

VORYS

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March 23, 2015

Via Hand Delivery

Mr. James O'Dell
Ohio Power Siting Board
180 East Broad Street, 11th Floor
Columbus, OH 43215-3793

Re: Carroll County Energy LLC
Case No.: 13-1752-EL-BGN
Permit and Document Submittal
Conditions 8 and 10

Dear Mr. O'Dell:

The Ohio Power Siting Board's April 28, 2014 Certificate of Environmental Compatibility and Public Need issued in Case No. 13-1752-EL-BGN incorporated the Notice of Filing List of Commitments docketed on February 5, 2014 and the Joint Stipulation and Recommendation filed on March 10, 2014, both of which established conditions that are to be completed prior to certain construction activities.

Condition 8 of the Joint Stipulation and Recommendation provides as follows:

(8) Prior to commencement of construction activities that require transportation permits, the Applicant shall obtain all such permits. The Applicant shall coordinate with the appropriate authority regarding any temporary or permanent road closures, lane closures, road access restrictions, and traffic control necessary for construction and operation of the proposed facility. The Applicant's process for coordination shall be detailed as part of a final traffic plan submitted to Staff prior to the preconstruction conference for review and confirmation that it complies with this condition.

This is to certify that the images appearing are an accurate and complete reproduction of a case file document delivered in the regular course of business.
Technician Jim Date Processed MAR 23 2015

Mr. James O'Dell
March 23, 2015
Page 2

Please find attached a copy of the "Traffic Plan Summary – 2015 Construction Phase" prepared by CESO, Inc. which complies with Condition 8. This plan only deals with construction traffic during 2015 activities, but another plan will be submitted before the end of the year which will document the plan for 2016 activities.

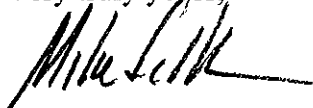
Condition 10 of the Joint Stipulation and Recommendation provides:

(10) Prior to commencement of construction, the Applicant shall conduct test borings to a maximum of 150 feet to confirm, to the extent possible, the depth of the Upper Mahoning (#7A) coal seam. Test borings will include rock quality description (RDQ) data to confirm that subsurface conditions would support the proposed facility. If it is determined that mine voids are present and the subsurface rock does not support the proposed facility, then the Applicant shall be required to develop a subsidence mitigation plan. The subsidence mitigation plan shall provide geotechnical and engineering design recommendations that shall be included in the final design of the proposed facility, including but not limited to grouting the mined out cavities. Additionally, the mitigation plan shall consider the potential risk for induced subsidence and other mining effects on neighboring properties due to the construction of the proposed facility.

Please also find attached a copy of the Abandoned Underground Mine Review prepared by S&ME which complies with Condition 10.

Please call me or Amy Frazier, Associate General Counsel and Manager, Environmental Permitting, Advanced Power Services (NA) Inc. at 617-456-2209 if you have any questions regarding this correspondence. Thank you in advance for your consideration.

Very truly yours,



Michael J. Settineri

MJS/jaw
Enclosure



CREATION TO COMPLETION

For

**PROPOSED CARROLL COUNTY
ENERGY FACILITY**

Located On

**East Side of Kensington Road NE (S.R. 9),
Between S.R. 171 & C.R. 38,
Carroll County, Ohio**

Prepared by:

CESO, Inc.

**395 Springside Drive, Suite 202
Akron, OH 44333**

March 23, 2015



1. Executive Summary (2015 Construction Phase)

1.1 Summary

The study addresses the traffic impacts associated with the early construction phase of the proposed Carroll County Energy Facility located on the east side of Kensington Road NE (S.R. 9) north of Brenner Road (C.R. 38) and south of Cobbler Road (S.R. 171) in Carroll County, Ohio.

The study analyzed the traffic operations for the following two (2) traffic scenarios:

- **Existing Traffic Conditions Scenario** – Represents current (year 2015) traffic conditions
- **2015 Project Traffic Conditions Scenario (Construction Phase)** - Represents traffic conditions that would exist during year 2015 in the initial stages of development relating to the proposed use of the Site as an Energy Facility.

Site Access

A proposed 28 foot wide site access driveway is proposed to be constructed extending from Kensington Road NE (S.R.) east approximately 2,168 feet into the site. The proposed site driveway will intersect Kensington Road NE (S.R. 9), approximately 5,700 feet south of S.R. 171, forming a “T” type stop sign controlled intersection.

Traffic Analysis

The following is an outline of the traffic analysis for the respective traffic conditions of this project. HCM 2010 methodology was used for the analysis.

Existing Traffic Conditions Analysis:

- CESO obtained 24 hour bi-directional ADT volumes on Kensington Road NE (S.R. 9). The count was conducted on September 5, 2013. In order to arrive at 2015 base traffic volumes, a growth rate was applied to the 2013 ADT count. CESO obtained a 2011 ADT traffic count from ODOT that showed an ADT volume

on Kensington Road NE (S.R. 9) 23% lower than the 2013 ADT volume. This growth rate factor of 1.23² was applied to the 2013 ADT count to arrive at 2015 base volumes.

