

July 8, 2016

Mr. Shaun Lehman  
MDEQ-OOGM Lansing District Office  
Constitution Hall 2 South  
525 West Allegan Street  
Lansing, MI 48913

Re: **Groundwater Characterization Work Plan 2**  
Hartland 36 Gas Plant  
SE/NE/NW Section 36, T03N-R06E  
Hartland Township, Livingston County, Michigan

Dear Mr. Lehman:

This Groundwater Characterization Work Plan 2 (Work Plan) was compiled by Environmental Consulting & Technology, Inc. (ECT) and proposes additional groundwater assessment activities to address the sulfolane plume identified during facility decommissioning activities at the Hartland 36 Gas Plant (Site).

***Project Location***

The Site is located in the SE/NE/NW of Section 36, T03N-R06E, on the south side of Lone Tree Road between North Pleasant Valley Road and South Tipsico Lake Road in Hartland Township, Livingston County, Michigan.

The closest surface waters to the Site are a pond located approximately 0.25 miles west, wetlands located approximately 180 feet southwest, 775 feet southeast, and 0.25 miles northeast, and a sand and gravel pit located approximately 0.5 miles north-northeast.

The closest water supply wells to the Site are located on the northern adjacent property (13390 Lone Tree Road) and consist of an irrigation well located approximately 950 feet north of the Site and the residential supply well located approximately 1,075 feet north of the Site. Additional discussion of residential supply wells are presented herein.

*A Site Location Map, Site and Surrounding Properties Map, and Site Plan are attached as Figure 1, Figure 2, and Figure 3, respectively.*

***Project Background***

Contaminated soil was discovered in September 2015 during facility decommissioning activities at the former sweetening plant/refrigeration building (sulfolane impact from the chemical sulfinol) and former inlet compressor building (used oil impact). Remediation activities (excavation) completed from September 2015 through December 2015 resulted in disposal of 13,481.4 tons of soil at the Venice Park Landfill in Lennon, Michigan. Verification of soil remediation (VSR) samples collected from the excavations confirmed remediation of impacted soils. *Refer to the Soil Closure Report, dated February 15, 2016, for a detailed summary of soil remediation and VSR sampling activities.*

Sulfolane impacted soils extended to groundwater at the former sweetening plant/refrigeration building (apparent source area). A groundwater sample (W-Pit) collected on October 15, 2015 from the excavation reported a concentration of sulfolane at 20,000 micrograms per liter ( $\mu\text{g/L}$ ).

In order to gather characteristics with regard to sulfolane impact in groundwater, and to determine groundwater flow characteristics, personnel from ECT oversaw and directed the installation of seven monitor wells (MW-1 through MW-7) and one temporary vertical profile monitor well (TMW-6) on October 29-30, 2015. Groundwater samples were collected from TMW-6 on October 30, 2015 from 65-70 feet below ground surface (ft bgs), 55-60 ft bgs, 45-50 ft bgs, and 35-40 ft bgs. Groundwater samples for laboratory analysis of sulfolane were collected from MW-1 through MW-7 on November 4-5, 2015 and January 27, 2016 (no sample was collected from MW-3 on January 27, 2016 due to the access issues) and from the excavation on November 13, 2015. Laboratory analytical results reported sulfolane as non-detect from all monitor wells except MW-7, which reported sulfolane concentrations of 880  $\mu\text{g/L}$  from the November 4-5, 2015 sampling event and 44  $\mu\text{g/L}$  from the January 27, 2016 sampling event. The groundwater sample collected from the excavation reported the concentration of sulfolane at 14,000  $\mu\text{g/L}$ .

A vertical and horizontal control survey of the monitor wells and excavations was completed by Gourdie-Fraser, Inc. on November 18, 2015. Static water levels and top-of-casing (TOC) elevations from the monitor wells were utilized to calculate groundwater elevations for use with contouring software. The direction of groundwater flow, as determined from multiple monitor well gauging events, trends to the northeast.

For additional information regarding the initial groundwater characterization, please refer to the "Groundwater Characterization Work Plan" completed by ECT, dated February 23, 2016.

### ***Preliminary Groundwater Characterization***

In order to further refine the extent of groundwater impacted with sulfolane at the Site, and as a precursor to the installation of permanent monitor wells, personnel from ECT oversaw and directed the installation of eight shallow temporary monitor wells (TMW-01 through TMW-05 and TMW-07 through TMW-09) and two temporary vertical profile monitor wells (TMW-010 and TMW-011) on June 2, 2016. The TMW locations were incorporated into existing Site survey data by Gourdie-Fraser Associates (GFA) on June 9, 2016. *TMW locations are depicted on Figure 3.*

The shallow temporary monitor wells (TMWs) were installed using a direct-push drill rig. Soil samples were collected continuously from 15 ft bgs through the boring completion depths of 25 ft bgs, except boring TMW-01 which was advanced to 30 ft bgs, and were visually characterized and classified. Approximately five to ten feet of saturated silty/gravelly sand was identified in all of the shallow TMWs. Clay was encountered below the silty/gravelly sand layer at TMW-01 and TMW-03. Shallow temporary monitor wells were constructed of 1-inch PVC equipped with 5-foot long screens generally situated to straddle the groundwater table. Groundwater samples were collected from

the shallow TMWs immediately following installation using a peristaltic pump and new disposable polyethylene tubing. Subsequent to sample collection, the TMWs were removed and the borings were abandoned with bentonite.

The two temporary vertical profile monitor wells were installed using a truck mounted drill rig equipped with 4¼-inch ID hollow stem augers (HSAs). TMW-010, located generally downgradient of the apparent source area near the eastern boundary of the Site, was drilled to an approximate depth of 98 ft bgs. Two-foot split spoon samples were collected every five feet starting at 18 ft bgs. Gravelly and/or silty sands were encountered from 18 ft bgs to 94 ft bgs. A silt layer was encountered at 94 ft bgs to the remaining depth of the boring. Groundwater samples were collected from a 2-inch diameter temporary PVC monitor well from 90-95 ft bgs, 70-75 ft bgs, and 45-50 ft bgs using new disposable bailers. Prior to sample collection, approximately 200 gallons of groundwater was purged from each screened interval. Due to poor production from the surge bailer at the 45-50 ft bgs interval, a new disposable bailer was utilized to purge approximately 25 gallons of groundwater prior to sample collection. Subsequent to sample collection, TMW-010 was abandoned with bentonite.

TMW-011, located generally downgradient of the apparent source area adjacent to the excavation, was drilled to a completion depth of 36 ft bgs. Clay was encountered in two continuous 2-foot split spoon samples collected from 32-34 ft bgs and 34-36 ft bgs, thus confirming the presence of a confining layer at this location. Therefore, TMW-011 was screened above the clay at 27-32 ft bgs and a groundwater sample was collected using a new disposable bailer. Prior to sample collection, approximately 110 gallons of groundwater was purged from the well. Subsequent to sample collection, TMW-011 was abandoned with bentonite.

Interpolated cross section A-A' approximately bisects the Site from west to east and is attached as Figure 5. Interpolated cross section B-B' approximately bisects the Site from north to south and is attached as Figure 6. The cross sections depict soil lithology, the groundwater table, and groundwater contaminant concentrations. *Soil boring logs/monitor well construction diagrams are attached.*

In addition to the TMW sampling, static water levels and groundwater samples were collected from MW-1 through MW-7 on June 3, 2016. Static water levels were collected with an electronic water level meter (0.01 feet accuracy). Static water levels and top-of-casing (TOC) elevations from the monitor wells were utilized to calculate groundwater elevations for use with contouring software. The resulting groundwater flow direction is generally consistent with previous gauging events, trending to the northeast. It should be noted the groundwater elevation for MW-5 was not consistent with other elevations and was not utilized with the contouring software. The elevation discrepancy for MW-5 could be attributed to a clay layer identified at approximately 23 ft bgs (bottom of monitor well). *Groundwater elevation data is included on the attached Table 1 and groundwater flow characteristics are depicted on the attached Figure 4 – Groundwater Flow Diagram.*

Groundwater samples were collected from MW-1 through MW-7 using new disposable bailers. Prior to sample collection, approximately three times the water volume in the well casing at each monitor well was purged. Groundwater samples were collected into laboratory supplied containers, placed on ice, and shipped under chain-of-custody protocols to an independent/third party laboratory.

### **Groundwater Analytical Summary & Cleanup Criteria Comparison**

No cleanup criteria for sulfolane have currently been established via Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), Public Act 451 of 1994, as amended (Part 201). However, MDEQ-Remediation and Redevelopment Division (MDEQ-RRD) are in the process of developing cleanup criteria for sulfolane. An interim cleanup criteria for sulfolane of 90 µg/L was established by the MDEQ-Office of Oil, Gas, and Minerals (MDEQ-OOGM). The following presents a summary and comparison of groundwater analytical results to sulfolane cleanup criteria from permanent and temporary monitor well samples collected on June 2-3, 2016 at the Site:

#### Permanent monitor wells MW-1 through MW-7

- Sulfolane was reported as non-detect from MW-1 through MW-6.
- The concentration of sulfolane reported for MW-7 exceeded cleanup criteria.

#### Temporary monitor wells TMW-01 through TMW-05 and TMW-07 through TMW-011

- Sulfolane was reported as non-detect from TMW-01, TMW-02, TMW-03, and TMW-010.
- The concentration of sulfolane reported for TMW-04, TMW-05, TMW-07, TMW-08, TMW-09, and TMW-011 exceeded cleanup criteria.

Groundwater samples collected from MW-7, TMW-04, TMW-07, and TMW-08 from the June 2-3, 2016 sampling event were additionally analyzed for diisopropanolamine (DIPA). DIPA and sulfolane are constituents in sulfinol, a chemical that was used as part of gas plant operations at the Site. DIPA was reported as non-detect for each of the above mentioned groundwater samples.

*Groundwater analytical results for the permanent monitor wells and the TMWs are summarized and compared to cleanup criteria on the attached Tables 2 and 3, respectively. Groundwater analytical results are also depicted on the attached Figure 7 – Groundwater Contaminant Concentration Diagram.*

### **Residential Water Supply Well Sampling**

Personnel from ECT collected samples from water supply wells at the following 12 residences in the vicinity of the Site:

- 13223 Lone Tree Road
- 900 Erin Lane
- 495 Jeni Lane
- 13850 Cherry Blossom Ln
- 13247 Lone Tree Road
- 460 Jeni Lane
- 513 Jeni Lane
- 13900 Cherry Blossom Ln
- 13390 Lone Tree Road
- 477 Jeni Lane
- 869 Pleasant Valley Road
- 13593 Sheila Lane

Sulfolane was reported as non-detect from all water supply well samples. Laboratory analytical reports from residential water supply well samples will be provided as a separate submittal.

Personnel from ECT completed a review of available water supply well records from the MDEQ GeoWebFace Application and Wellogic database (pre-2000 scanned records). Records were identified for the following wells that were sampled:

- 13390 Lone Tree Road (irrigation well)
- 477 Jeni Lane
- 495 Jeni Lane
- 869 Pleasant Valley Road

Information on the well records indicates static water levels ranged from 11 to 30 ft bgs and screened intervals ranged from 56-60 ft bgs to 74-78 ft bgs. Lithology was generally comprised of varying intervals of sand, gravel, and clay. *Well records for the four water supply wells noted above and additional water supply wells in the vicinity of the Site are attached.*

#### ***Installation of Additional Permanent Monitor Wells***

In order to further refine and delineate the extent of groundwater impacted with sulfolane at the Site, as well as monitor groundwater contaminant plume characteristics, nine additional shallow permanent monitor wells and three additional vertical delineation permanent monitor wells are proposed.

The monitor wells will be installed using a truck mounted drill rig equipped with 4¼-inch ID hollow stem augers (HSAs). The monitor wells (2-inch diameter PVC) will be equipped with 5-foot screens. The shallow monitor wells will have the top of the screens situated near the groundwater table (approximately 20-25 ft bgs).

Two of the vertical delineation monitor wells will be installed along the eastern boundary of the Site generally downgradient of the apparent source area and will be screened from approximately 40-45 ft bgs. The third vertical delineation monitor well will be installed in the vicinity of the apparent source area. For this well, 2-foot split spoon samples will be collected every five feet beginning at 18 ft bgs until either a competent confining layer or a boring depth of 100 ft bgs has been reached. In the event that a competent confining layer is reached at a depth greater than 45 ft bgs, TMWs will be screened, purged, and sampled at distributed intervals from the boring depth up to 40-45 ft bgs, where the permanent monitor well will be set.

The proposed shallow monitor wells will be located as follows (refer to Figure 8):

- MW-8, MW-9, and MW-10 will be located to delineate and refine the extent of sulfolane impact identified at MW-7.
- MW-11 and MW-13 will be located for monitoring mid-gradient sulfolane concentrations.

- MW-12 will be located to monitor potential contaminant characteristics downgradient of the apparent source area at the eastern property boundary between monitor wells MW-4 and MW-6.
- MW-14 will be located to monitor sulfolane concentrations at the apparent source area.
- MW-15 and MW-16 will be located to further refine the extent of sulfolane impact reported from TMW-09.

New permanent monitor well locations and elevation data will be incorporated into existing data by GFA.

### ***Groundwater Monitoring Activities***

The nine shallow permanent monitor wells and 3 vertical permanent monitor wells will be sampled a minimum of three days following installation. Subsequently, quarterly groundwater monitoring of select monitor wells will be completed. At a minimum, monitoring will include collecting static water levels and groundwater samples.

Groundwater sampling will be completed in accordance with MDEQ-RRD Operational Memorandum No. 2, dated October 22, 2004 and USEPA EQASOP-GW 001 Region 1 Low-Stress (Low-Flow) SOP Revision 3, dated January 19, 2010. Groundwater samples will be submitted to an independent/third party laboratory for analysis of sulfolane by USEPA Method 8270D.

### ***Project Status Reporting***

Data obtained from permanent monitor well installation and sampling activities and quarterly groundwater monitoring will be summarized in Project Status/Update Reports. At a minimum, the reports will include a narrative summary of activities completed during the quarter, groundwater elevation and analytical summary tables, groundwater flow data, cleanup criteria comparisons, and conclusions and recommendations for project progression.

### ***Schedule***

Installation of permanent monitor wells will be scheduled within two weeks of MDEQ-OOGM concurrence with this Work Plan. The Project Status/Update Report summarizing permanent monitor well installation and sampling activities will be submitted to MDEQ-OOGM within two weeks of receiving the laboratory analytical report.



**Closing**

ECT sincerely appreciates the opportunity to provide our consulting services on this important project. Should you have questions or require additional information, please do not hesitate to contact me at your convenience at 231.946.8200 or [jlewandowski@ectinc.com](mailto:jlewandowski@ectinc.com).

Sincerely,

**ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.**



Jeremy S. Lewandowski  
Senior Engineer



Dirk S. Mammen  
Principal Scientist

CC: Sean Craven – Merit Energy Company

Attachments:

- Figure 1 – Site Location Map
- Figure 2 – Site and Surrounding Properties Map
- Figure 3 – Site Plan
- Figure 4 – Groundwater Flow Diagram
- Figure 5 – Cross Section A-A'
- Figure 6 – Cross Section B-B'
- Figure 7 – Groundwater Contaminant Concentration Diagram
- Figure 8 – Proposed Monitor Well Locations
- Table 1 – Groundwater Elevation Data
- Table 2 – Sulfolane Analytical Summary & Cleanup Criteria Comparison – Monitor Wells
- Table 3 – Sulfolane Analytical Summary & Cleanup Criteria Comparison – Temporary Monitor Wells
- Boring/Monitor Well Logs
- Residential Water Supply Well Records
- Laboratory Analytical Report

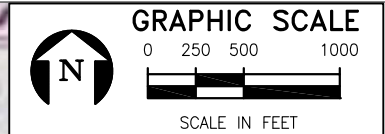
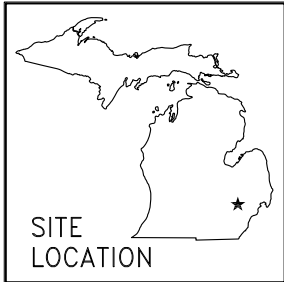


FIGURE 1.  
SITE LOCATION MAP

Sources: USGS Quad: Kent Lake, 2015; West Highland, 2015; ECT, 2016.







