaCO3/T Ton	Calculated

Respectfully Submitted,

  
Judith W. Spitzer



1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Vermilion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-36	2012-239-37	2012-239-38	2012-239-39	2012-239-40		
Sample Interval, ft	268.9-275.4	275.4-285.4	285.4-291.35	291.35-301.35	301.65- ?		
Description	silt shale	clay shale	clay shale	silt shale	silt shale		
						Units of	
Acid-Base Account:						Measure	Analyzed Tech
pH, Paste (EPA-600/2-78-054 3.2.2)	9.8	10.2	9.7	9.8	9.5	Units	02/21/12 SJH
Sulfur, Total (ASTM D4239C)	0.28	0.20	0.83	1.07	1.38	% as detd	03/09/12 PAJ
Sulfur, Pyritic (ASTM D2492)	0.28	0.20	0.83	1.07	1.38	% as detd	03/02/12 PAJ
Potential Acidity (EPA-600/2-78-054 1.3.1)	8.75	6.25	25.94	33.44	43.13	Ton CaCO3/T Ton	Calculated
Fixe Rate (EPA-600/2-78-054 3.2.3)	1	0	0	0	1	Rating	02/21/12 SJH
Neutralization Potential (EPA-600/2-78-054 3.2.3)	66.38	18.11	18.24	15.38	72.33	Ton CaCO3/T Ton	02/29/12 SJH
Net Neutralization Potential (EPA-600/2-78-054 1.3.1)	57.63	11.86	-7.70	-18.06	29.20	Ton CaCO3/T Ton	Calculated

Respectfully Submitted,

  
Judith W. Szidar



1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Vermillion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-41	2012-239-42	2012-239-43	2012-239-44	2012-239-45	Units of	
Sample Interval, ft	312.08-317.0	317.0-319.10	319.10-324.90	324.90-328.55	328.55-332.50		
Description	danville coal underlay		underlay	limestone	limestone		
<b>Acid-Base Account:</b>						<b>Measure</b>	<b>Analyzed Tech</b>
pH, Paste	8.0	9.9	10.1	10.0	9.9	Units	02/28/12 SJW
(EPA-600/2-78-054 3.2.2)							
Sulfur, Total	4.40	2.83	1.06	1.13	0.14	% as detd	03/10/12 PAJ
(ASTM D4239C)							
Sulfur, Pyritic	2.50	2.58	1.06	1.13	0.14	% as detd	03/02/12 PAJ
(ASTM D2492)							
Potential Acidity	78.13	80.63	33.13	35.31	4.38	Ton CaCO3/T Ton	Calculated
(EPA-600/2-78-054 1.3.1)							
Fixx Rate	0	0	2	3	3	Rating	02/22/12 SJW
(EPA-600/2-78-054 3.2.3)							
Neutralisation Potential	6.58	5.83	247.51	298.26	816.94	Ton CaCO3/T Ton	02/23/12 SJW
(EPA-600/2-78-054 3.2.3)							
Net Neutralization	-71.55	-74.80	214.38	262.95	812.56	Ton CaCO3/T Ton	Calculated
Potential (EPA-600/2-78-054 1.3.1)							

Respectfully Submitted,

  
Judith W. Snider



1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Vermilion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-46	2012-239-47	2012-239-48	2012-239-49	2012-239-50	Units of	
Sample Interval, ft	332.50-338.3	338.30-343.7	343.70-351.28	351.28-357.88	357.88-360.58		
Description	sandy shale	silt shale	silt shale	herrin coal	underclay		
<b>Acid-Base Account:</b>						<b>Measure</b>	<b>Analyzed Tech</b>
pH, Paste	10.0	10.1	8.8	7.6	9.4	Units	02/28/12 SJN
(EPA-600/2-78-054 3.2.2)							
Sulfur, Total	0.25	1.25	3.17	2.58	3.38	% as detd	03/09/12 PAJ
(ASTM D4239C)							
Sulfur, Pyritic	0.25	1.17	2.96	0.54	3.38	% as detd	03/02/12 PAJ
(ASTM D2492)							
Potential Acidity	7.81	36.56	92.50	16.88	105.63	Ton CaCO3/T Ton	Calculated
(EPA-600/2-78-054 1.3.1)							
Fire Rate	0	1	1	0	2	Rating	02/22/12 SJN
(EPA-600/2-78-054 3.2.3)							
Neutralization Potential	27.92	50.62	24.57	6.33	190.77	Ton CaCO3/T Ton	02/23/12 SJN
(EPA-600/2-78-054 3.2.3)							
Net Neutralization	20.11	14.06	-67.93	-10.55	85.14	Ton CaCO3/T Ton	Calculated
Potential (EPA-600/2-78-054 1.3.1)							