- The 2015 base capacity analysis shows that the Level of Service along Kensington Road NE (S.R. 9) in the vicinity of the site operates at an “A” level of service condition during the Weekday AM and PM peak hours.

Project Conditions Analysis:

The proposed Energy Facility will have a dayshift operation. The dayshift traffic to the site is based around 7:00 am to 5:30 pm work hours Monday through Friday. The analysis studies both Weekday AM and PM peak hour conditions.

- The proposed Energy Facility Construction Phase will employ a range of personnel varying from 40 dayshift personnel in April 2015 to 70 dayshift personnel in October 2015. Earthwork Fill & Storm Drainage trucks are anticipated early on from May 2015 through October 2015 and range from 50 trucks (October 2015) to 200 trucks (August 2015) per day spaced over a 10 hour time frame. Additionally, non-haul daily deliveries will vary from 10 per day in July 2015 to 20 per day in October 2015.

2015 Construction: AM Peak/PM Peak: Trips generated for the proposed site used the month of August 2015 as the month with the most combined dayshift personnel, Earthwork Fill & Storm Drain, Non heavy haul deliveries, and concrete truck trips per day.

During highest Construction month of August, the Carroll County Energy Facility will generate 60 passenger cars to/from the site, 20 earthwork Fill & Storm Drain trucks to/from the site, 10 non heavy haul daily deliveries and 16



concrete truck deliveries to/from the site per day resulting in 106 total Weekday AM peak hour inbound and 106 total Weekday PM Peak hour outbound trips.

Craft/Labor Daily Traffic			Daily Deliveries			Total Dayshift Traffic
Month	Year	Dayshift Personnel	Earthwork Fill & Storm Drain	Non Heavy Haul Daily Deliveries	Concrete Trucks	
August	2015	60	20	10	16	106

2015 Project Traffic Conditions Analysis – Construction Phase:

- The projected trips generated during the construction phase of the Energy Facility were combined with the 2015 base traffic volumes to create 2015 Project Traffic Volumes.

The key study intersection of Kensington Road NE (S.R. 9) & Energy Facility Site Driveway will operate at an overall LOS (level of service) "A" condition during the Weekday AM and PM peak hours.

Movement	Control	AM Peak Hour	PM Peak Hour
WBL	Stop Sign	B (12.4)	B (11.1)
SBL		A (8.3)	A (8.3)
Overall		A (1.1)	A (2.4)

Sight Distance Analysis

- A horizontal and vertical sight distance analysis was performed for the proposed Kensington Road NE (S.R. 9) & Energy Facility Site Driveway.

The analysis shows that sight distance (horizontal and vertical) satisfy ODOT requirements as outlined in the ODOT L&D Volume 1 manual.

Turn Lane Analysis

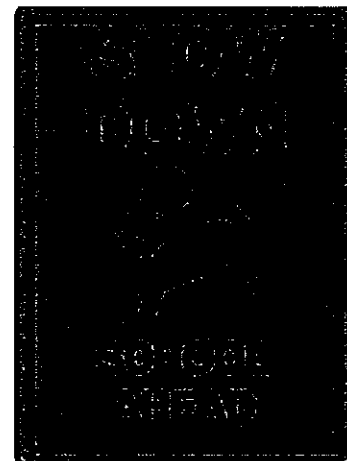
- According to Table 401-6bE and 401-5bE of the ODOT L&D manual, volume 1, left and right turn lanes are not required on Kensington Road NE (S.R. 9) at the Energy Facility Driveway during the 2015 Project Construction traffic scenario.

1.2 Recommendations

The following summary of recommendations was determined for 2015 and 2016 Project condition scenarios.

- 2015 Project Traffic Conditions Scenario ~ Construction Phase (Responsibility – Carroll County Energy Facility):**

- (1) Provide "Truck Route" signs along Kensington Road NE (S.R. 9) within the vicinity of the site.
- (2) Carroll Hills School is located approximately 2,600 feet north of the proposed Carroll County Energy Facility. The School currently has signage in place for pedestrian ahead crossing and school speed limit flashing beacon lights. CESO recommends that additional school ahead signage be placed on Kensington Road NE (S.R. 9) in advance of the school in both the northbound and southbound directions.





February 11, 2015
7217-14-008B

Mr. Andrew Degon
Director, Engineering and Construction
Advanced Power Services (NA) Inc.
31 Milk Street, Suite 1001
Boston, MA 02109

Re: Abandoned Underground Mine Review
Proposed Carroll County Energy Power Plant
Carroll County, Ohio

Dear Mr. Degon:

In accordance with our proposal dated March 3, 2014 which was authorized on September 23, 2014, S&ME, Inc. (S&ME) is pleased to submit this report. This report revises and replaces our report dated October 3, 2014. As part of this work, S&ME reviewed published information associated with potential abandoned underground mines at the proposed Carroll County Energy combined cycle power plant. In addition, S&ME performed a subsurface investigation for the project, and two borings were advanced to determine the presence of coal seams at the site.