FIGURE 2.  
SITE AND SURROUNDING PROPERTIES MAP

Source: Google Earth, 2016.

**ECT** Environmental  
Consulting &  
Technology, Inc.



# MERIT ENERGY COMPANY HARTLAND 36 NATURAL GAS PLANT

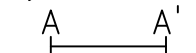
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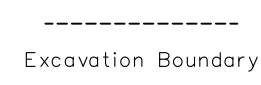
Monitor Well



Temporary Monitor Well Location



Cross Section



Excavation Boundary



Fenceline



130685 - 2000  
ECT PROJECT NUMBER

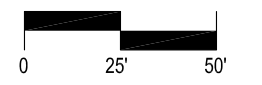
DESIGNED BY \_\_\_\_\_ CHECKED BY \_\_\_\_\_

BJB DRAWN BY \_\_\_\_\_ JSL APPROVED BY \_\_\_\_\_

SHEET TITLE

### SITE PLAN

SCALE: 1" = 50' @ 11x17



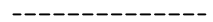


FIGURE

# 3



### Legend

-  Monitor Well
-  Temporary Monitor Well Location
-  Excavation Boundary

GROUNDWATER ELEVATIONS COLLECTED FROM 6/3/16 DATA.

GROUNDWATER ELEVATION FOR MW-5 NOT INCLUDED IN GROUNDWATER FLOW CALCULATIONS.

GROUNDWATER CONTOUR INTERVAL = 0.1 FT

## MERIT ENERGY COMPANY HARTLAND 36 NATURAL GAS PLANT

130685 - 2000  
ECT PROJECT NUMBER

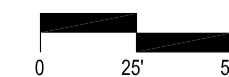
DESIGNED BY \_\_\_\_\_ CHECKED BY \_\_\_\_\_

BJB DRAWN BY \_\_\_\_\_ JSL APPROVED BY \_\_\_\_\_

SHEET TITLE

### GROUNDWATER FLOW DIAGRAM

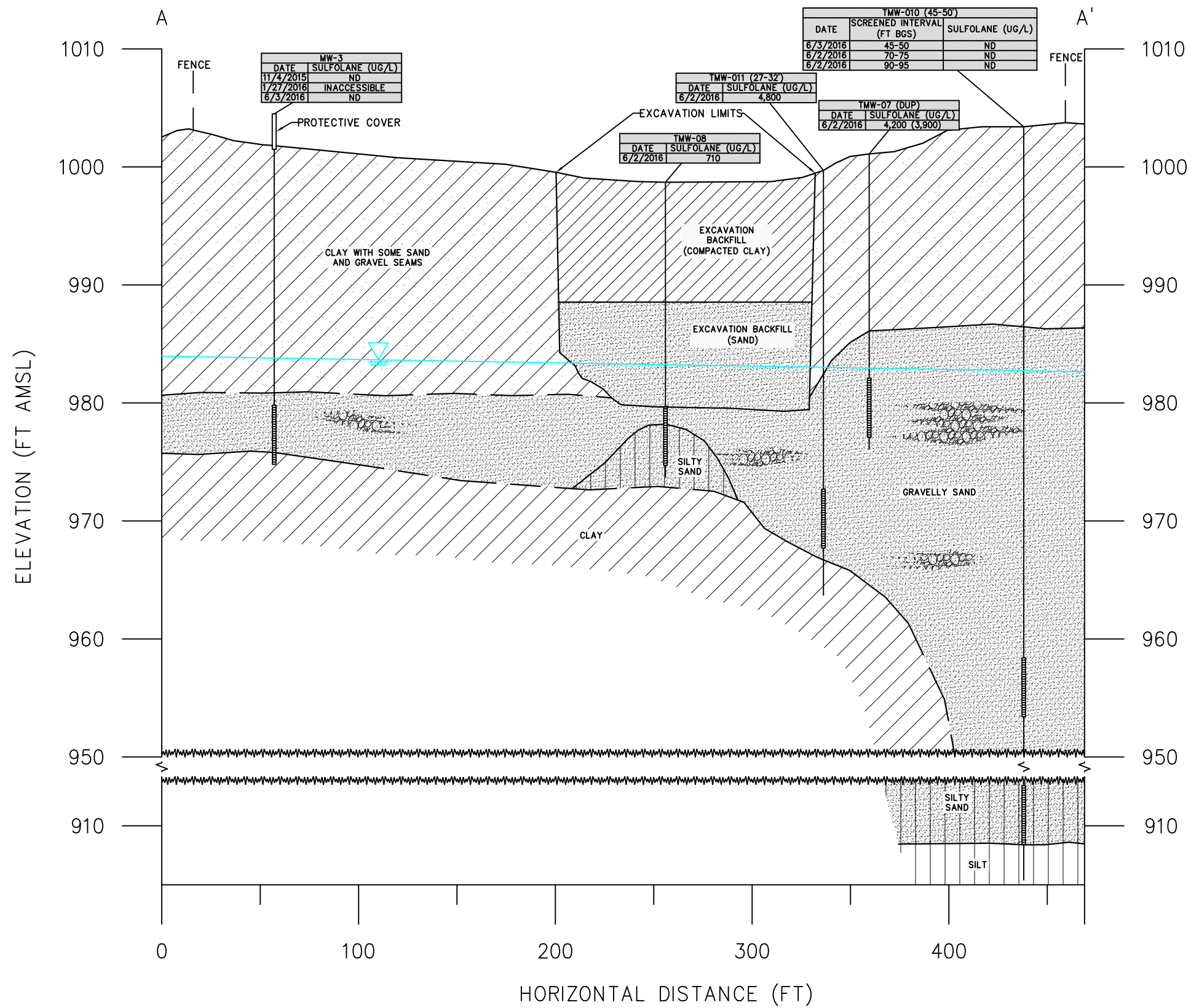
SCALE: 1" = 50' @ 11x17



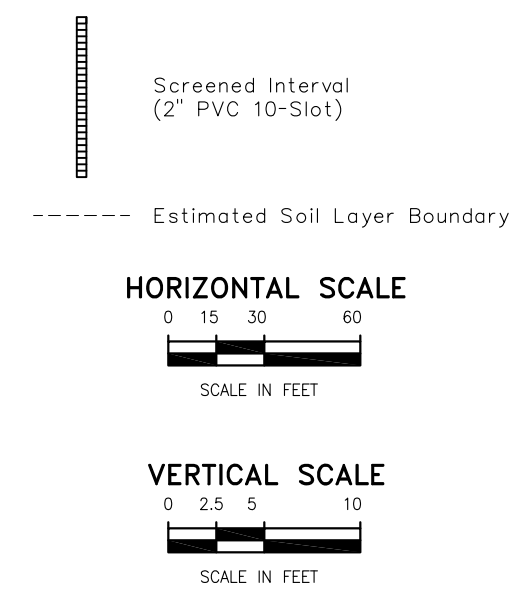
FIGURE

4





**Legend**



**MERIT ENERGY COMPANY  
HARTLAND 36  
NATURAL GAS PLANT**

130685 - 2000  
ECT PROJECT NUMBER

DESIGNED BY: \_\_\_\_\_ CHECKED BY: \_\_\_\_\_

BJB DRAWN BY: \_\_\_\_\_ JSL APPROVED BY: \_\_\_\_\_

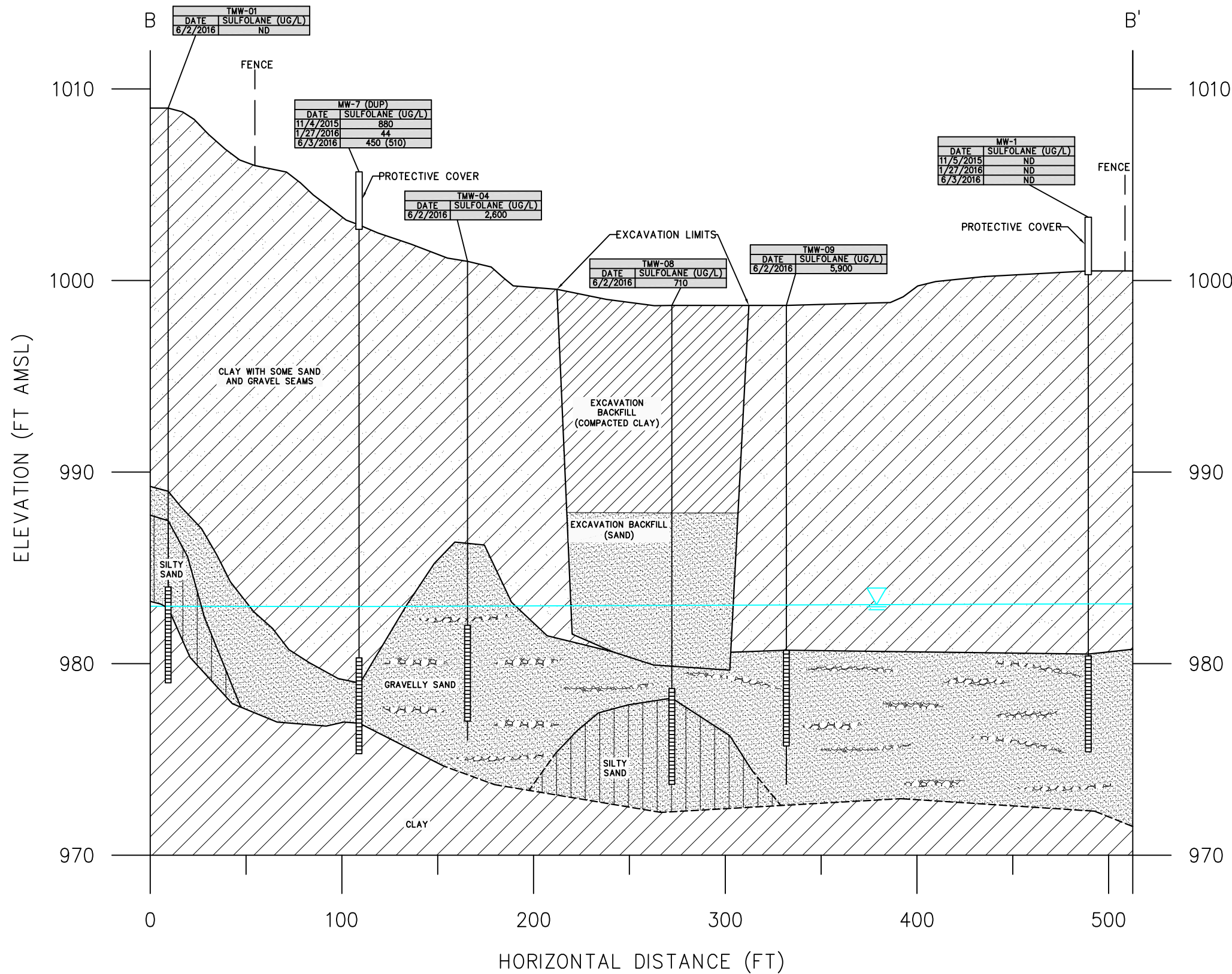
SHEET TITLE

**CROSS SECTION A-A'**

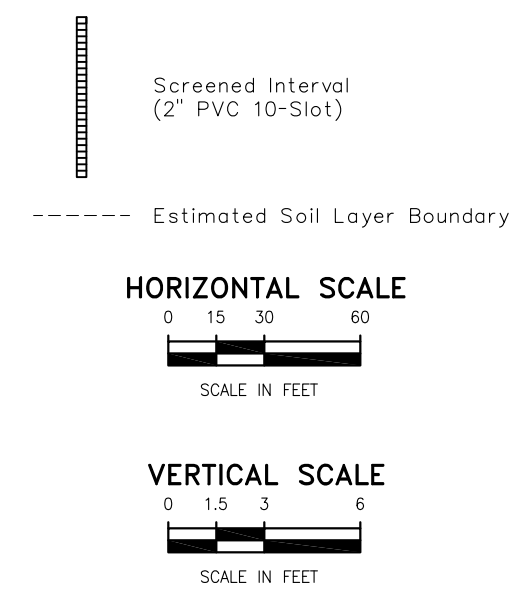
SEE LEGEND FOR SCALE

FIGURE  
**5**





### Legend



## MERIT ENERGY COMPANY HARTLAND 36 NATURAL GAS PLANT

130685 - 2000  
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DESIGNED BY \_\_\_\_\_ CHECKED BY \_\_\_\_\_  
BJB JSL  
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SHEET TITLE  
**CROSS SECTION B-B'**

SEE LEGEND FOR SCALE

FIGURE  
**6**



# MERIT ENERGY COMPANY HARTLAND 36 NATURAL GAS PLANT

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BJB DRAWN BY \_\_\_\_\_ JSL APPROVED BY \_\_\_\_\_

SHEET TITLE  
**GROUNDWATER  
CONTAMINANT  
CONCENTRATION  
DIAGRAM**

SCALE: 1" = 50' @ 11x17

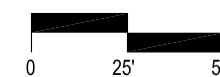


FIGURE  
**7**

### Legend

-  Monitor Well
-  Temporary Monitor Well Location
-  Excavation Boundary
-  Fence line





# MERIT ENERGY COMPANY HARTLAND 36 NATURAL GAS PLANT

## Legend

- Monitor Well
- Temporary Monitor Well
- Proposed Monitor Well Location (Screened ~20-25' BGS)
- Proposed Monitor Well Location (Screened ~20-25' BGS & ~40-45' BGS)
- Excavation Boundary
- Fenceline

130685 - 2000  
ECT PROJECT NUMBER

DESIGNED BY \_\_\_\_\_ CHECKED BY \_\_\_\_\_  
BJB DRAWN BY \_\_\_\_\_ JSL APPROVED BY \_\_\_\_\_

SHEET TITLE

### PROPOSED MONITOR WELL LOCATIONS

SCALE: 1" = 50' @ 11x17



FIGURE  
**8**



**TABLE 1  
GROUNDWATER ELEVATION DATA**

Hartland 36 Gas Plant  
SE/NE/NW Section 36, T03N-R06E, Hartland Township, Livingston County, Michigan  
ECT Project #13-0685-2000

**30-Oct-15**

LOCATION	TOC ELEVATION (ft)	GROUND ELEVATION (FT)	STATIC WATER LEVEL (ft btoc)	GROUNDWATER ELEVATION (ft)	WELL DEPTH (ft btoc)	WELL DEPTH (ft bgs)	STATIC WATER LEVEL (ft bgs)	SCREENED INTERVAL (ft bgs)
MW-1	1003.27	1000.5	20.84	982.43	27.9	25.1	18.07	20.1 - 25.1
MW-2	1002.48	999.2	19.68	982.80	27.4	24.1	16.40	19.1 - 24.1
MW-3	1005.07	1001.8	22.23	982.84	30.3	27.0	18.96	22.0 - 27.0
MW-4	1005.00	1002.8	22.75	982.25	30.3	28.1	20.55	23.1 - 28.1

**4-Nov-15**

LOCATION	TOC ELEVATION (ft)	GROUND ELEVATION (FT)	STATIC WATER LEVEL (ft btoc)	GROUNDWATER ELEVATION (ft)	WELL DEPTH (ft btoc)	WELL DEPTH (ft bgs)	STATIC WATER LEVEL (ft bgs)	SCREENED INTERVAL (ft bgs)
MW-1	1003.27	1000.5	20.89	982.38	27.9	25.1	18.12	20.1 - 25.1
MW-2	1002.48	999.2	19.76	982.72	27.4	24.1	16.48	19.1 - 24.1
MW-3	1005.07	1001.8	22.31	982.76	30.3	27.0	19.04	22.0 - 27.0
MW-4	1005.00	1002.8	22.80	982.20	30.3	28.1	20.60	23.1 - 28.1
MW-5	1005.76	1003.5	23.20	982.56	25.3	23.0	20.94	18.0 - 23.0
MW-6	1006.15	1003.7	24.00	982.15	32.8	30.4	21.55	25.4 - 30.4
MW-7	1005.74	1002.9	23.45	982.29	30.4	27.6	20.61	22.6 - 27.6