Respectfully Submitted,

  
Judith W. Snider



1530 North Cullen Avenue, Evansville, IN 47715

## FOR:

SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

Area: Vermilion County  
Hole Number: SA116-181426  
Date Sampled: February 2012  
Sampled By: Client

DATE REPORTED: 03/28/12

Laboratory ID	2012-239-51	2012-239-52	2012-239-53	2012-239-54		
Sample Interval, ft	360.58-362.83	362.83-364.08	364.08-364.58	364.58-367.0		
Description	limestone	underclay	limestone	underclay		
					Units of	
Acid-Base Account:					Measure	Analysed Tech
pH, Paste	9.8	9.9	9.2	9.8	Units	02/28/12 SJM
(EPA-600/2-78-054 3.2.2)						
Sulfur, Total	0.87	3.39	5.81	1.32	% as detd	03/10/12 PAJ
(ASTM D4239C)						
Sulfur, Pyritic	0.87	3.39	5.81	1.05	% as detd	03/09/12 PAJ
(ASTM D2492)						
Potential Acidity	27.19	105.94	181.56	32.81	Ton CaCO3/T Ton	Calculated
(EPA-600/2-78-054 1.3.1)						
Fixe Rate	3	2	3	2	Rating	02/22/12 SJM
(EPA-600/2-78-054 3.2.3)						
Neutralization Potential	513.72	225.69	606.48	272.44	Ton CaCO3/T Ton	03/08/12 SJM
(EPA-600/2-78-054 3.2.3)						
Net Neutralization	486.53	119.75	424.92	239.63	Ton CaCO3/T Ton	Calculated
Potential (EPA-600/2-78-054 1.3.1)						

Respectfully Submitted,

  
Judith W. Spider

Allerton Mine  
Summary of Consolidated Overburden Net Neutralization Potential and  
Correlation With Standard Labs Analysis Laboratory ID