S&ME has worked on abandoned mine land projects in Ohio since 1979. We have completed mine subsidence investigations, subsidence mitigation projects, and abandoned mine lands reclamation projects. S&ME has worked on past mining projects since 1979 for the Ohio Department of Natural Resources, Ohio Department of Transportation, Ohio Mine Subsidence Insurance, local governments, and private clients.

INTRODUCTION

The project site is located off of State Route 9 (aka Kensington Road NE), north of Carrollton in Carroll County, Ohio. The location is shown on the set of drawings entitled "Preliminary Plot Plan" prepared by CESO and dated 10-2-13. This set of drawings was furnished to S&ME by Advanced Power. The project is located in Washington Township within Carroll County, just north of Center Township. Proposed final grades at the site vary from Elevation 1175 to 1300 feet msl.

It is our understanding that the following comment was provided during the siting review:

Prior to commencement of construction, the Applicant shall conduct test borings to a maximum of 150 feet to confirm, to the extent possible, the depth of the Upper Mahoning (#7A) coal seam. Test borings will include rock quality description data to confirm that subsurface conditions would support the proposed facility. If it is determined that mine voids are present and the subsurface rock does not support the proposed facility, then the Applicant shall be required to develop a subsidence mitigation plan. The subsidence mitigation plan shall provide geotechnical and engineering design recommendations that shall

be included in the final design of the proposed facility, including, but not limited to, grouting the mined out cavities. Additionally, the mitigation plan shall consider the potential risk for induced subsidence and other mining effects on neighboring properties due to the construction of the proposed facility.

SITE VISIT

On September 29, 2014, Mr. Joseph Troxell (S&ME) and Mr. Mark Schott (S&ME) visited the site. At the time of our visit, corn was still standing in the fields, which hindered our ability to perform visual observations at the site. No indication of mine subsidence, such as a sinkhole type feature, was observed at the time of our visit. Mr. Troxell again visited the site on October 27 and 29, 2014, after the corn had been cut in the fields. No indications of mine subsidence or past mining activities were observed during these visits.

SECONDARY SOURCES

S&ME reviewed mapping prepared by ODNR DGS (Ohio Department of Natural Resources, Division of Geologic Survey) for the project site and ODNR DGS reports (principally Reports of Investigation 29 and 34) that covered coal seams and historic mining in Carroll County. There is not a mapped underground mine at the project site.

It is reported that the Mahoning (7A) coal bed is present in Augusta, Center, Fox, Harrison, Rose and Union Townships. Reports indicate the Mahoning Coal was mined in Center Township and is reported to have a thickness of 24 inches. Reports indicate the Mahoning Coal is located approximately 16 to 60 feet above the elevation of the Upper Freeport.

The Upper Freeport (No. 7) Coal is located at the contact between the Conemaugh and Allegheny formations. Based on the mapping provided, the Upper Freeport would occur near elevation 1050 feet at the project site and will have a thickness of approximately 35 inches.

The Lower Freeport (No. 6a) Coal is mapped near elevation 970 feet msl, with a thickness of 0-7 inches. The Middle Kittanning (No. 6) Coal occurs near elevation 850 feet at the project site, with a thickness of approximately 49 inches.

There are several local coal seams that occur in Carroll County, including the Brush Creek, Wilgus, Anderson, Barton, and Harlem Coal seams. All these seams are in the Conemaugh formation, which is located above the elevation of the Upper Freeport (No. 7) Coal. None of the seams are reported to occur in Washington Township.

DISCUSSION

The Mahoning (No. 7A) Coal may not be present at the site. If the Mahoning Coal is present at the site, it would be expected to be encountered between 16 and 60 feet above the elevation of the Upper Freeport Coal. Due to the thickness of the Mahoning Coal, it does not appear likely that it was mined at the property.

The Upper Freeport Coal is expected to be encountered at the site, with a thickness of approximately 35 inches and near elevation 1050 feet. There are no indications that it was mined at the property, however the depth to the Upper Freeport Coal is approximately 150-200 feet (due to the variable grade at the site).

The Middle Kittanning (No. 6) Coal occurs near elevation 850 feet (depths of 325-450 feet across the site) with a thickness near 49 inches. There is not a mapped mine shown at the site. While the abandoned mine mapping indicates there are some abandoned mines that operated in the Middle Kittanning Coal, these are generally shown along the crop line and operated in a 'room and pillar' fashion. The crop line for the Middle Kittanning is several miles from the site. Further, surface expressions of subsidence over room and pillar mines are extremely rare at depths over 150 feet, and at the site, the depth would be over 300 feet.