**13-Nov-15**

LOCATION	TOC ELEVATION (ft)	GROUND ELEVATION (FT)	STATIC WATER LEVEL (ft btoc)	GROUNDWATER ELEVATION (ft)	WELL DEPTH (ft btoc)	WELL DEPTH (ft bgs)	STATIC WATER LEVEL (ft bgs)	SCREENED INTERVAL (ft bgs)
MW-1	1003.27	1000.5	20.99	982.28	27.9	25.1	18.22	20.1 - 25.1
MW-2	1002.48	999.2	19.85	982.63	27.4	24.1	16.57	19.1 - 24.1
MW-3	1005.07	1001.8	22.49	982.58	30.3	27.0	19.22	22.0 - 27.0
MW-4	1005.00	1002.8	22.88	982.12	30.3	28.1	20.68	23.1 - 28.1
MW-5	1005.76	1003.5	23.29	982.47	25.3	23.0	21.03	18.0 - 23.0
MW-6	1006.15	1003.7	24.05	982.10	32.8	30.4	21.60	25.4 - 30.4
MW-7	1005.74	1002.9	23.55	982.19	30.4	27.6	20.71	22.6 - 27.6

**27-Jan-16**

LOCATION	TOC ELEVATION (ft)	GROUND ELEVATION (FT)	STATIC WATER LEVEL (ft btoc)	GROUNDWATER ELEVATION (ft)	WELL DEPTH (ft btoc)	WELL DEPTH (ft bgs)	STATIC WATER LEVEL (ft bgs)	SCREENED INTERVAL (ft bgs)
MW-1	1003.27	1000.5	21.41	981.86	27.9	25.1	18.64	20.1 - 25.1
MW-2	1002.48	999.2	20.38	982.10	27.4	24.1	17.10	19.1 - 24.1
MW-3	1005.07	1001.8	---	---	30.3	27.0	---	22.0 - 27.0
MW-4	1005.00	1002.8	23.30	981.70	30.3	28.1	21.10	23.1 - 28.1
MW-5	1005.76	1003.5	23.78	981.98	25.3	23.0	21.52	18.0 - 23.0
MW-6	1006.15	1003.7	24.49	981.66	32.8	30.4	22.04	25.4 - 30.4
MW-7	1005.74	1002.9	23.96	981.78	30.4	27.6	21.12	22.6 - 27.6

**3-Jun-16**

LOCATION	TOC ELEVATION (ft)	GROUND ELEVATION (FT)	STATIC WATER LEVEL (ft btoc)	GROUNDWATER ELEVATION (ft)	WELL DEPTH (ft btoc)	WELL DEPTH (ft bgs)	STATIC WATER LEVEL (ft bgs)	SCREENED INTERVAL (ft bgs)
MW-1	1003.27	1000.5	20.15	983.12	27.9	25.1	17.38	20.1 - 25.1
MW-2	1002.48	999.2	18.48	984.00	27.4	24.1	15.20	19.1 - 24.1
MW-3	1005.07	1001.8	21.27	983.80	30.3	27.0	18.00	22.0 - 27.0
MW-4	1005.00	1002.8	22.23	982.77	30.3	28.1	20.03	23.1 - 28.1
MW-5	1005.76	1003.5	22.57	983.19	25.3	23.0	20.31	18.0 - 23.0
MW-6	1006.15	1003.7	23.42	982.73	32.8	30.4	20.97	25.4 - 30.4
MW-7	1005.74	1002.9	22.76	982.98	30.4	27.6	19.92	22.6 - 27.6

**TABLE 2**  
**SULFOLANE ANALYTICAL SUMMARY &**  
**CLEANUP CRITERIA COMPARISON - MONITOR WELLS**

Hartland 36 Gas Plant  
SE/NE/NW Section 36, T03N-R06E,  
Hartland Township, Livingston County, Michigan  
ECT Project #13-0685-2000

Sample Location	Screened Interval (ft bgs)	Sulfolane by EPA Method 8270D (µg/L)				
		10/15/2015	11/4-5/2015	11/13/2015	1/27/2016	6/6/2016
W-Pit	---	<b>20,000</b>	---	<b>14,000</b>	---	---
MW-1	20.1-25.1	---	<10	---	<10	<10
MW-2	19.1-24.1	---	<10	---	<10	<10
MW-3	22.0-27.0	---	<10	---	<10	<10
MW-4	23.1-28.1	---	<10	---	<10	<10
MW-5	18.0-23.0	---	<10	---	<10	<10
MW-6	25.4-30.4	---	<10	---	<10	<10
MW-7	22.6-27.6	---	<b>880</b>	---	44	<b>450 (510)<sup>9</sup></b>
<b>MDEQ-OOGM Cleanup Criteria</b>		<b>90</b>				
<b>Collection Method</b>		Grab	LF	LF	LF	Grab

**Notes**

- 1) ft/bgs - Feet below ground surface.
- 2) Collection method - Grab (bailer or peristaltic pump), low flow (LF), Bailer.
- 3) µg/L - Micrograms per liter, equivalent to parts per billion (ppb).
- 4) (---) - Not sampled.
- 5) nd - Concentration not detected above reporting limit.
- 6) (###) - Concentration is for duplicate sample.
- 7) Cleanup criteria for sulfolane established by MDEQ-Office of Oil, Gas, and Minerals (MDEQ-OOGM).
- 8) Concentrations that are shaded  and bold exceed cleanup criteria.
- 9) Sample also collected and reported "nd" for diisopropanolamine (DIPA).



**TABLE 3**  
**SULFOLANE ANALYTICAL SUMMARY & CLEANUP CRITERIA**  
**COMPARISON - TEMPORARY MONITOR WELLS**

Hartland 36 Gas Plant  
SE/NE/NW Section 36, T03N-R06E,  
Hartland Township, Livingston County, Michigan  
ECT Project #13-0685-2000

Sample Location	Screened Interval (ft bgs)	Sulfolane by EPA Method 8270D (µg/L)	
		10/30/2015	6/2/2016
TMW-6	35-40	<10	---
TMW-6	45-50	<10	---
TMW-6	55-60	<10	---
TMW-6	65-70	<10	---
TMW-01	25-30	---	<11
TMW-02	20-25	---	<10
TMW-03	18-23	---	<10
TMW-04 <sup>9</sup>	19-24	---	<b>2,600</b>
TMW-05	16.5-21.5	---	<b>4,500</b>
TMW-07 <sup>9</sup>	19-24	---	<b>4,200 (3,900)</b>
TMW-08 <sup>9</sup>	19-24	---	<b>710</b>
TMW-09	18-23	---	<b>5,900</b>
TMW-010	90-95	---	<10
TMW-010	70-75	---	<10
TMW-010	45-50	---	<10
TMW-011	27-32	---	<b>4,800</b>
<b>MDEQ-OOGM Cleanup Criteria</b>		<b>90</b>	
<b>Collection Method</b>		Grab	

**Notes**

- 1) ft/bgs - Feet below ground surface.
- 2) Collection method - Grab (bailer or peristaltic pump), low flow (LF), Bailer.
- 3) µg/L - Micrograms per liter, equivalent to parts per billion (ppb).
- 4) (---) - Not sampled.
- 5) nd - Concentration not detected above reporting limit.
- 6) (###) - Concentration is for duplicate sample.
- 7) Cleanup criteria for sulfolane established by MDEQ-Office of Oil, Gas, and Minerals (MDEQ-OOGM).
- 8) Concentrations that are shaded  and bold exceed cleanup criteria.
- 9) Sample also collected and reported "nd" for diisopropanolamine (DIPA).



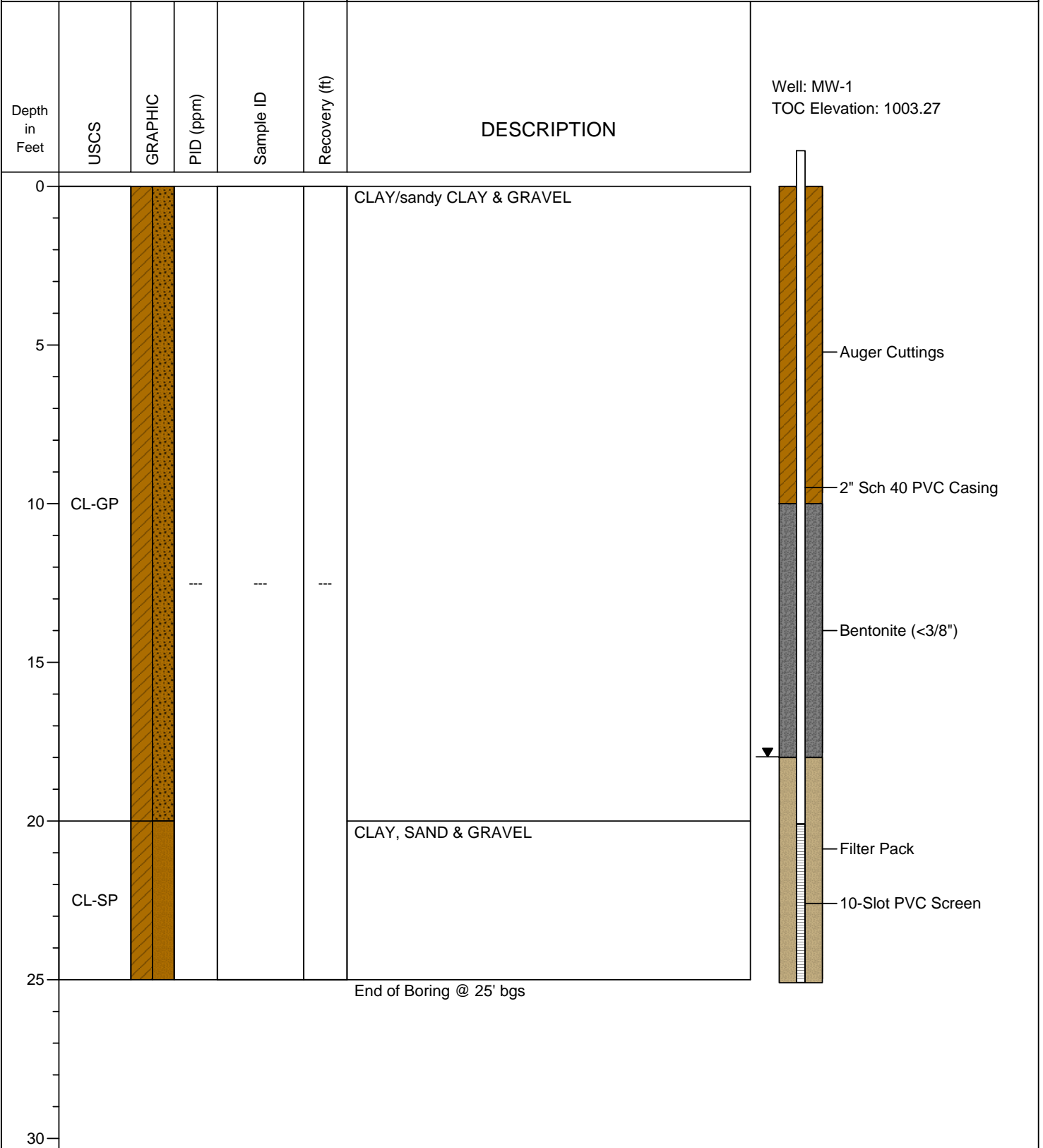
**BORING LOG DIAGRAM: B-1/MW-1**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 10/29/2015  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800



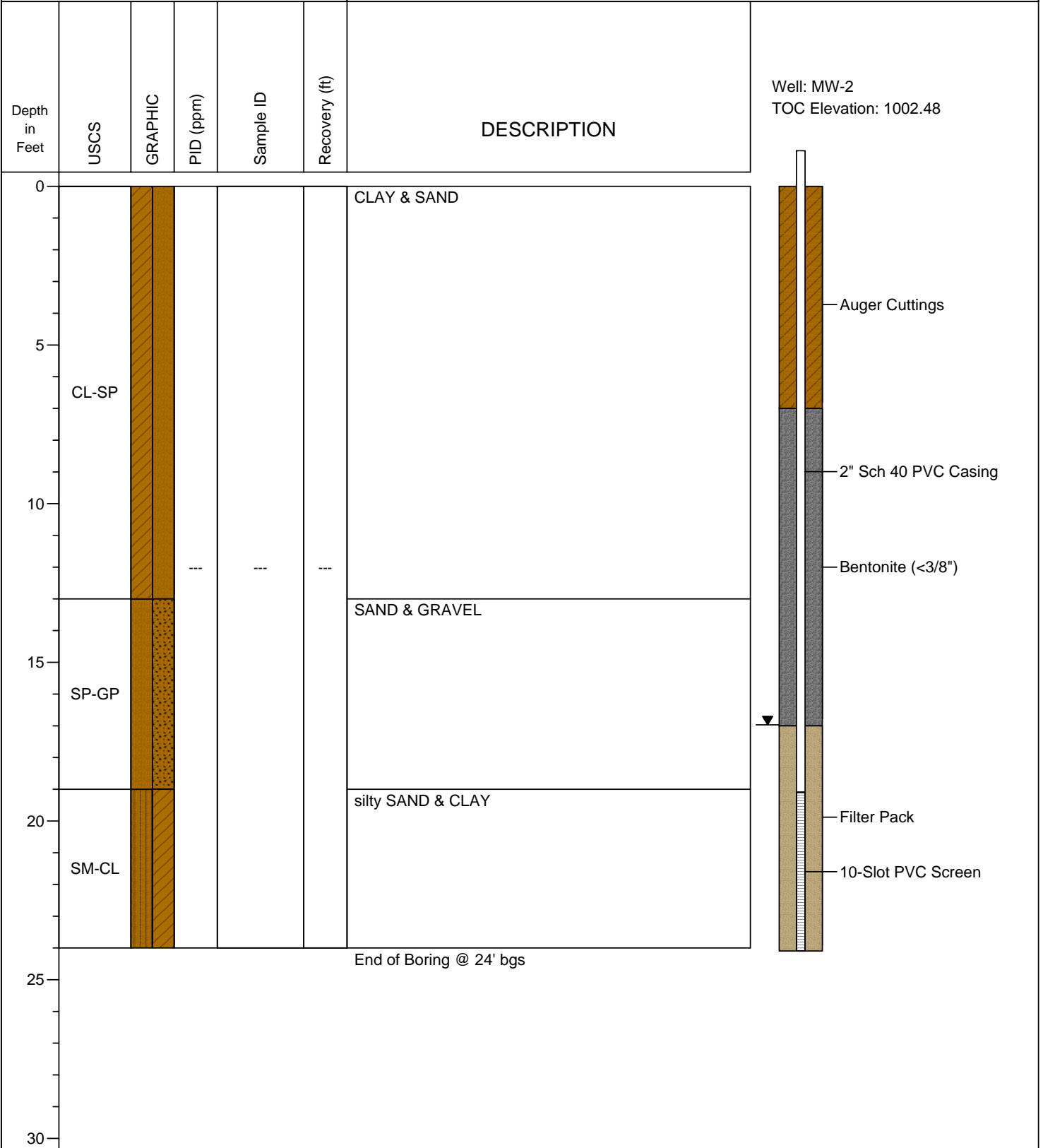
**BORING LOG DIAGRAM: B-2/MW-2**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 10/29/2015  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800