Standard Labs Laboratory ID #	Depth to Top of Strata	Depth to Bottom of Strata	Strata Thickness	Strata Description	Tons CaCO3 Equiv. per 1000 Tons Material			
					Potential Acidity	Neutralization Potential	Net Neutralization Potential Needed	Excess
2012-239-1	38.00	46.00	8.00	limestone	3.13	953.92	-	950.79
2012-239-2	46.00	46.40	0.40	underclay	20.94	114.09	-	93.15
2012-239-3	46.00		-	underclay	42.81	60.95	-	18.14
2012-239-4	58.00	68.00	10.00	silt shale	38.75	53.24	-	14.49
2012-239-5	68.00	78.00	10.00	silt shale	21.25	101.62	-	80.37
2012-239-6	78.00	86.00	8.00	silt shale	26.56	94.76	-	68.20
2012-239-7	86.00	88.05	2.05	silt shale	35.63	67.33	-	31.70
2012-239-8	88.05	99.35	11.30	sandy shale	5.63	25.93	-	20.30
				interlaminated silt shale				
2012-239-9	99.35	100.70	1.35	& sandstone	5.63	8.66	-	3.03
2012-239-10	100.70	110.70	10.00	mudstone	5.00	15.35	-	10.35
2012-239-11	110.70	114.40	3.70	mudstone	5.00	18.07	-	13.07
				interlaminated silt shale				
2012-239-12	114.40	117.70	3.30	& sandstone	4.69	33.04	-	28.35
2012-239-13	117.70	127.70	10.00	silt shale	8.13	49.50	-	41.37
2012-239-14	127.70	137.70	10.00	silt shale	7.50	52.85	-	45.35
2012-239-15	137.70	147.70	10.00	silt shale	9.06	56.82	-	47.76
2012-239-16	147.70	152.80	5.10	sandy shale	4.69	30.57	-	25.88
				interbedded silt shale &				
2012-239-17	152.80	162.80	10.00	sandstone	3.44	28.34	-	24.90
				interbedded silt shale &				
2012-239-18	162.80	169.50	6.70	sandstone	4.38	27.48	-	23.10
				interbedded silt shale &				
2012-239-19	169.50	175.10	5.60	sandstone	5.31	26.24	-	20.93
2012-239-20	175.10	176.90	1.80	sandstone	5.00	67.00	-	62.00
2012-239-21	176.90	178.00	1.10	sandy shale	5.94	16.50	-	10.56
2012-239-22	178.00	182.00	4.00	sandstone	10.31	63.28	-	52.97
2012-239-23	182.00	192.00	10.00	sandstone	5.31	75.19	-	69.88
2012-239-24	192.00	202.60	10.60	sandstone	2.50	37.59	-	35.09
2012-239-25	202.60	206.25	3.65	clay, shale	12.19	47.89	-	35.70
2012-239-26	206.25	212.70	6.45	sandy shale	4.06	36.72	-	32.66
2012-239-27	212.70	217.25	4.55	sandstone	4.69	54.84	-	50.15
				interbedded shale &				
2012-239-28	217.25	223.35	6.10	sandstone	4.06	30.15	-	26.09
2012-239-29	223.35	236.00	12.65	sandstone	8.75	50.50	-	41.75
2012-239-30	235.70	241.60	5.90	sandstone, limestone	18.44	559.15	-	540.71
2012-239-31	241.70	247.10	5.40	claystone	12.19	108.48	-	96.29
2012-239-32	247.10	250.55	3.45	claystone	8.13	124.69	-	116.56
2012-239-33	250.60	256.00	5.40	limestone & silt shale	5.94	528.64	-	522.70
2012-239-34	256.00	266.90	10.90	silt shale	9.38	19.85	-	10.47
				interbedded limestone				
2012-239-35	266.90	268.90	2.00	& shale	7.81	465.71	-	457.90
2012-239-36	268.90	275.40	6.50	silt shale	8.75	66.38	-	57.63
2012-239-37	275.40	285.40	10.00	clay shale	6.25	18.11	-	11.86
2012-239-38	285.40	291.35	5.95	clay shale	25.94	18.24	-7.7	-
2012-239-39	291.35	301.35	10.00	silt shale	33.44	15.38	-18.06	-
2012-239-40	301.65		-	silt shale	43.13	72.33	-	29.20
2012-239-41	312.08	317.00	4.92	danville coal				-
2012-239-42	317.00	319.10	2.10	underclay	80.63	5.83	-74.8	-
2012-239-43	319.10	324.90	5.80	underclay	33.13	247.51	-	214.38
2012-239-44	324.90	328.55	3.65	limestone	35.31	298.26	-	262.95
2012-239-45	328.55	332.50	3.95	limestone	4.38	816.94	-	812.56
2012-239-46	332.50	338.30	5.80	sandy shale	7.81	27.92	-	20.11
2012-239-47	338.30	343.70	5.40	silt shale	36.56	50.62	-	14.06
2012-239-48	343.70	351.28	7.58	silt shale	92.50	24.57	-67.93	-
2012-239-49	351.28	357.88	6.60	herrin #6 coal				-
2012-239-50	357.88	360.58	2.70	underclay	105.63	190.77	-	85.14
2012-239-51	360.58	362.83	2.25	limestone	27.19	513.72	-	486.53
2012-239-52	362.83	364.08	1.25	underclay	105.94	225.69	-	119.75
2012-239-53	364.08	364.58	0.50	limestone	181.56	606.48	-	424.92
2012-239-54	364.58	367.00	2.42	underclay	32.81	272.44	-	239.63
Total Sum of Data	-	-	-	-	1,243.19	7,576.13	-168.49	6,501.43

Sunrise Coal, LLC  
Bulldog Mine  
Permit No. 429

# ATTACHMENT III-2A3

HERRIN #6 COAL SEAM SULFUR FORMS

LAB NO. 2012-239-49

DATE REC'D 02/16/12

DATE SAMPLED -----

SAMPLED BY CLIENT

1530 N. Cullen Avenue  
Evansville, IN 47715SUNRISE COAL, LLC  
1183 EAST CANVASBACK DR  
TERRE HAUTE, IN 47802

## SAMPLE IDENTIFICATION

SA116-181426  
HERRIN COAL  
351.28-357.88

DATE REPORTED: 04/24/12

	% MOISTURE	% ASH	% VOLATILE	% FIXED CARBON	BTU/LBS	% SULFUR
AS REC'D	2.15	11.42	XXXX	XXXX	12547	2.58
DRY BASIS	-----	11.67	XXXX	XXXX	12823	2.64
M-A-FREE					14517	

FORMS OF SULFUR	% DRY BASIS
TOTAL	2.64
PYRITIC	0.55
SULFATE	<0.01
ORGANIC	2.09

NOTE: XXXX INDICATES ANALYSIS WAS NOT PERFORMED

Respectfully Submitted

 A handwritten signature in cursive script, appearing to read 'Judith W. Snider', is written over a horizontal line.
   
Judith W. Snider