If the Middle Kittanning was mined by a longwall mine, it would have occurred recently and it is expected that the mine would be mapped by ODNR. Since longwall subsidence generally occurs within a period of approximately two years, unless it was recently mined, the subsidence would have already occurred at the site.

SUBSURFACE INVESTIGATION

As part of the subsurface investigation at the site, two borings (B-400 and B-401C) were advanced in an attempt to encounter the Upper Freeport (No. 7) Coal and determine its depth. Boring B-400 was advanced to a depth of 304 feet, and with a surface elevation of 1228 feet (and a corresponding lower elevation of 924 feet). The Upper Freeport (No. 7) Coal was not observed in this boring. A coal seam approximately 0.8 feet thick was encountered near elevation 992 feet. Boring B-401C was advanced to a depth of 150 feet, with a surface elevation of 1214 feet msl. As noted on the attached boring logs, recovery of the rock core was generally 98 to 100% of the sample interval. Additionally, no tool drops or voids were encountered in the borings.

CONCLUSIONS

Based on the subsurface investigation, it appears that neither the Mahoning (No. 7a) Coal nor the Upper Freeport (No. 7) Coal were present at the site. Based on the subsurface investigation, there is no evidence of a collapsed subsurface void at the property.


The Middle Kittanning (No. 6) Coal maybe present at the site. However, there are no reports in the reviewed literature that it was mined at the property. Mapped mines are in the area, but are shown near the cropline. Further, if an unmapped mine is at the property, it is expected that it would be a 'room and pillar' mine at a depth of over 300 feet, whereas surface expressions of subsidence are extremely rare at depths of over 150 feet. It is unlikely that a longwall mine operated in the Middle Kittanning Coal, since it would be a more recent mine and mapping would be available. However, in the event an unknown mine operated in the Middle Kittanning, unless it was in the last two years, surface movement related to subsidence would generally be complete.

We appreciate having been given the opportunity to work with you on this project.

Respectfully,

S&ME, Inc.
Columbus, Ohio


Michael T. Romanello, P.E.
Project Engineer


Joseph M. Troxell, P.E.
Senior Engineer

Submitted: 1 copy via email

**LOG OF BORING NO. B-400
CARROLL COUNTY ENERGY
CARROLLTON, OH**



LOCATION: **N345244, E2368356** ELEVATION: **1228** DATE: **11/3/14**
 DRILLING METHOD: **3-1/4" I.D. Hollow-stem Auger** COMPLETION DEPTH: **304.0'**
 SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
									NATURAL MOISTURE CONTENT				
									PLASTIC LIMIT		LIQUID LIMIT		
	0								10	20	30	40	
		1	1 1/2 / 3	5	100			Brown and gray silty clay with very-fine sand, damp, with iron staining. (CL)					H=4.75
1225.0		2	6 5/9 / 13	22	65			Brown and tan very-fine sand , fine silt, dry, with iron staining. (SM)					
	5	3	17 12/19 / 14	33	100								
1220.0		4	27 32/24 / 26	50	50								
	10	5	18 12/16 / 27	43	100			Brown, gray very-fine sand , dry, with iron staining. (SP), partly similar to weathered sandstone.					
			50-3"R										
	15	6	36 50/50 / 1"R		100								
1209.0													
	20							Hard brown and gray sandstone with some iron staining, nearly horizontal bedding, moderately weathered. R-1: 19' to 24'					
		R-1	RQD 67%		100								
								R-2: 24' to 29'					
	25												
WATER LEVEL: ▽ N/R ▽ ▽									SYMBOLS USED TO INDICATE TEST RESULTS				
WATER NOTE: _____									G - Gradation	See	H - Penetrometer (tsf)		
DATE: _____									Q - Uncon Comp	Separate	W - Unit Dry Wt (pcf)		
									T - Triax Comp	Curves	D - Relative Dens (%)		
									C - Consol.				

2015 S&ME LOG W/ N & HATCHING

**LOG OF BORING NO. B-400
CARROLL COUNTY ENERGY
CARROLLTON, OH**



LOCATION: **N345244, E2368356** ELEVATION: **1228** DATE: **11/3/14**
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ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
									NATURAL MOISTURE CONTENT				
	25								PLASTIC LIMIT		LIQUID LIMIT		
									10	20	30	40	
		R-2	RQD 69%			98							
								R-3: 29' to 34'					
	30												
		R-3	RQD 89%			100							
								R-4: 34' to 39'					
	35												
		R-4	RQD 57%			100							
1190.0								Medium-hard gray siltstone, near horizontal bedding, moderately weathered, with some iron staining and clay in joints.					
	40							R-5: 39' to 44'					
		R-5	RQD 55%			100							
1185.0								Hard gray sandstone, moderately weathered, nearly horizontal bedding.					
	45							R-6: 44' to 49'					
		R-6	RQD 72%			100							
								R-7: 49' to 54'					
	50												
WATER LEVEL: ▽ N/R									SYMBOLS USED TO INDICATE TEST RESULTS				
WATER NOTE: _____									G - Gradation See H - Penetrometer (tsf)				
DATE: _____									Q - Uncon Comp Separate W - Unit Dry Wt (pcf)				
									T - Triax Comp Curves D - Relative Dens (%)				
									C - Consol.				