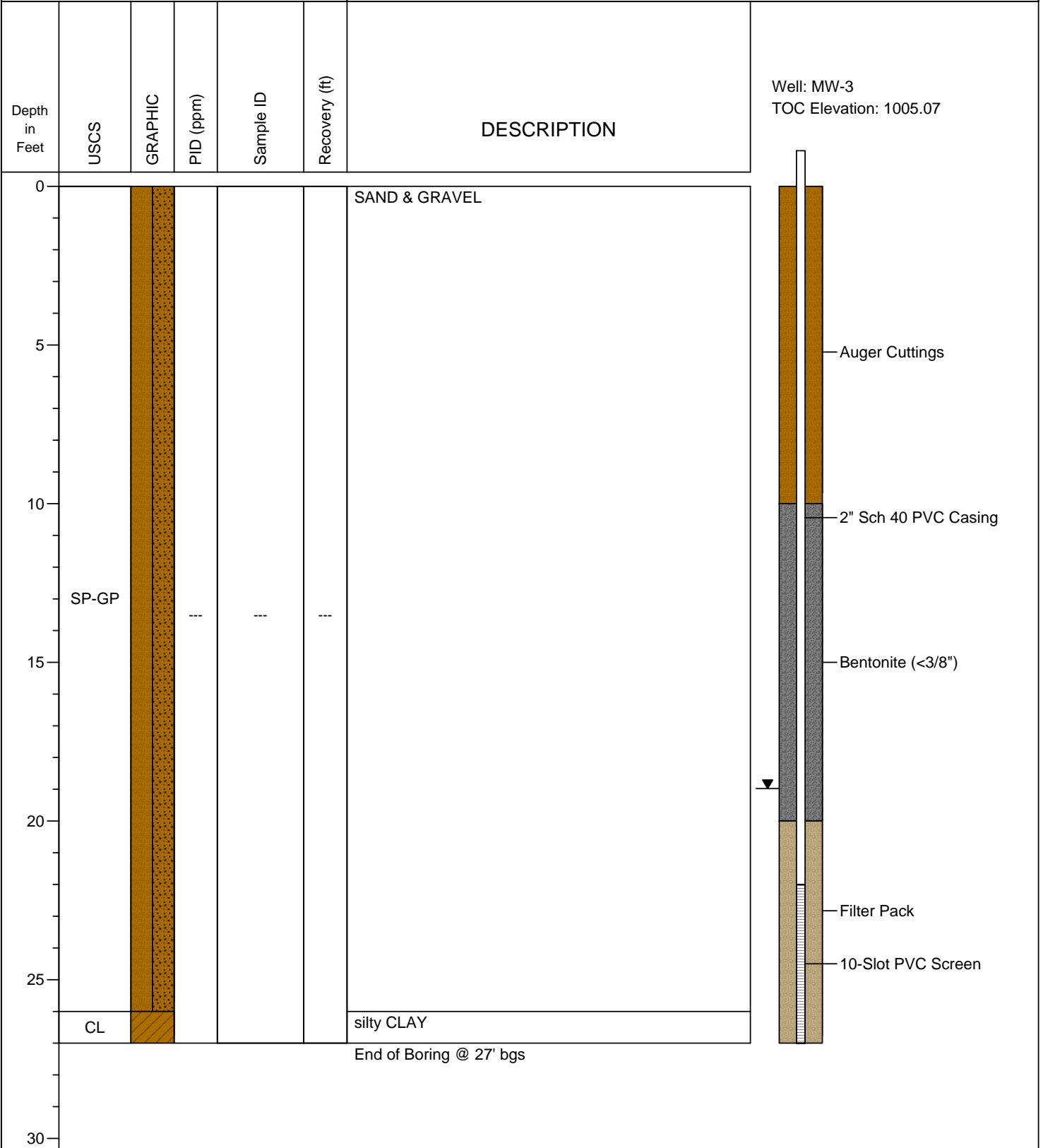
**BORING LOG DIAGRAM: B-3/MW-3**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 10/29/2015  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800



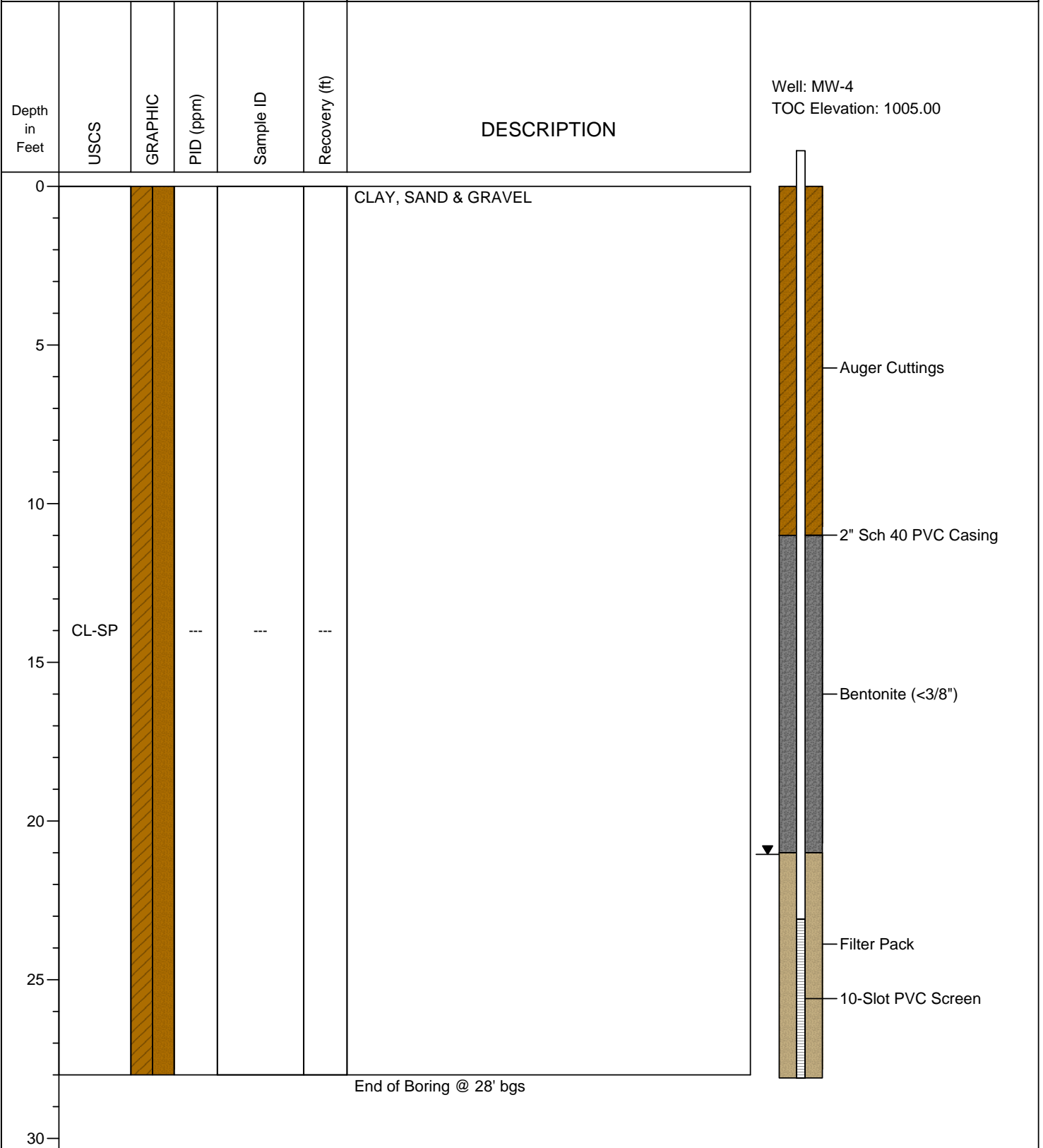
**BORING LOG DIAGRAM: B-4/MW-4**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 10/29/2015  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800



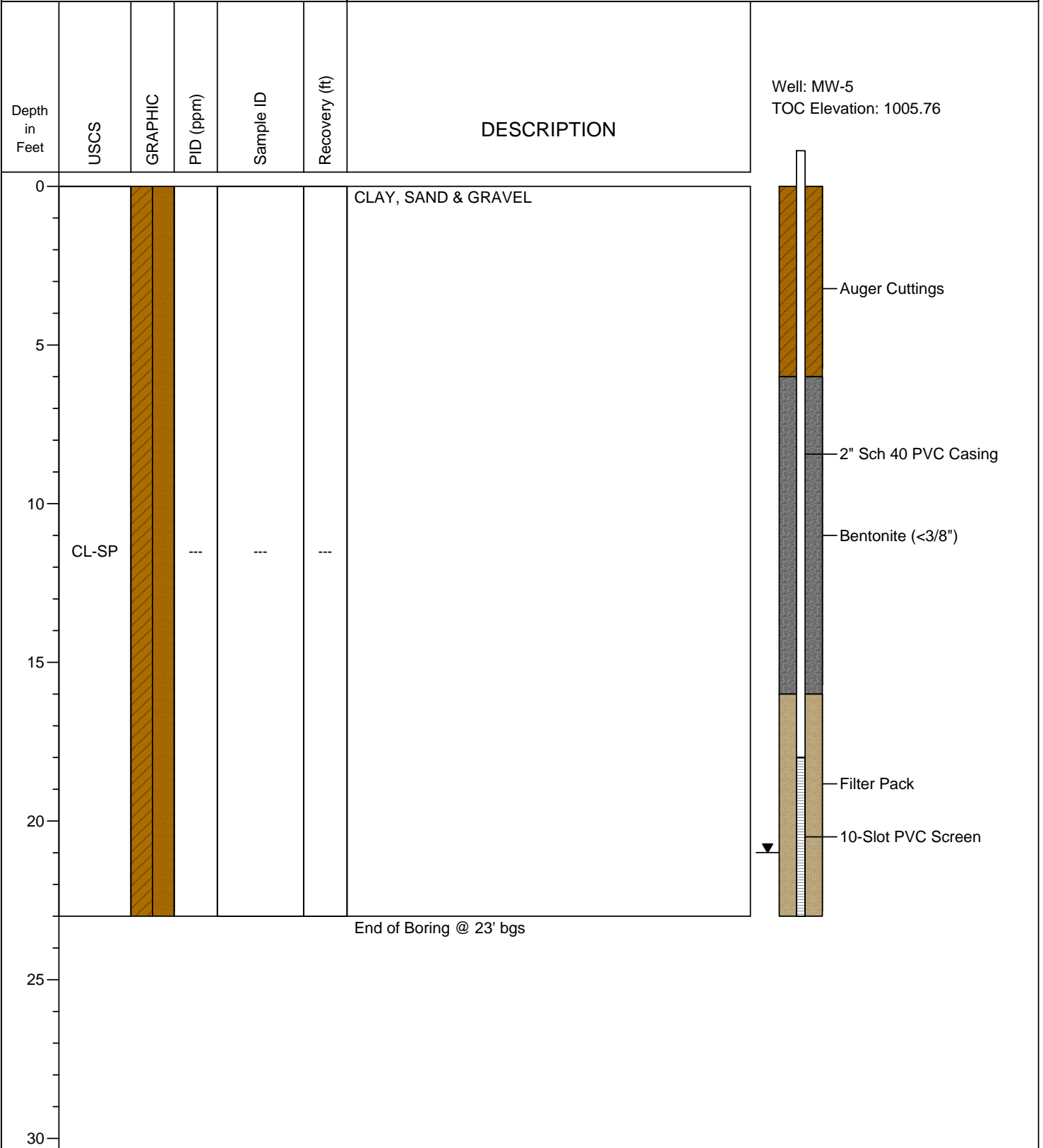
**BORING LOG DIAGRAM: B-5/MW-5**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 10/30/2015  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800





**BORING LOG DIAGRAM: B-6/MW-6**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

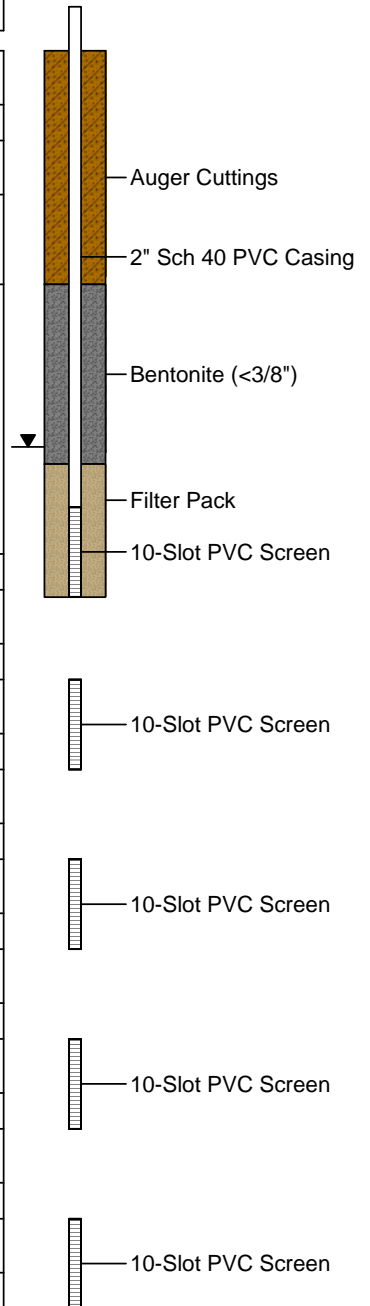
Date Completed : 10/30/2015  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Sample ID	Recovery (ft)	DESCRIPTION
0	SW-GW	[Pattern]				SAND & GRAVEL
2	CL	[Pattern]				CLAY
4	SM	[Pattern]				silty SAND
8	GW	[Pattern]				sandy GRAVEL
12		[Pattern]				clayey SAND
18	SC	[Pattern]				
28	GM	[Pattern]				silty GRAVEL
32		[Pattern]				No split spoon sample
34	SP-GP	[Pattern]	---		---	coarse SAND and fine GRAVEL
36		[Pattern]		TMW-6 35-40'		No split spoon sample
38	SP-GP	[Pattern]				coarse SAND and fine GRAVEL
40		[Pattern]				No split spoon sample
42	GW	[Pattern]				medium to coarse GRAVEL
44		[Pattern]				No split spoon sample
46		[Pattern]		TMW-6 45-50'		medium to coarse GRAVEL
48		[Pattern]				No split spoon sample
52	SP	[Pattern]				coarse SAND
54		[Pattern]				No split-spoon sample
56		[Pattern]		TMW-6 55-60'		coarse SAND & GRAVEL, some silt
58	SP-GW	[Pattern]				No split spoon sample
62		[Pattern]				No recovery
64		[Pattern]				No split spoon sample
66		[Pattern]		TMW-6 65-70'		fine SAND and SILT
70	SM	[Pattern]				
75						End of Boring @ 70' bgs

Well: TMW-6/MW-6  
TOC Elevation: 1006.15



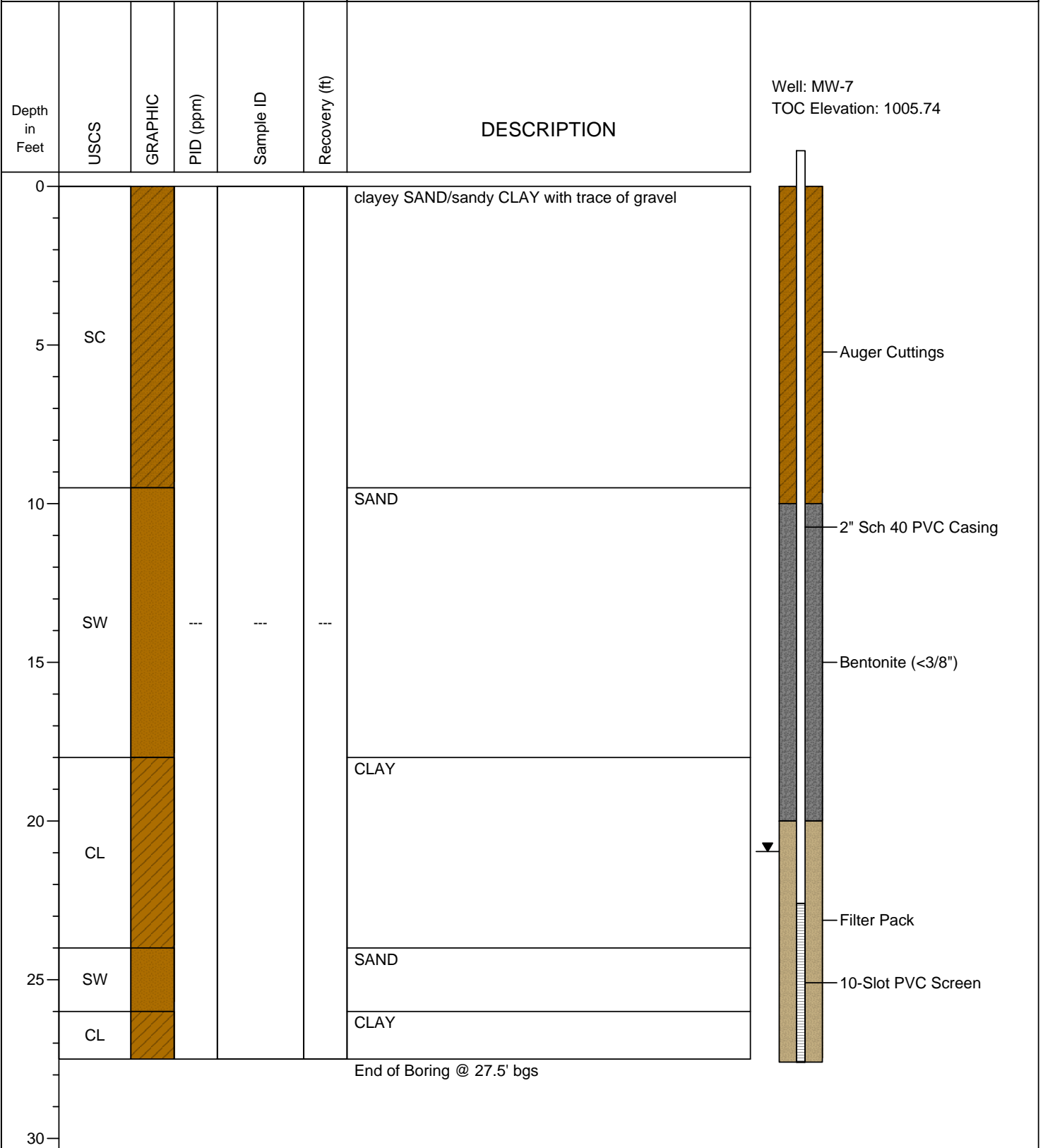
## BORING LOG DIAGRAM: B-7/MW-7

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 10/29/2015  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800