WATER LEVEL: ∇ **N/R** ∇ ∇
 WATER NOTE: _____
 DATE: _____

SYMBOLS USED TO INDICATE TEST RESULTS

G - Gradation	See	H - Penetrometer (tsf)
Q - Uncon Comp	Separate	W - Unit Dry Wt (pcf)
T - Triax Comp	Curves	D - Relative Dens (%)
C - Consol.		

[illegible]

SYMBOLS USED TO INDICATE TEST RESULTS		
G - Gradation	See Separate Curves	H - Penetrometer (tsf)
Q - Uncon Comp		W - Unit Dry Wt (pcf)
T - Triax Comp		D - Relative Dens (%)
C - Consol		

[illegible]

SYMBOLS USED TO INDICATE TEST RESULTS		
G - Gradation	See Separate Curves	H - Penetrometer (tsf)
Q - Uncon Comp		W - Unit Dry Wt (pcf)
T - Triax Comp		D - Relative Dens (%)
C - Consol		

SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE EFFECT	N-Value	SAMPLE REC. %	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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 SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
								NATURAL MOISTURE CONTENT				
	125							PLASTIC LIMIT		LIQUID LIMIT		
								10	20	30	40	
1101.0		R-22	RQD 80%		100							
							Interbedded hard gray sandstone, and medium-hard gray shale, near horizontal bedding, moderately weathered.					
							R-23: 129' to 134'					
	130											
		R-23	RQD 76%		100							
							R-24: 134' to 139'					
	135											
		R-24	RQD 68%		100							
1089.0							Hard gray sandstone, moderately weathered, coarse grained, near horizontal bedding.					
							R-25: 139' to 144'					
	140											
		R-25	RQD 52%		100							
							R-26: 144' to 149'					
	145											
		R-26	RQD 68%		100							
							R-27: 149' to 154'					
	150											
WATER LEVEL: ▽ N/R ▽ ▽								SYMBOLS USED TO INDICATE TEST RESULTS				
WATER NOTE: _____								G - Gradation	See Separate Curves	H - Penetrometer (tsf)		
DATE: _____								Q - Uncon Comp		W - Unit Dry Wt (pcf)		
								T - Triax Comp		D - Relative Dens (%)		
								C - Consol.				

2015 S&ME LOG W/N & HATCHING

SAMPLER(S): **2" O.D. Split-barrel Sampler**

[illegible]

SAMPLER(S): **2" O.D. Split-barrel Sampler**

Plate 8





SAMPLER(S): **2" O.D. Split-barrel Sampler**

[illegible]

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ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS	
									NATURAL MOISTURE CONTENT					
	225													
		R-42	RQD 48%			100								
								R-43: 229' to 234'						
	230													
		R-43	RQD 70%			100								
								R-44: 234' to 239'						
993.5														
992.7	235						C	Coal (approximately 0.8 thick), possibly No. 7A Seam.						
								Soft gray siltstone, nearly horizontal bedding, moderately weathered.						
		R-44	RQD 42%			100								
								R-45: 239' to 244'						
	240													
		R-45	RQD 100%			100								
								R-46: 244' to 249'						
	245													
		R-46	RQD 74%			100								
								R-47: 249' to 254'						
	250													
WATER LEVEL:  N/R  									SYMBOLS USED TO INDICATE TEST RESULTS					
WATER NOTE: _____									G - Gradation See					
DATE: _____									Q - Uncon Comp Separate					
									T - Triax Comp Curves					
									C - Consol. _____					
									H - Penetrometer (tsf)					
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									D - Relative Dens (%)					

WATER LEVEL: ∇ **N/R** ∇ ∇
 WATER NOTE: _____
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G - Gradation	See	H - Penetrometer (tsf)
Q - Uncon Comp	Separate	W - Unit Dry Wt (pcf)
T - Triax Comp	Curves	D - Relative Dens (%)
C - Consol.		

[illegible]

SYMBOLS USED TO INDICATE TEST RESULTS		
G - Gradation	See Separate Curves	H - Penetrometer (tsf)
Q - Uncon Comp		W - Unit Dry Wt (pcf)
T - Triax Comp		D - Relative Dens (%)
C - Consol		

**LOG OF BORING NO. B-400
CARROLL COUNTY ENERGY
CARROLLTON, OH**



LOCATION: **N345244, E2368356** ELEVATION: **1228** DATE: **11/3/14**
 DRILLING METHOD: **3-1/4" I.D. Hollow-stem Auger** COMPLETION DEPTH: **304.0'**
 SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE EFFECT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS	
								NATURAL MOISTURE CONTENT					
	275						medium-hard gray shale, near horizontal bedding, slightly weathered.	<div><div></div><div></div><div></div><div></div></div>					
		R-53	RQD 98%		100								
							R-53: 279' to 284'						
	280												
		R-54	RQD 98%		100								
							R-54: 284' to 289'						
	285												
		R-55	RQD 98%		100								
							R-55: 289' to 294'						
	290												
		R-56	RQD 100%		100								
							R-56: 294' to 299'						
	295												
		R-57	RQD 68%		100								
							R-57: 299' to 304'						
	300												
WATER LEVEL: <div><div></div><div></div><div></div></div> N/R <div><div></div><div></div><div></div></div> <div><div></div><div></div><div></div></div>								SYMBOLS USED TO INDICATE TEST RESULTS					
WATER NOTE: _____								G - Gradation	See Separate Curves	H - Penetrometer (tsf)			
DATE: _____								Q - Uncon Comp		W - Unit Dry Wt (pcf)			
								T - Triax Comp		D - Relative Dens (%)			
								C - Consol.					

2015 S&ME LOG W/ N & HATCHING

**LOG OF BORING NO. B-400
CARROLL COUNTY ENERGY
CARROLLTON, OH**



LOCATION: **N345244, E2368356** ELEVATION: **1228** DATE: **11/3/14**
 DRILLING METHOD: **3-1/4" I.D. Hollow-stem Auger** COMPLETION DEPTH: **304.0'**
 SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
									NATURAL MOISTURE CONTENT				
									PLASTIC LIMIT	LIQUID LIMIT			
									10	20	30	40	
300		R-58	RQD 60%			100							
924.0													
	305							- No seepage encountered. - Drilled by Bill Minor with a CME 550 from Penn Drill and Logged by Cate Burton.					
	310												
	315												
	320												
	325												

WATER LEVEL: ∇ **N/R** ∇ ∇
 WATER NOTE: _____
 DATE: _____

SYMBOLS USED TO INDICATE TEST RESULTS
 G - Gradation } See
 Q - Uncon Comp } Separate
 T - Triax Comp } Curves
 C - Consol. }
 H - Penetrometer (tsf)
 W - Unit Dry Wt (pcf)
 D - Relative Dens (%)

2015 S&ME LOG W/ N & HATCHING

**LOG OF BORING NO. B-401
CARROLL COUNTY ENERGY
CARROLLTON, OH**



LOCATION: **N345070, E2368429** ELEVATION: **1214** DATE: **11/2/14**
 DRILLING METHOD: **3-1/4" I.D. Hollow-stem Auger** COMPLETION DEPTH: **130.6'**
 SAMPLER(S): **2" O.D. Split-barrel Sampler**

2015 S&ME LOG W/N & HATCHING

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC %	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
									NATURAL MOISTURE CONTENT				
	0								PLASTIC LIMIT		LIQUID LIMIT		
									10	20	30	40	
		1	2 / 2 / 2	4	100			Hard brown mottled with gray silty clay , some fine to coarse sand. (CL)					H=4.75
1211.5			4										
		2	3 / 7 / 12	19	95			Medium-dense brown and light-brown fine sand , some silt and few clay lenses, iron oxide staining. (SM)					H=4.75
			13										
	5	3	7 / 8 / 11	19	100								
			14										
1207.0		4	9 / 10 / 11	21	90								
			12					Medium-dense brown sand , some silt and clay, iron oxide staining. (SM)					
		5	8 / 13 / 11	24	100								
	10		6										
1202.0													
		6	50-5"R		75			Very-soft brown sandstone , rock fragments and iron oxide staining.					
	15												
1196.0													
		7	50-2"R		100			Very-soft brown and gray sandstone with rock fragments and iron oxide staining.					
	20												
1190.5													
	25												
		R-1	RQD 62%			67		Hard gray sandstone , nearly horizontally bedded, slightly weath. R-1: 23.5' to 25.6'					
WATER LEVEL: ∇ N/R ∇ ∇									SYMBOLS USED TO INDICATE TEST RESULTS				
WATER NOTE: _____									G - Gradation	See	H - Penetrometer (tsf)		
DATE: _____									Q - Uncon Comp	Separate	W - Unit Dry Wt (pcf)		
									T - Triax Comp	Curves	D - Relative Dens (%)		
									C - Consol.				