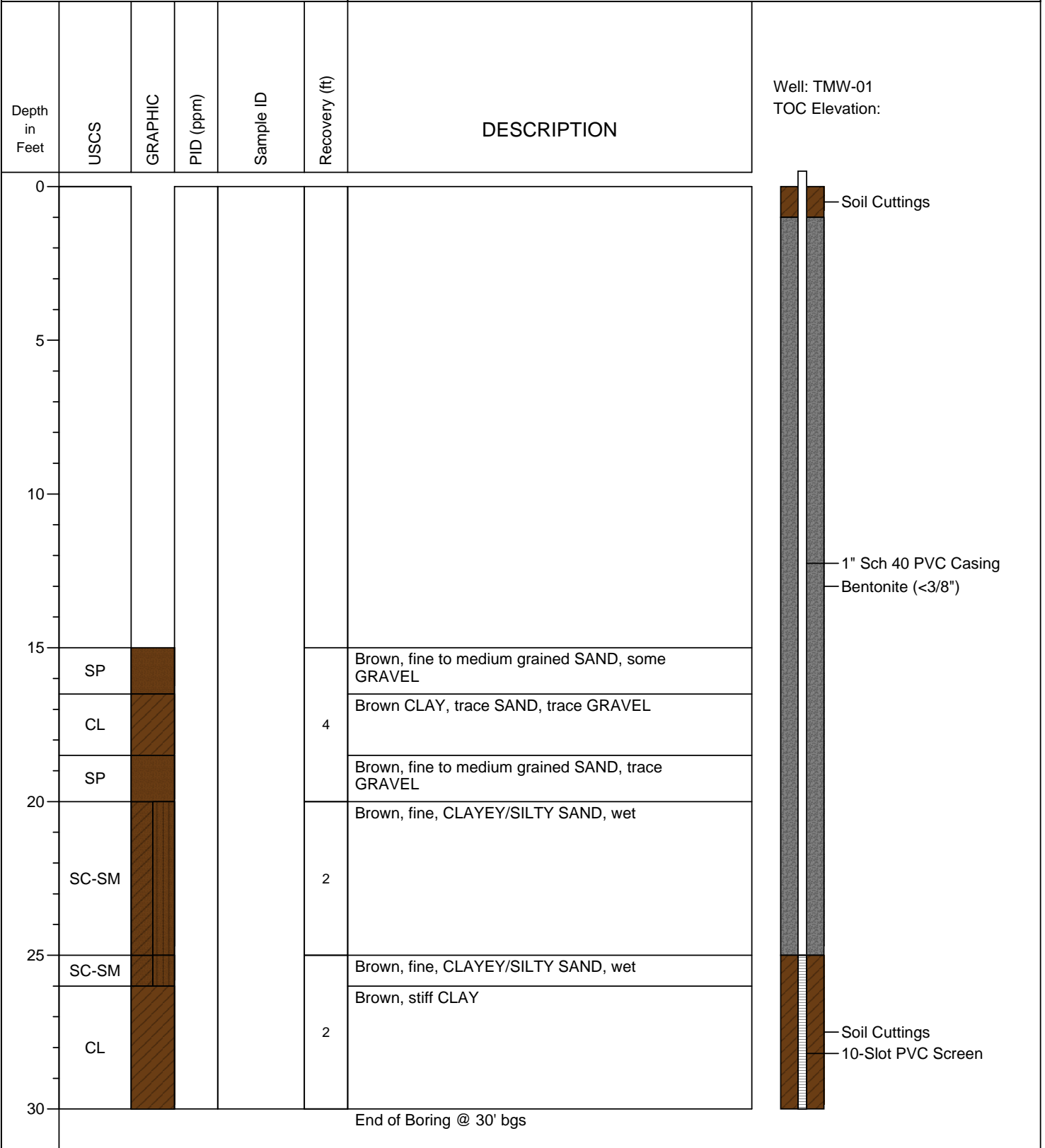
# BORING LOG DIAGRAM: TMW-01

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 6/2/2016  
Hole Diameter : 2.5"  
Drilling Company : Shepler Well Drilling  
Drilling Method : GeoProbe  
Drill Rig : 7822DT

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-2000



## BORING LOG DIAGRAM: TMW-02

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

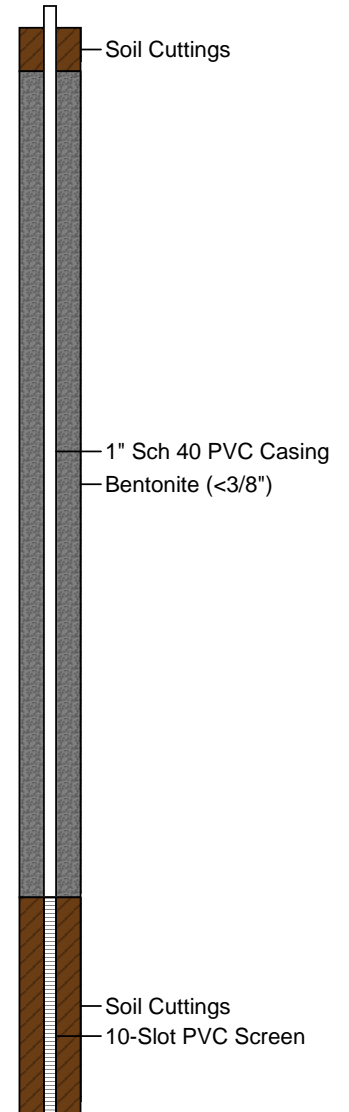
Date Completed : 6/2/2016  
Hole Diameter : 2.5"  
Drilling Company : Shepler Well Drilling  
Drilling Method : GeoProbe  
Drill Rig : 7822DT

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-2000

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Sample ID	Recovery (ft)	DESCRIPTION
0						
5						
10						
15	SP				0.1	Brown SAND, some GRAVEL
20	SP				0	Brown SAND, some GRAVEL
25						End of Boring @ 25' bgs
30						

Well: TMW-02  
TOC Elevation:














## BORING LOG DIAGRAM: TMW-03

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

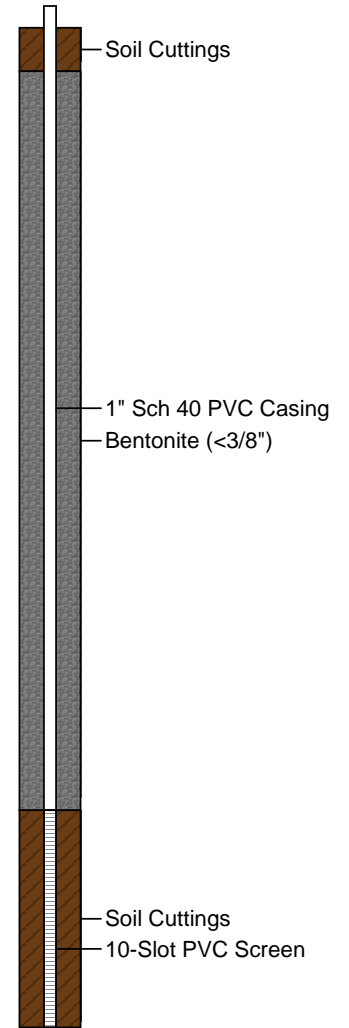
Date Completed : 6/2/2016  
Hole Diameter : 2.5"  
Drilling Company : Shepler Well Drilling  
Drilling Method : GeoProbe  
Drill Rig : 7822DT

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-2000

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Sample ID	Recovery (ft)	DESCRIPTION
0						
5						
10						
15	SP					Brown, fine to coarse SAND, trace CLAY, wet
16					2	Brown, medium grained GRAVEL, trace CLAY
17	GP					
18	GP					
19	GP					
20	GP					
21	CL				4	Brown, medium grained GRAVEL, trace CLAY
22	CL					Brown, soft, sandy CLAY, wet
23	CL					
24	CL					Gray CLAY, trace SAND, wet
25						End of Boring @ 25' bgs
30						

Well: TMW-03  
TOC Elevation:



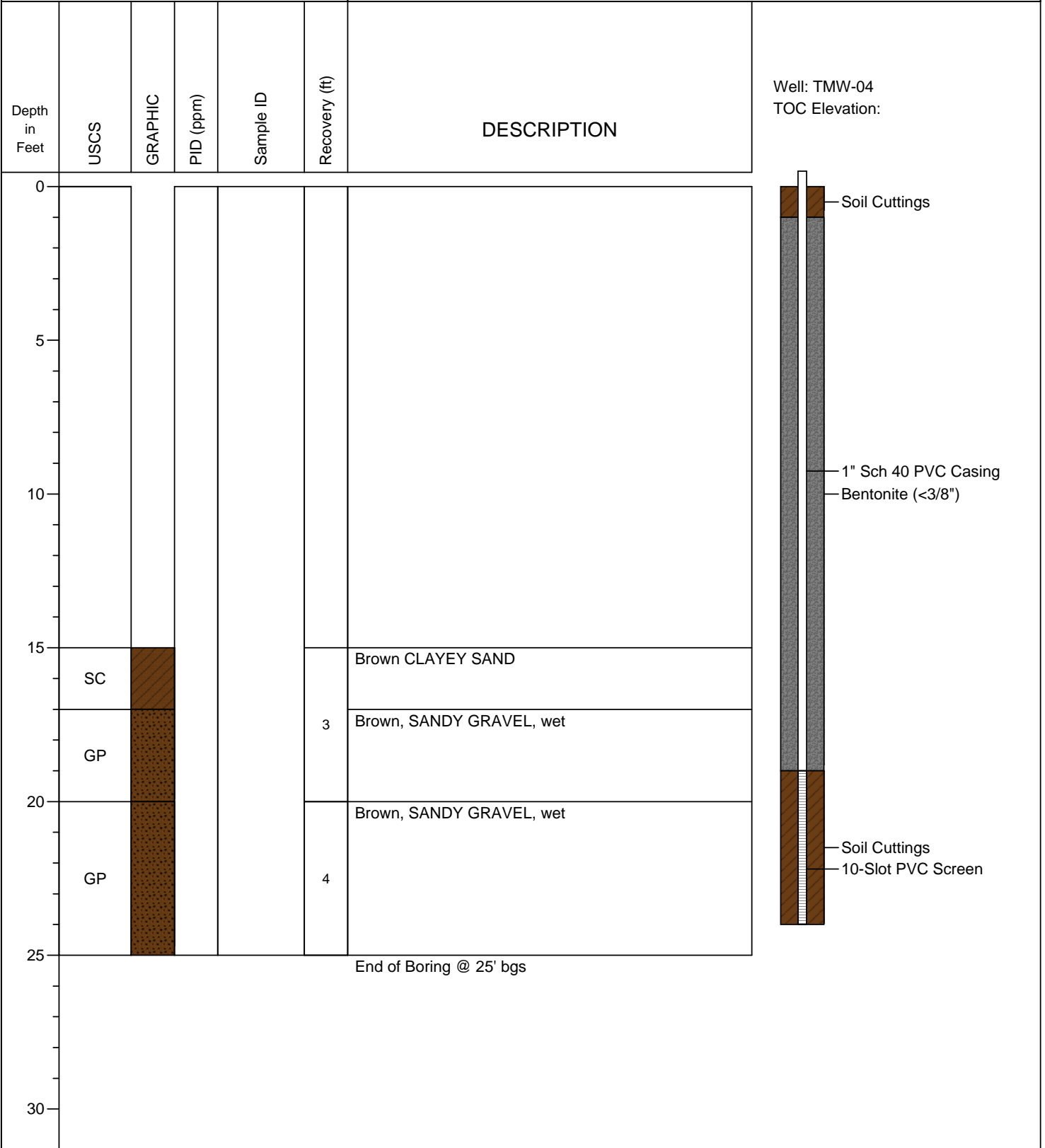
## BORING LOG DIAGRAM: TMW-04

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 6/2/2016  
Hole Diameter : 2.5"  
Drilling Company : Shepler Well Drilling  
Drilling Method : GeoProbe  
Drill Rig : 7822DT

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-2000





## BORING LOG DIAGRAM: TMW-05

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

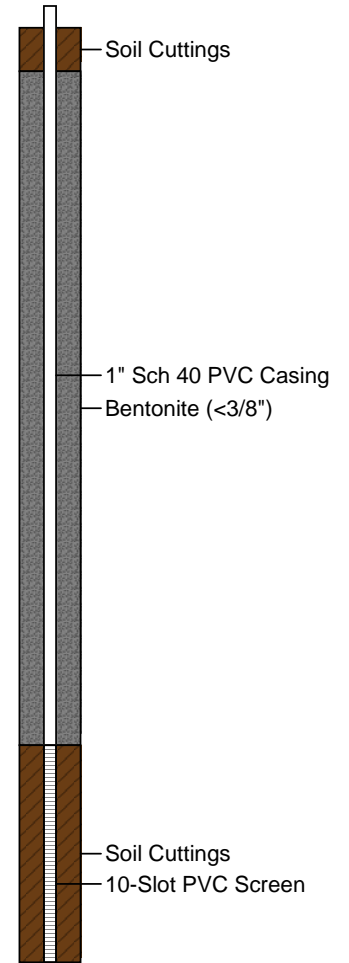
Date Completed : 6/2/2016  
Hole Diameter : 2.5"  
Drilling Company : Shepler Well Drilling  
Drilling Method : GeoProbe  
Drill Rig : 7822DT

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-2000

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Sample ID	Recovery (ft)	DESCRIPTION
0						
5						
15	SP					Brown SAND, some GRAVEL
17.5	SP				2.5	Brown SAND, some GRAVEL, wet
20	SP					Brown, fine to medium SAND, wet
22.5	SP				5	Gray SAND, trace GRAVEL, wet
25						End of Boring @ 25' bgs
30						

Well: TMW-05  
TOC Elevation:



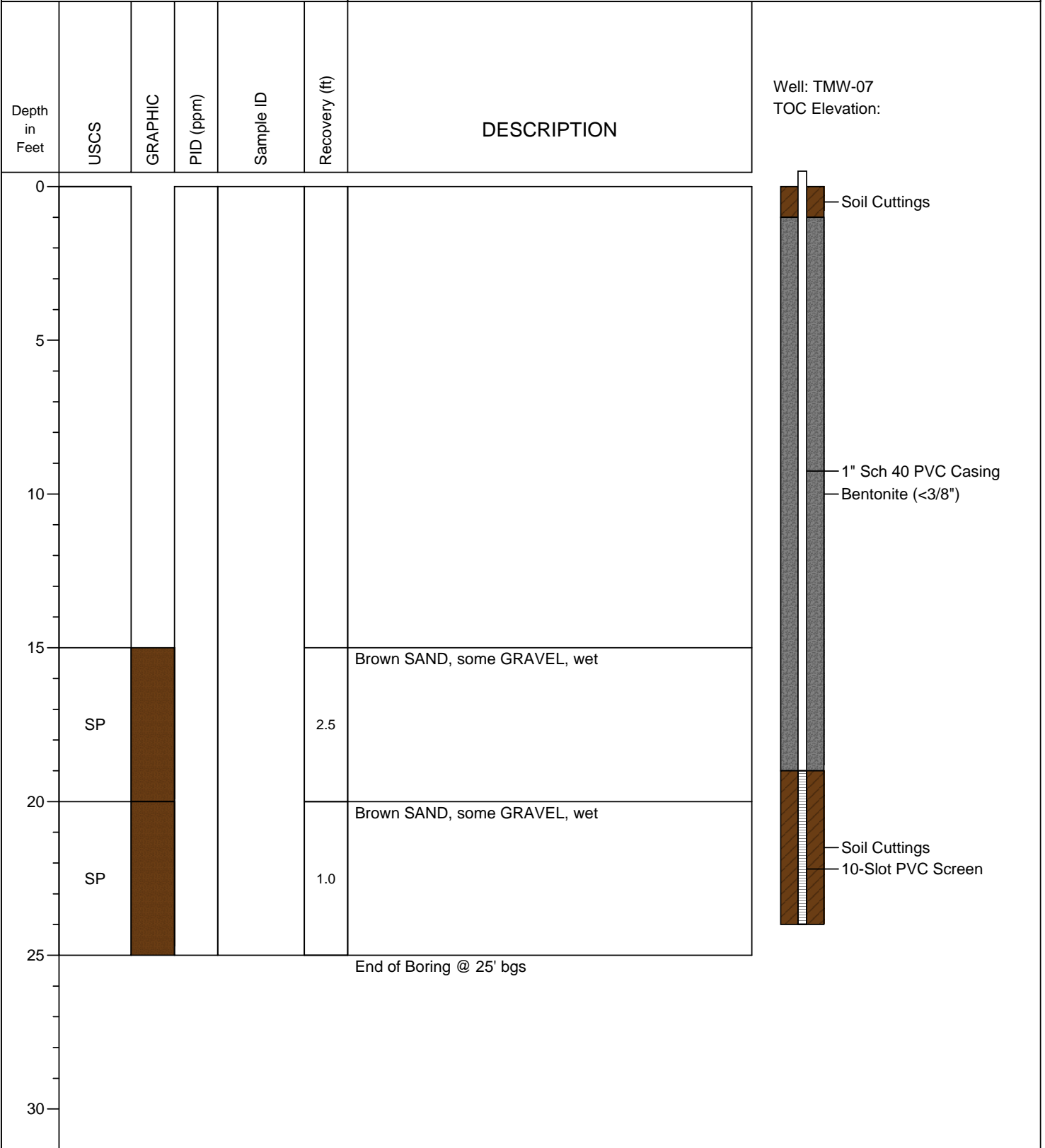
## BORING LOG DIAGRAM: TMW-07

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 6/2/2016  
Hole Diameter : 2.5"  
Drilling Company : Shepler Well Drilling  
Drilling Method : GeoProbe  
Drill Rig : 7822DT

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-2000



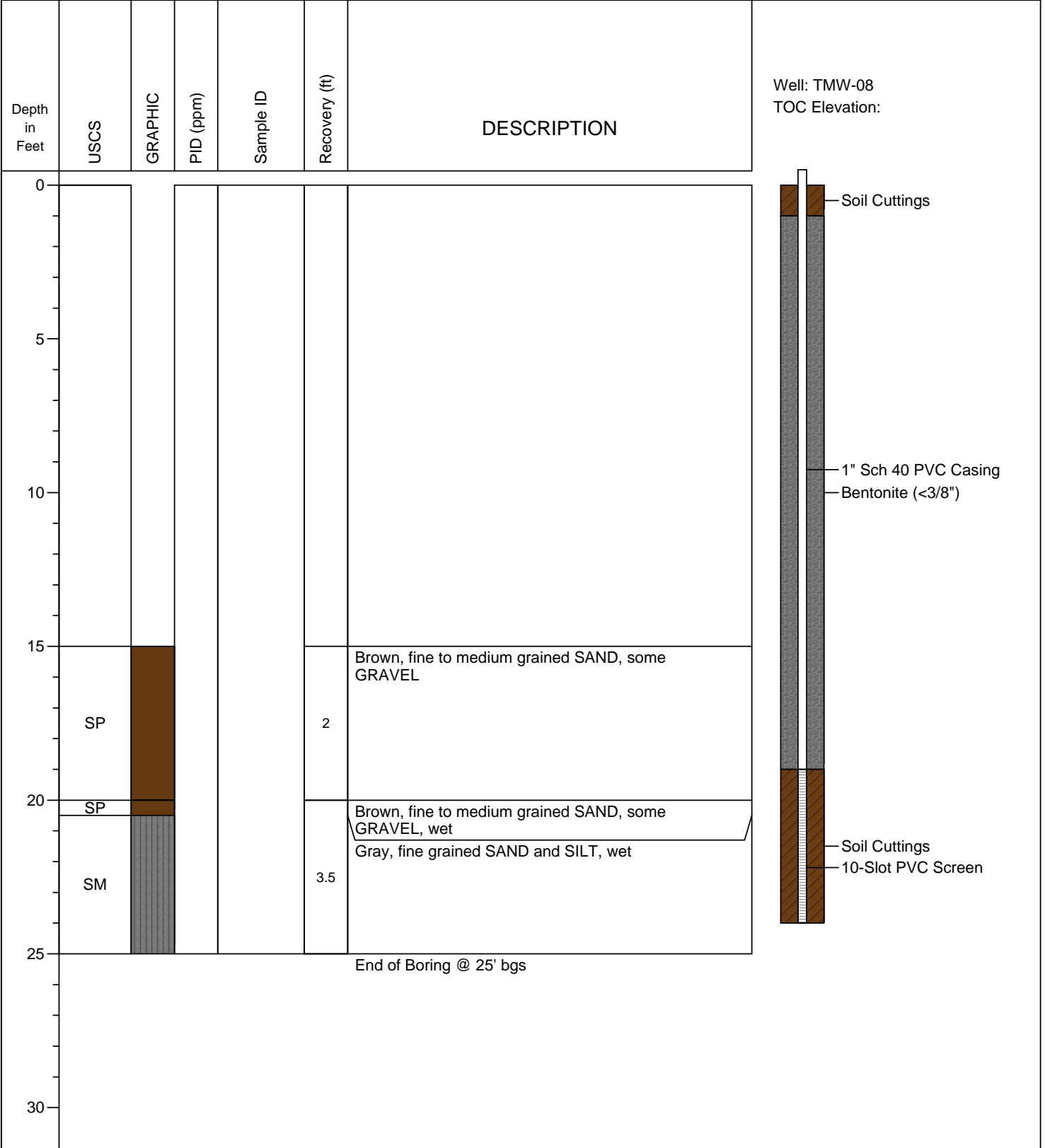
## BORING LOG DIAGRAM: TMW-08

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 6/2/2016  
Hole Diameter : 2.5"  
Drilling Company : Shepler Well Drilling  
Drilling Method : GeoProbe  
Drill Rig : 7822DT

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-2000



## BORING LOG DIAGRAM: TMW-09

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

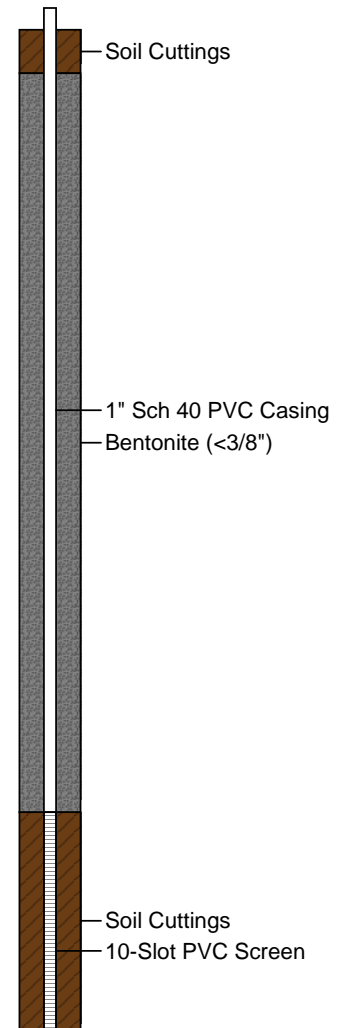
Date Completed : 6/2/2016  
Hole Diameter : 2.5"  
Drilling Company : Shepler Well Drilling  
Drilling Method : GeoProbe  
Drill Rig : 7822DT

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-2000

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Sample ID	Recovery (ft)	DESCRIPTION
0						
5						
10						
15						
15	SP				0.5	Brown SAND, trace GRAVEL, wet
20						
20	SP				1.0	Brown SAND, trace GRAVEL, wet
25						End of Boring @ 25' bgs
30						

Well: TMW-09  
TOC Elevation:



**BORING LOG DIAGRAM: TMW-010**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 6/2/2016  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Blow Count	Recovery (in)	DESCRIPTION	Well: TMW-010 TOC Elevation:
0						Brown, fine to medium SAND with fine to coarse GRAVEL	
10	GP						
19	SP			19	16	Brown, fine SAND, trace fine GRAVEL	
20							




**BORING LOG DIAGRAM: TMW-010**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 6/2/2016  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Blow Count	Recovery (in)	DESCRIPTION
20						No split spoon samples
25	SP			7 4 4 8	12	Brown, fine to coarse SAND, trace fine GRAVEL, wet
						No split spoon samples
30	SP-GP			8 14 23 26	14	Brown, coarse SAND and fine to coarse GRAVEL, wet
						No split spoon samples
35				70	0	No recovery.
						No split spoon samples
40	GP			8 19	18	Brown, fine to coarse GRAVEL, some fine to coarse SAND, wet

Well: TMW-010  
TOC Elevation:



2" Sch 40 PVC Casing










**BORING LOG DIAGRAM: TMW-010**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

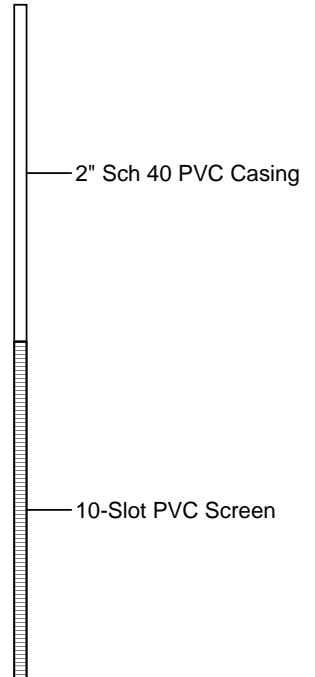
Date Completed : 6/2/2016  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Blow Count	Recovery (in)	DESCRIPTION
40	GP			23 26	18	Brown, coarse GRAVEL with some fines, little fine to coarse SAND, wet
						No split spoon samples
45	GP			35 70	3	Brown, fine to coarse GRAVEL, trace coarse SAND, wet
						No split spoon samples
50	GP			27	15	Brown, coarse GRAVEL, trace coarse SAND, wet
	SP			26 24 23		Brown, fine to coarse SAND, trace fine GRAVEL, wet
						No split spoon samples
55	SP			9	12	Brown, fine to coarse SAND, trace fine GRAVEL, wet
	SP			13 23 23		Brown, fine to medium SAND, trace fine GRAVEL, wet
						No split spoon samples
60	SP			8	14	Brown, fine to coarse SAND, trace fine GRAVEL, wet

Well: TMW-010  
TOC Elevation:









Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 6/2/2016  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Blow Count	Recovery (in)	DESCRIPTION
60	SM			19 21	14	Brown with gray hue, fine silty SAND, wet
						No split spoon samples
65	SP			9 23 33	15	Gray with brown hue, coarse SAND, trace fine GRAVEL, wet
	SM			33		Gray with brown hue, fine SAND, some SILT, wet
						No split spoon samples
70	SP			9 19 23 27	17	Brown, fine to coarse SAND with fine GRAVEL
						No split spoon samples
75	SP			14 17 25 27	14	Gray with brown hue, fine to medium SAND, little SILT, wet
						No split spoon samples
80	SM			9 23	16	Brown with gray hue, fine to medium, SILTY SAND, trace fine GRAVEL, wet

Well: TMW-010  
TOC Elevation:



10-Slot PVC Screen







**BORING LOG DIAGRAM: TMW-010**

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 6/2/2016  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Blow Count	Recovery (in)	DESCRIPTION
80	SM			25 28	16	No split spoon samples
85	SM			9 19 24 27	14	Light gray with brown hue, fine to coarse SILTY SAND, trace fine GRAVEL, wet
						No split spoon samples
90	SM			9 13 17 21	17	Light gray with brown hue, fine to coarse SILTY SAND, some fine GRAVEL, wet
						No split spoon samples
95	SP			9	23	Light gray, fine to medium SAND, trace fine GRAVEL, wet
	ML			17 21 24		Grey, soft SILT
	SM-ML			3 6 8 13	16	Light grey, very fine SAND, some SILT, trace fine GRAVEL, wet
End of Boring @ 98' bgs						
100						

Well: TMW-010  
TOC Elevation:



10-Slot PVC Screen

# BORING LOG DIAGRAM: TMW-011

Merit Energy Company  
1510 Thomas Road  
Kalkaska, Michigan 49646

Date Completed : 6/2/2016  
Hole Diameter : 8 inches  
Drilling Company : Shepler Well Drilling  
Drilling Method : 4.25" ID HSAs  
Drill Rig : Truck-mounted Mobile Drill B-57

Boring Location : Former Hartland 36 Gas Plant  
: SE/NE/NW Section 36  
: T03N-R06E  
: Hartland Twp, Livingston Co, MI

Project #13-0685-1800

Depth in Feet	USCS	GRAPHIC	PID (ppm)	Blow Count	Recovery (in)	DESCRIPTION	
0						CLAY, SAND and GRAVEL (observed in cuttings)	Well: TMW-011 TOC Elevation:  
5							
10	CL-SP						
15							
20							
25						Brown, fine to coarse CLAYEY SAND, wet	
30	SP						
35	CL					Gray, medium stiff CLAY, trace fine GRAVEL	
				4 4 4 6 6 6 6 6 6 6 11 14	13 18		
						End of Boring @ 36' bgs	
40							



**WATER WELL AND PUMP RECORD**

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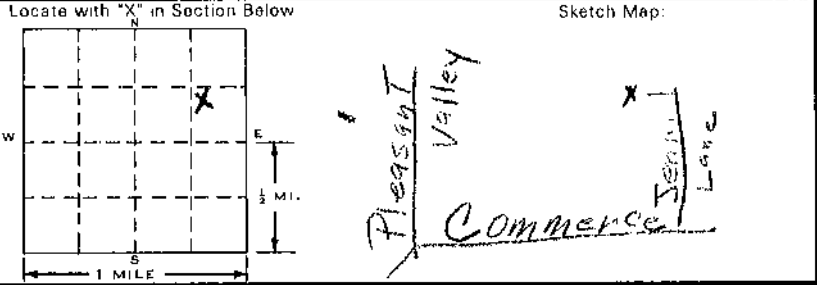
**PERMIT NUMBER**

<b>1 LOCATION OF WELL</b>				<b>3 OWNER OF WELL:</b>	
County <i>Livingston</i>	Township Name <i>Harland</i>	Fraction <i>NW 1/4 SE 1/4 N 1/4</i>	Section Number <i>36</i>	Town Number <i>3 (N)</i>	Range Number <i>6 (E/W)</i>

Distance And Direction From Road Intersection  
*1/2 mile N of Commerce on N.W. corner of Jenni Lane*

Street Address & City of Well Location

*R. Calkins*  
Address  
*477 Jenni Lane*  
Address Same As Well Location?  Yes  No



**4 WELL DEPTH:** Date Completed MO. DAY YEAR  New Well  Replacement Well  
*78 FT. 10 24 90*

**5**  Cable tool  Rotary  Driven  Dug  
 Hollow rod  Auger  Jetted

**6 USE:**  Domestic  Type I Public  Type III Public  
 Irrigation  Type IIa Public  Heat pump  
 Test Well  Type IIb Public

**7 CASING:** Diameter  Steel  Threaded  Plastic  Welded  
*5 in to 74 ft depth*  
Height: Above/Below Surface *1* ft.  
Weight *11* lbs./ft.  
Drive Shoe  Yes  No

2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
-------------------------	----------------------	----------------------------

<i>Brn. sand</i>	<i>11</i>	<i>11</i>
<i>Brn. Clay</i>	<i>3</i>	<i>14</i>
<i>Brn. sand &amp; Grav.</i>	<i>8</i>	<i>22</i>
<i>Brn. sand &amp; Clay</i>	<i>6</i>	<i>28</i>
<i>Blue Clay &amp; Grav.</i>	<i>18</i>	<i>46</i>
<i>Blue Clay</i>	<i>9</i>	<i>55</i>
<i>Gray W. Grav.</i>	<i>23</i>	<i>78</i>

**8 SCREEN:**  Not Installed  
Type *S.S.* Diameter *4"*  
Slot/Gauge *10* Length *4'*  
Set between *74* ft. and *78* ft.  
FITTINGS:  K-Packer  Lead Packer  Bremer Check  
 Blank above screen \_\_\_\_\_ ft. Other \_\_\_\_\_

**9 STATIC WATER LEVEL:** *11* ft. below land surface  Flow

**10 PUMPING LEVEL:** below land surface  
*20* ft. after *1/2* hrs. pumping at *20* G.P.M.  
*20* ft. after *1* hrs. pumping at *20* G.P.M.