**LOG OF BORING NO. B-401
CARROLL COUNTY ENERGY
CARROLLTON, OH**



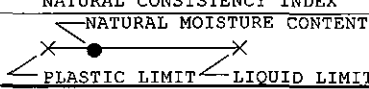
LOCATION: **N345070, E2368429** ELEVATION: **1214** DATE: **11/2/14**
 DRILLING METHOD: **3-1/4" I.D. Hollow-stem Auger** COMPLETION DEPTH: **130.6'**
 SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX NATURAL MOISTURE CONTENT PLASTIC LIMIT LIQUID LIMIT				TEST RESULTS
1188.4	25							10	20	30	40	
		R-2	RQD 5%		100		Hard brown sandstone, nearly horizontally bedded, moderately weathered with some iron oxide staining, many horizontally and diagonal fractures (some mechanical). R-2: 25.6' to 30.6'					
	30											
		R-3	RQD 70%		100		R-3: 30.6' to 35.6'					
	35											
1178.4												
		R-4	RQD 65%		100		Hard brown sandstone, nearly horizontally bedded, moderate weathered, horizontal fractures. R-4: 35.6' to 40.6'					
	40											
		R-5	RQD 91%		94		R-5: 40.6' to 45.6'					
	45											
1168.4												
		R-6	RQD 80%		100		Medium-hard gray siltstone, nearly horizontally and diagonally fractured, slightly weathered. R-6: 45.6' to 50.6'					
	50											
WATER LEVEL: ∇ N/R ∇ ∇ WATER NOTE: _____ DATE: _____								SYMBOLS USED TO INDICATE TEST RESULTS				
								G - Gradation	See	H - Penetrometer (tsf)		
								Q - Uncon Comp	Separate	W - Unit Dry Wt (pcf)		
								T - Triax Comp	Curves	D - Relative Dens (%)		
								C - Consol.				

**LOG OF BORING NO. B-401
CARROLL COUNTY ENERGY
CARROLLTON, OH**



LOCATION: **N345070, E2368429** ELEVATION: **1214** DATE: **11/2/14**
 DRILLING METHOD: **3-1/4" I.D. Hollow-stem Auger** COMPLETION DEPTH: **130.6'**
 SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
									NATURAL MOISTURE CONTENT				
	50												
									10	20	30	40	
1162.4								R-7: 50.6' to 55.6'					
		R-7	RQD 80%			100		Hard brown sandstone, nearly horizontally bedded, moderately weathered.					

SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
									NATURAL MOISTURE CONTENT				
									PLASTIC LIMIT	LIQUID LIMIT			
	75								10	20	30	40	
1131.2		R-12		RQD 85%		100		R-12: 75.6' to 80.6'					
	80												

**LOG OF BORING NO. B-401
CARROLL COUNTY ENERGY
CARROLLTON, OH**



LOCATION: **N345070, E2368429** ELEVATION: **1214** DATE: **11/2/14**
 DRILLING METHOD: **3-1/4" I.D. Hollow-stem Auger** COMPLETION DEPTH: **130.6'**
 SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
								NATURAL MOISTURE CONTENT				
								PLASTIC LIMIT		LIQUID LIMIT		
1113.4	100		68%					10	20	30	40	
		R-17	RQD 91%		100		Medium-hard gray siltstone , nearly horizontally bedded, slight weathered. R-17: 100.6' to 105.6'					
	-105											
		R-18	RQD 62%		100		R-18: 105.6' to 110.6'					
	-110											
1103.4		R-19	RQD 94%		100		Medium-hard gray siltstone , nearly horizontally bedded, moderately weathered. R-19: 110.6' to 115.6'					
	-115											
1098.4		R-20	RQD 92%		100		Hard gray sandstone , nearly horizontally bedded, slight weathered. R-20: 115.6' to 120.6'					
	-120											
		R-21	RQD 72%		96		R-21: 120.6' to 125.6'					
	-125											
WATER LEVEL: ▽ N/R ▽ ▽								SYMBOLS USED TO INDICATE TEST RESULTS				
WATER NOTE: _____								G - Gradation } See H - Penetrometer (tsf)				
DATE: _____								Q - Uncon Comp } Separate W - Unit Dry Wt (pcf)				
								T - Triax Comp } Curves D - Relative Dens (%)				
								C - Consol. }				

2015 S&ME LOG W/N & HATCHING

SAMPLER(S): **2" O.D. Split-barrel Sampler**

[illegible]

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE NUMBER	SAMPLE NUMBER	EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX		TEST RESULTS
										NATURAL MOISTURE CONTENT		

[illegible]

SYMBOLS USED TO INDICATE TEST RESULTS		
G - Gradation	See Separate Curves	H - Penetrometer (tsf)
Q - Uncon Comp		W - Unit Dry Wt (pcf)
T - Triax Comp		D - Relative Dens (%)
C - Consol.		

SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
									NATURAL MOISTURE CONTENT				
									PLASTIC LIMIT	LIQUID LIMIT			
									10	20	30	40	
1187.7	25	R-2	RQD 50%			100		R-2: 24' to 29'					
								Hard brown to tan sandstone , moderate wealth, fine-grained, horizontal to near horizontally bedding.					
								R-3: 29' to 34'					
	30	R-3	RQD 30%			100							
1180.0													
								Soft to medium-hard brown siltstone , moderate weathered.					
	35	R-4	RQD 62%			100		R-4: 34' to 39'					
1177.8								Hard brown sandstone moderate weathered, nearly horizontally bedded, fine-grained, iron staining.					
								R-5: 39' to 44'					
	40	R-5	RQD 42%			100							
1168.7								R-6: 44' to 49'					
	45	R-6	RQD 56%			100		Soft gray shale , slight weathered.					
1167.4								Hard gray sandstone , slight weathered.					
1165.9								Hard gray, fine-grained, sandstone , slight weathered, horizontal to near horizontally bedding.					
	50							R-7: 49' to 54'					

WATER LEVEL:

WATER NOTE:

DATE:

SYMBOLS USED TO INDICATE TEST RESULTS

G - Gradation

Q - Uncon Comp

T - Triax Comp

C - Consol.

See

Separate

Curves

H - Penetrometer (tsf)

W - Unit Dry Wt (pcf)

D - Relative Dens (%)

**LOG OF BORING NO. B-401C
CARROLL COUNTY ENERGY
CARROLLTON, OH**



LOCATION: **5' N of B-401** ELEVATION: **1214** DATE: **11/17/14 - 11/19/14**
 DRILLING METHOD: **3-1/4" I.D. Hollow-stem Auger** COMPLETION DEPTH: **150.0'**
 SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC.-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS	
									NATURAL MOISTURE CONTENT					
									PLASTIC LIMIT		LIQUID LIMIT			
	10	20	30	40										
	50													
		R-7	RQD 38%			100								
								R-8: 54' to 59'						
	55													
		R-8	RQD 32%			100								
								R-9: 59' to 64'						
	60													
1152.7		R-9	RQD 96%			100		Soft gray shale , layer at 69' to 69.9', back to sandstone at 69.9'.						
								R-10: 64' to 69'						
	65													
		R-10	RQD 82%			100								
								R-11: 69' to 74'						
	70													
		R-11	RQD 66%			100								
								R-12: 74' to 79'						
1139.9								Medium-hard gray shale , nearly horizontally						
	75													
WATER LEVEL: ▽ N/R ▽ ▽									SYMBOLS USED TO INDICATE TEST RESULTS					
WATER NOTE: _____									See Separate Curves	H - Penetrometer (tsf)				
DATE: _____										W - Unit Dry Wt (pcf)				
										D - Relative Dens (%)				

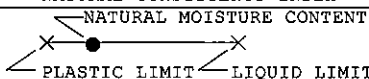
2015 S&ME LOG W/N & HATCHING

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS	
									NATURAL MOISTURE CONTENT					
									PLASTIC LIMIT		LIQUID LIMIT			
	10	20	30	40										
	75							bedded.						
		R-12	RQD 90%			100								
								R-13: 79' to 84'						
	80													
		R-13	RQD 88%			100								
1131.3								Hard gray fine-grained sandstone, near horizontally bedded.						
								R-14: 84' to 89'						
	85													
		R-14	RQD 64%			100								
								R-15: 89' to 94'						
	90													
		R-15	RQD 46%			98								
								R-16: 94' to 99'						
	95													
		R-16	RQD 76%			100								
								R-17: 99' to 104'						
1114.6								Medium-hard gray shale, near horizontal						
	100													
WATER LEVEL: <div><div></div><div></div><div></div></div>									SYMBOLS USED TO INDICATE TEST RESULTS					
WATER NOTE: <div><div></div><div></div><div></div></div>									G - Gradation See					H - Penetrometer (tsf)
DATE: <div><div></div><div></div><div></div></div>									Q - Uncon Comp Separate					W - Unit Dry Wt (pcf)
									T - Triax Comp Curves					D - Relative Dens (%)
									C - Consol.					

**LOG OF BORING NO. B-401C
CARROLL COUNTY ENERGY
CARROLLTON, OH**



LOCATION: **5' N of B-401** ELEVATION: **1214** DATE: **11/17/14 - 11/19/14**
 DRILLING METHOD: **3-1/4" I.D. Hollow-stem Auger** COMPLETION DEPTH: **150.0'**
 SAMPLER(S): **2" O.D. Split-barrel Sampler**

ELEV.	DEPTH, FEET	SAMPLE NUMBER	SAMPLE	SAMPLE EFFORT	N-Value	SAMPLE REC-%	USCS DESC	DESCRIPTION	NATURAL CONSISTENCY INDEX				TEST RESULTS
									NATURAL MOISTURE CONTENT				
	100												
		R-17	RQD 88%			100		bedding, interbedded with thin sandstone layers (<3"), <10% sandstone.		10	20	30	40
			</										

[illegible]

SYMBOLS USED TO INDICATE TEST RESULTS		
G - Gradation	See Separate Curves	H - Penetrometer (tsf)
Q - Uncon Comp		W - Unit Dry Wt (pcf)
T - Triax Comp		D - Relative Dens (%)
C - Consol		

SAMPLER(S): **2" O.D. Split-barrel Sampler**

[illegible]