**11 WELL HEAD COMPLETION:**  Pitless adapter  12" above grade  
 Basement offset  Approved pit

**12 WELL GROUTED?**  No  Yes From *Top* to *28* ft.  
 Neat cement  Bentonite  Other \_\_\_\_\_  
No. of bags of cement *4* Additives \_\_\_\_\_

**13 Nearest source of possible contamination**  
Type *Septic* Distance *100'* Direction *NE*  
Well disinfected upon completion?  Yes  No  
Was old well plugged?  Yes  No

**14 PUMP:**  Not Installed  Pump Installation Only  
Manufacturer's name *Meyers*  
Model number *0482N102 1* Volts *230*  
Length of Drop Pipe *61* ft. capacity *10* G.P.M.  
TYPE:  Submersible  Jet  
PRESSURE TANK: *Well X-Trol*  
Manufacturer's name \_\_\_\_\_  
Model number *203* Capacity *60* Gallons

**RECEIVED**  
Mich. Dept. of Public Health  
**JAN 8 1991**

15. Remarks, elevation, source of data, etc.

**16. WATER WELL CONTRACTOR'S CERTIFICATION:**  
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.  
*Zylom Well Drilling Inc.* *63 1879*  
REGISTERED BUSINESS NAME  
Address *4794 N. Duck Lake, Highland*  
Signed *James Zylom* Date *11/19/90*  
AUTHORIZED REPRESENTATIVE

17. Rig Operator's Name:  
*James Zylom*







# Water Well And Pump Record



Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.

Import ID: 47037635002

<b>Tax No:</b> 008-35-200-018	<b>Permit No:</b>	<b>County:</b> Livingston	<b>Township:</b> Hartland
<b>Well ID: 47000015016</b>		<b>Town/Range:</b> 03N 06E	<b>Section:</b> 35
		<b>Well Status:</b>	<b>WSSN:</b>
<b>Elevation:</b> 1025 ft. <b>Latitude:</b> 42.6184420715 <b>Longitude:</b> -83.6987349242 <b>Method of Collection:</b> Interpolation-Map		<b>Distance and Direction from Road Intersection:</b> 869 PLEASANT VALLEY RD.	
		<b>Well Owner:</b> MCDONALD, ROBERT	
		<b>Well Address:</b> 869 PLEASANT VALLEY RD. MILFORD, MI 48042	<b>Owner Address:</b> 869 PLEASANT VALLEY RD. MILFORD, MI 48042

<b>Drilling Method:</b> Cable Tool	<b>Well Use:</b> Household	<b>Pump Installed:</b> Yes	<b>Pump Installation Only:</b> No
<b>Well Depth:</b> 60.00 ft.	<b>Date Completed:</b> 10/13/1984	<b>Pump Installation Date:</b>	<b>HP:</b>
<b>Well Type:</b> Replacement	<b>Height:</b>	<b>Manufacturer:</b> Red Jacket	<b>Pump Type:</b> Submersible
<b>Casing Type:</b> Steel - black		<b>Model Number:</b>	<b>Pump Capacity:</b> 0 GPM
<b>Casing Joint:</b> Welded		<b>Drop Pipe Length:</b> 43.00 ft.	<b>Pump Voltage:</b>
<b>Casing Fitting:</b> Drive shoe		<b>Drop Pipe Diameter:</b>	<b>Drilling Record ID:</b>
<b>Diameter:</b> 4.00 in. to 56.00 ft. depth		<b>Draw Down Seal Used:</b> No	
<b>Borehole:</b>		<b>Pressure Tank Installed:</b> No	
		<b>Pressure Relief Valve Installed:</b> No	

<b>Static Water Level:</b> 30.00 ft. Below Grade <b>Well Yield Test:</b> Pumping level 43.00 ft. after 1.00 hrs. at 50 GPM <b>Yield Test Method:</b> Unknown	Formation Description	Thickness	Depth to Bottom
	Brown Clay & Gravel	18.00	18.00
	Brown Sand	34.00	52.00
	Gravel Coarse Water Bearing	8.00	60.00

<b>Screen Installed:</b> Yes	<b>Filter Packed:</b> No
<b>Screen Diameter:</b> 3.00 in.	<b>Blank:</b> 1.00 ft. Above
<b>Screen Material Type:</b>	
<b>Slot</b>	<b>Length</b>
15.00	4.00 ft.
	<b>Set Between</b>
	56.00 ft. and 60.00 ft.
<b>Fittings:</b> Neoprene packer	

<b>Well Grouted:</b> No	<b>Geology Remarks:</b>
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<b>Wellhead Completion:</b> Pitless adapter	
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<b>Nearest Source of Possible Contamination:</b>	<b>Drilling Machine Operator Name:</b>
<b>Type</b>	<b>Employment:</b> Unknown
Septic tank	
<b>Distance</b>	<b>Contractor Type:</b> Unknown
75 ft.	<b>Reg No:</b> 15-0413
<b>Direction</b>	<b>Business Name:</b>
Southeast	<b>Business Address:</b>

<b>Abandoned Well Plugged:</b> No	<b>Water Well Contractor's Certification</b>
<b>Reason Not Plugged:</b>	This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

	<b>Signature of Registered Contractor</b>	<b>Date</b>
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<b>General Remarks:</b>
<b>Other Remarks:</b>



**WATER WELL AND PUMP RECORD**

PART 127 ACT 368, P.A. 1978

PERMIT NUMBER

<b>1 LOCATION OF WELL</b>																							
County <b>Livingston</b>	Township Name <b>Hartland</b>	Fraction <b>nw 1/4 ne 1/4 ne 1/4</b>																					
Distance And Direction From Road Intersection <b>West of Tipsico Lake Rd. on south side.</b>		Section Number <b>36</b>																					
Street Address & City of Well Location		Town Number <b>3 N/3</b>																					
Locate with "X" in Section Below		Range Number <b>6 E/W</b>																					
		3 OWNER OF WELL: <b>Niles Shelton</b> Address <b>13844 Lone Tree Rd.</b> <b>Milford, MI 48042</b> Address Same As Well Location? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																					
2 FORMATION DESCRIPTION <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">FORMATION DESCRIPTION</th> <th style="width: 15%;">THICKNESS OF STRATUM</th> <th style="width: 15%;">DEPTH TO BOTTOM OF STRATUM</th> </tr> </thead> <tbody> <tr> <td>Brown Sandy Clay</td> <td style="text-align: center;">11</td> <td style="text-align: center;">11</td> </tr> <tr> <td>Gray Clay &amp; Gravel</td> <td style="text-align: center;">17</td> <td style="text-align: center;">28</td> </tr> <tr> <td>Brown Sandy &amp; Gravel</td> <td style="text-align: center;">13</td> <td style="text-align: center;">41</td> </tr> <tr> <td>Brown Gravel Coarse</td> <td style="text-align: center;">31</td> <td style="text-align: center;">72</td> </tr> <tr> <td>Gray Gravel</td> <td style="text-align: center;">7</td> <td style="text-align: center;">79</td> </tr> <tr> <td>Gray Sand</td> <td style="text-align: center;">6</td> <td style="text-align: center;">85</td> </tr> </tbody> </table>		FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	Brown Sandy Clay	11	11	Gray Clay & Gravel	17	28	Brown Sandy & Gravel	13	41	Brown Gravel Coarse	31	72	Gray Gravel	7	79	Gray Sand	6	85	4 WELL DEPTH: (completed) <b>85' ft.</b> Date of Completion <b>Oct. 10, 1984</b>
		FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM																			
Brown Sandy Clay	11	11																					
Gray Clay & Gravel	17	28																					
Brown Sandy & Gravel	13	41																					
Brown Gravel Coarse	31	72																					
Gray Gravel	7	79																					
Gray Sand	6	85																					
		5 <input checked="" type="checkbox"/> Cable tool <input type="checkbox"/> Rotary <input type="checkbox"/> Driven <input type="checkbox"/> Dug <input type="checkbox"/> Hollow rod <input type="checkbox"/> Auger <input type="checkbox"/> Jetted <input type="checkbox"/>																					
		6 USE: <input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Type I Public <input type="checkbox"/> Type III Public <input type="checkbox"/> Irrigation <input type="checkbox"/> Type IIa Public <input type="checkbox"/> Heat pump <input type="checkbox"/> Test Well <input type="checkbox"/> Type IIb Public <input type="checkbox"/>																					
		7 CASING: <input type="checkbox"/> Steel <input checked="" type="checkbox"/> Threaded <input type="checkbox"/> Welded <input type="checkbox"/> Plastic <input type="checkbox"/> Height: Above/Below <b>4</b> in. to <b>81</b> ft. depth Surface <b>11</b> ft. Weight <b>11</b> lbs./ft. Grouted Drill Hole Diameter <input checked="" type="checkbox"/> Yes Drive Shoe <input type="checkbox"/> No																					
		8 SCREEN: <b>Johnson</b> <input type="checkbox"/> Not Installed Type <b>s/s w/w</b> Diameter <b>4"</b> Slot <b>10</b> Length <b>4'</b> Set between <b>81</b> ft. and <b>85</b> ft. FITTINGS: <input type="checkbox"/> K-Packer <input checked="" type="checkbox"/> Lead Packer <input type="checkbox"/> Bremer Check <input type="checkbox"/> Blank above screen <b>ft.</b> Other																					
		9 STATIC WATER LEVEL: <b>51</b> ft. below land surface <input type="checkbox"/> Flow																					
		10 PUMPING LEVEL: below land surface <b>70</b> ft. after <b>1 1/2</b> hrs. pumping at <b>20</b> G.P.M. ft. after hrs. pumping at G.P.M.																					
		11 WELL HEAD COMPLETION: <input checked="" type="checkbox"/> Pitless adapter <input type="checkbox"/> 12" above grade <input type="checkbox"/> Basement offset <input type="checkbox"/> Approved pit																					
		12 WELL GROUTED? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes From _____ to _____ ft. <input type="checkbox"/> Neat cement <input type="checkbox"/> Bentonite <input type="checkbox"/> Other <b>Mud Slurry</b> No. of bags of cement _____ Additives _____																					
		13 Nearest source of possible contamination Type <b>Septic</b> Distance <b>75</b> ft. Direction _____ Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																					
		14 PUMP: <input type="checkbox"/> Not Installed <input type="checkbox"/> Pump Installation Only Manufacturer's name <b>McDonald</b> Model number <b>18050K2</b> HP <b>1/8</b> Volts <b>230</b> Length of Drop Pipe <b>70</b> ft. capacity <b>15</b> G.P.M. TYPE: <input checked="" type="checkbox"/> Submersible <input type="checkbox"/> Jet PRESSURE TANK: Manufacturer's name <b>Air Guard</b> Model number _____ Capacity <b>42</b> Gallons																					
15. Remarks, elevation, source of data, etc. <div style="text-align: center;">                     RECEIVED                      Mich. Dept. of Public Health                      FEB 6 1985                      Bureau of Environmental and                      Occupational Health - GWQS                 </div> <div style="text-align: center; margin-top: 20px;">                     RECEIVED                      USE A 2ND SHEET IF NEEDED                      JAN 18 1985                      Livingston County Health                      Department                 </div>		16. WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. <div style="text-align: center; margin-top: 10px;"> <b>Brown Drilling Co., Inc.</b> 0026  <small>REGISTERED BUSINESS NAME REGISTRATION NO.</small>                      Address <b>Howell</b>                      Signed <i>Henry R. Brown</i> Date _____  <small>AUTHORIZED REPRESENTATIVE</small> </div>																					



# Water Well And Pump Record



Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.

Import ID: 47037635012

<b>Tax No:</b> 008-35-200-003	<b>Permit No:</b>	<b>County:</b> Livingston	<b>Township:</b> Hartland
<b>Well ID: 47000015026</b>		<b>Town/Range:</b> 03N 06E	<b>Section:</b> 35
<b>Elevation:</b> 1035 ft.		<b>Well Status:</b>	<b>WSSN:</b>
<b>Latitude:</b> 42.6172200146		<b>Source ID/Well No:</b>	
<b>Longitude:</b> -83.6982897207		<b>Distance and Direction from Road Intersection:</b> 804 PLEASANT VALLEY DR.	
<b>Method of Collection:</b> Interpolation-Map		<b>Well Owner:</b> TEFFT, BOB	
		<b>Well Address:</b> 804 PLEASANT VALLEY DR. MILFORD, MI 48042	<b>Owner Address:</b> 804 PLEASANT VALLEY DR. MILFORD, MI 48042

<b>Drilling Method:</b> Cable Tool	<b>Well Use:</b> Household	<b>Pump Installed:</b> Yes	<b>Pump Installation Only:</b> No
<b>Well Depth:</b> 74.00 ft.	<b>Date Completed:</b> 10/25/1975	<b>Pump Installation Date:</b>	<b>HP:</b>
<b>Well Type:</b> Replacement	<b>Height:</b>	<b>Manufacturer:</b> Flint & Walling	<b>Pump Type:</b> Submersible
<b>Casing Type:</b> Steel - black		<b>Model Number:</b>	<b>Pump Capacity:</b> 0 GPM
<b>Casing Joint:</b> Threaded & coupled		<b>Drop Pipe Length:</b> 65.00 ft.	<b>Pump Voltage:</b>
<b>Casing Fitting:</b> Drive shoe		<b>Drop Pipe Diameter:</b>	<b>Drilling Record ID:</b>
<b>Diameter:</b> 4.00 in. to 69.00 ft. depth		<b>Draw Down Seal Used:</b> No	
<b>Borehole:</b>		<b>Pressure Tank Installed:</b> No	
		<b>Pressure Relief Valve Installed:</b> No	

<b>Static Water Level:</b> 50.00 ft. Below Grade	<b>Yield Test Method:</b> Unknown	<b>Formation Description</b>	<b>Thickness</b>	<b>Depth to Bottom</b>
<b>Well Yield Test:</b> Pumping level 60.00 ft. after 3.00 hrs. at 20 GPM		Yellow Clay	21.00	21.00
		Yellow Clay & Gravel	29.00	50.00
		Sand Wet/Moist	24.00	74.00

<b>Screen Installed:</b> Yes	<b>Filter Packed:</b> No		
<b>Screen Diameter:</b> 4.00 in.	<b>Blank:</b> 0.00 ft. Above		
<b>Screen Material Type:</b>			
<b>Slot Length Set Between</b>			
25.00 4.00 ft. 69.00 ft. and 73.00 ft.			
<b>Fittings:</b> Neoprene packer			

<b>Well Grouted:</b> Yes	<b>Grouting Method:</b> Unknown		
<b>Grouting Material</b>	<b>Bags</b>	<b>Additives</b>	<b>Depth</b>
Unknown	0.00	None	0.00 ft. to 0.00 ft.
<b>Geology Remarks:</b>			

<b>Wellhead Completion:</b> Pitless adapter	
---	--

<b>Nearest Source of Possible Contamination:</b>	<b>Drilling Machine Operator Name:</b>
<b>Type</b>	<b>Employment:</b> Unknown
Septic tank	
<b>Distance</b>	<b>Contractor Type:</b> Unknown
75 ft.	<b>Reg No:</b> 47-0687
<b>Direction</b>	<b>Business Name:</b>
North	<b>Business Address:</b>

<b>Abandoned Well Plugged:</b> No	
<b>Reason Not Plugged:</b>	

<b>Water Well Contractor's Certification</b>	
This well was drilled under my supervision and this report is true to the best of my knowledge and belief.	
<b>Signature of Registered Contractor</b>	<b>Date</b>

<b>General Remarks:</b>
<b>Other Remarks:</b>



# Water Well And Pump Record



Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.

Import ID: 47037635013

<b>Tax No:</b> 008-35-200-022	<b>Permit No:</b>	<b>County:</b> Livingston	<b>Township:</b> Hartland
<b>Well ID: 47000015027</b>		<b>Town/Range:</b> 03N 06E	<b>Section:</b> 35
		<b>Well Status:</b>	<b>WSSN:</b>
<b>Elevation:</b> 1021 ft. <b>Latitude:</b> 42.6169386278 <b>Longitude:</b> -83.6997526215 <b>Method of Collection:</b> Interpolation-Map		<b>Distance and Direction from Road Intersection:</b> 777 PLEASANT VALLEY RD.	
		<b>Well Owner:</b> KOPCZYK, JAMES	
		<b>Well Address:</b> 777 PLEASANT VALLEY RD. MILFORD, MI 48042	<b>Owner Address:</b> 777 PLEASANT VALLEY RD. MILFORD, MI 48042

<b>Drilling Method:</b> Rotary	<b>Well Use:</b> Household	<b>Pump Installed:</b> Yes	<b>Pump Installation Only:</b> No
<b>Well Depth:</b> 85.00 ft.	<b>Well Type:</b> Replacement	<b>Pump Installation Date:</b>	<b>HP:</b>
<b>Well Type:</b> Replacement	<b>Date Completed:</b> 11/9/1988	<b>Manufacturer:</b> Red Jacket	<b>Pump Type:</b> Submersible
<b>Casing Type:</b> Steel - black	<b>Height:</b>	<b>Model Number:</b>	<b>Pump Capacity:</b>
<b>Casing Joint:</b> Threaded & coupled		<b>Drop Pipe Length:</b> 0.00 ft.	<b>Pump Voltage:</b>
<b>Casing Fitting:</b> Drive shoe		<b>Drop Pipe Diameter:</b>	<b>Drilling Record ID:</b>
<b>Diameter:</b> 4.00 in. to 81.00 ft. depth		<b>Draw Down Seal Used:</b> No	
<b>Borehole:</b>		<b>Pressure Tank Installed:</b> No	
		<b>Pressure Relief Valve Installed:</b> No	

<b>Static Water Level:</b> 40.00 ft. Below Grade	<b>Well Yield Test:</b>	<b>Yield Test Method:</b> Unknown	<b>Formation Description</b>	<b>Thickness</b>	<b>Depth to Bottom</b>
<b>Well Yield Test:</b>	Pumping level 70.00 ft. after 4.00 hrs. at 15 GPM		Clay	15.00	15.00
			Stones	11.00	26.00
			Gravel Dry	26.00	52.00
<b>Screen Installed:</b> Yes	<b>Filter Packed:</b> No		Clay & Stones Sandy	13.00	65.00
<b>Screen Diameter:</b> 4.00 in.	<b>Blank:</b> 1.50 ft. Above		Sand Wet/Moist	20.00	85.00
<b>Screen Material Type:</b>					
<b>Slot</b>	<b>Length</b>	<b>Set Between</b>			
12.00	4.00 ft.	81.00 ft. and 85.00 ft.			
<b>Fittings:</b> Neoprene packer					

<b>Well Grouted:</b> Yes	<b>Grouting Method:</b> Unknown	<b>Geology Remarks:</b>			
<b>Grouting Material</b>	<b>Bags</b>	<b>Additives</b>	<b>Depth</b>		
Bentonite slurry	0.00	None	0.00 ft. to 25.00 ft.		
<b>Wellhead Completion:</b> Pitless adapter					

<b>Nearest Source of Possible Contamination:</b>			<b>Drilling Machine Operator Name:</b> WES BAKER
<b>Type</b>	<b>Distance</b>	<b>Direction</b>	<b>Employment:</b> Unknown
Septic tank	75 ft.	Northeast	<b>Contractor Type:</b> Unknown
			<b>Reg No:</b> 47-0027

<b>Abandoned Well Plugged:</b> No	<b>Business Name:</b>
<b>Reason Not Plugged:</b>	<b>Business Address:</b>

<b>Water Well Contractor's Certification</b>	
This well was drilled under my supervision and this report is true to the best of my knowledge and belief.	
<b>Signature of Registered Contractor</b>	<b>Date</b>

<b>General Remarks:</b>
<b>Other Remarks:</b>





# Water Well And Pump Record



Completion is required under authority of Part 127 Act 368 PA 1978.

Failure to comply is a misdemeanor.

Import ID: 47037636018

<b>Tax No:</b> 008-36-200-006	<b>Permit No:</b>	<b>County:</b> Livingston	<b>Township:</b> Hartland
<b>Well ID: 47000015045</b>		<b>Town/Range:</b> 03N 06E	<b>Section:</b> 36
<b>Elevation:</b> 1030 ft.		<b>Well Status:</b>	<b>WSSN:</b>
<b>Latitude:</b> 42.620373626		<b>Source ID/Well No:</b>	
<b>Longitude:</b> -83.6821048412		<b>Distance and Direction from Road Intersection:</b> 13822 LONE TREE	
<b>Method of Collection:</b> Interpolation-Map		<b>Well Owner:</b> ADAMS, JOHN	
		<b>Well Address:</b> 13822 LONE TREE RD. MILFORD, MI 48042	<b>Owner Address:</b> 13822 LONE TREE RD. MILFORD, MI 48042

<b>Drilling Method:</b> Rotary	<b>Well Use:</b> Household	<b>Pump Installed:</b> Yes	<b>Pump Installation Only:</b> No
<b>Well Depth:</b> 128.00 ft.	<b>Date Completed:</b> 8/4/1988	<b>Pump Installation Date:</b>	<b>HP:</b>
<b>Well Type:</b> Replacement	<b>Height:</b>	<b>Manufacturer:</b> Red Jacket	<b>Pump Type:</b> Submersible
<b>Casing Type:</b> PVC plastic		<b>Model Number:</b>	<b>Pump Capacity:</b>
<b>Casing Joint:</b> Unknown		<b>Drop Pipe Length:</b> 100.00 ft.	<b>Pump Voltage:</b>
<b>Casing Fitting:</b> Drive shoe		<b>Drop Pipe Diameter:</b>	<b>Drilling Record ID:</b>
<b>Diameter:</b> 5.00 in. to 118.00 ft. depth		<b>Draw Down Seal Used:</b> No	
<b>Borehole:</b> 8.50 in. to 0.00 ft. depth		<b>Pressure Tank Installed:</b> No	
		<b>Pressure Relief Valve Installed:</b> No	

<b>Static Water Level:</b> 50.00 ft. Below Grade	<b>Formation Description</b>	<b>Thickness</b>	<b>Depth to Bottom</b>
<b>Well Yield Test:</b> Pumping level 120.00 ft. after 1.00 hrs. at 30 GPM	Brown Gravel Coarse	80.00	80.00
<b>Yield Test Method:</b> Unknown	Gray Clay	10.00	90.00
	Gravel	38.00	128.00

<b>Screen Installed:</b> Yes	<b>Filter Packed:</b> No
<b>Screen Diameter:</b> 5.00 in.	<b>Blank:</b> 0.00 ft. Above
<b>Screen Material Type:</b>	
<b>Slot Length Set Between</b>	
15.00 10.00 ft. 118.00 ft. and 128.00 ft.	
<b>Fittings:</b> None	

<b>Well Grouted:</b> Yes	<b>Grouting Method:</b> Unknown
<b>Grouting Material:</b> Other	<b>Depth:</b> 0.00 ft. to 128.00 ft.
<b>Bags:</b> 0.00	<b>Additives:</b> None
<b>Geology Remarks:</b>	

<b>Wellhead Completion:</b> Pitless adapter
---

<b>Nearest Source of Possible Contamination:</b>	<b>Drilling Machine Operator Name:</b> BARRY BROWN
<b>Type:</b> Septic tank	<b>Employment:</b> Unknown
<b>Distance:</b> 75 ft.	<b>Direction:</b> Northeast
	<b>Contractor Type:</b> Unknown
	<b>Reg No:</b> 78-1607

<b>Abandoned Well Plugged:</b> No	<b>Business Name:</b>
<b>Reason Not Plugged:</b>	<b>Business Address:</b>

<b>Water Well Contractor's Certification</b>	
This well was drilled under my supervision and this report is true to the best of my knowledge and belief.	
<b>Signature of Registered Contractor</b>	<b>Date</b>

<b>General Remarks:</b>
<b>Other Remarks:</b> Grouting Material 1: Listed as other in Wellkey







09-Jun-2016

Sean Craven  
Merit Energy  
1510 Thomas Rd  
PO Box 910  
Kalkaska, MI 49646

Re: **Merit (Hartland Gas Plant)**

Work Order: **1606258**

Dear Sean,

ALS Environmental received 21 samples on 04-Jun-2016 08:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with NELAP standard requirements and QC results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 31.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

**Gary Byar**

Electronically approved by: Gary Byar

Gary Byar  
Project Manager



Certificate No: MI: 0022

### Report of Laboratory Analysis

ADDRESS 3352 128th Avenue Holland, Michigan 49424-9263 | PHONE (616) 399-6070 | FAX (616) 399-6185

ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

Environmental 

[www.alsglobal.com](http://www.alsglobal.com)

RIGHT SOLUTIONS RIGHT PARTNER

Client: Merit Energy  
 Project: Merit (Hartland Gas Plant)  
 Work Order: 1606258

**Work Order Sample Summary**

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
1606258-01	TMW-03	Groundwater		6/2/2016 09:18	6/4/2016 08:00	<input type="checkbox"/>
1606258-02	TMW-04	Groundwater		6/2/2016 10:00	6/4/2016 08:00	<input type="checkbox"/>
1606258-03	TMW-05	Groundwater		6/2/2016 10:30	6/4/2016 08:00	<input type="checkbox"/>
1606258-04	TMW-09	Groundwater		6/2/2016 11:25	6/4/2016 08:00	<input type="checkbox"/>
1606258-05	TMW-07	Groundwater		6/2/2016 12:00	6/4/2016 08:00	<input type="checkbox"/>
1606258-06	TMW-07 DUP	Groundwater		6/2/2016 12:00	6/4/2016 08:00	<input type="checkbox"/>
1606258-07	TMW-010 (90-95')	Groundwater		6/2/2016 12:20	6/4/2016 08:00	<input type="checkbox"/>
1606258-08	TMW-08	Groundwater		6/2/2016 12:45	6/4/2016 08:00	<input type="checkbox"/>
1606258-09	TMW-010 (70-75;)	Groundwater		6/2/2016 13:00	6/4/2016 08:00	<input type="checkbox"/>
1606258-10	TMW-011 (27-32')	Groundwater		6/2/2016 15:25	6/4/2016 08:00	<input type="checkbox"/>
1606258-11	TMW-01	Groundwater		6/2/2016 15:40	6/4/2016 08:00	<input type="checkbox"/>
1606258-12	MW-1	Groundwater		6/3/2016 06:30	6/4/2016 08:00	<input type="checkbox"/>
1606258-13	MW-2	Groundwater		6/3/2016 07:25	6/4/2016 08:00	<input type="checkbox"/>
1606258-14	MW-6	Groundwater		6/3/2016 08:20	6/4/2016 08:00	<input type="checkbox"/>
1606258-15	MW-4	Groundwater		6/3/2016 09:05	6/4/2016 08:00	<input type="checkbox"/>
1606258-16	TMW-010 (45-50')	Groundwater		6/3/2016 09:05	6/4/2016 08:00	<input type="checkbox"/>
1606258-17	MW-5	Groundwater		6/3/2016 10:00	6/4/2016 08:00	<input type="checkbox"/>
1606258-18	MW-3	Groundwater		6/3/2016 10:15	6/4/2016 08:00	<input type="checkbox"/>
1606258-19	MW-7	Groundwater		6/3/2016 10:45	6/4/2016 08:00	<input type="checkbox"/>
1606258-20	MW-7 DUP	Groundwater		6/3/2016 10:45	6/4/2016 08:00	<input type="checkbox"/>
1606258-21	TWM-02	Groundwater		6/3/2016 11:10	6/4/2016 08:00	<input type="checkbox"/>

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** TMW-03  
**Collection Date:** 6/2/2016 09:18 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-01  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/7/2016 10:13 PM
Surr: 2,4,6-Tribromophenol	48.4		38-115	%REC	1	6/7/2016 10:13 PM
Surr: 2-Fluorobiphenyl	48.2		32-100	%REC	1	6/7/2016 10:13 PM
Surr: 2-Fluorophenol	26.5		22-59	%REC	1	6/7/2016 10:13 PM
Surr: 4-Terphenyl-d14	59.5		23-112	%REC	1	6/7/2016 10:13 PM
Surr: Nitrobenzene-d5	51.4		31-93	%REC	1	6/7/2016 10:13 PM
Surr: Phenol-d6	16.0		13-36	%REC	1	6/7/2016 10:13 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

Client: Merit Energy  
 Project: Merit (Hartland Gas Plant)  
 Sample ID: TMW-04  
 Collection Date: 6/2/2016 10:00 AM

Work Order: 1606258  
 Lab ID: 1606258-02  
 Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Diisopropanolamine	ND		50	µg/L	1	6/7/2016 10:53 PM
<b>Sulfolane</b>	<b>2,600</b>		<b>100</b>	<b>µg/L</b>	10	6/8/2016 10:55 AM
Surr: 2,4,6-Tribromophenol	71.7		38-115	%REC	1	6/7/2016 10:53 PM
Surr: 2-Fluorobiphenyl	70.4		32-100	%REC	1	6/7/2016 10:53 PM
Surr: 2-Fluorophenol	40.4		22-59	%REC	1	6/7/2016 10:53 PM
Surr: 4-Terphenyl-d14	63.0		23-112	%REC	1	6/7/2016 10:53 PM
Surr: Nitrobenzene-d5	77.4		31-93	%REC	1	6/7/2016 10:53 PM
Surr: Phenol-d6	25.7		13-36	%REC	1	6/7/2016 10:53 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

Client: Merit Energy  
 Project: Merit (Hartland Gas Plant)  
 Sample ID: TMW-05  
 Collection Date: 6/2/2016 10:30 AM

Work Order: 1606258  
 Lab ID: 1606258-03  
 Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
<b>Sulfolane</b>	<b>4,500</b>		<b>100</b>	<b>µg/L</b>	10	6/8/2016 11:15 AM
Surr: 2,4,6-Tribromophenol	77.4		38-115	%REC	1	6/7/2016 11:13 PM
Surr: 2-Fluorobiphenyl	69.6		32-100	%REC	1	6/7/2016 11:13 PM
Surr: 2-Fluorophenol	44.3		22-59	%REC	1	6/7/2016 11:13 PM
Surr: 4-Terphenyl-d14	62.9		23-112	%REC	1	6/7/2016 11:13 PM
Surr: Nitrobenzene-d5	76.7		31-93	%REC	1	6/7/2016 11:13 PM
Surr: Phenol-d6	29.0		13-36	%REC	1	6/7/2016 11:13 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** TMW-09  
**Collection Date:** 6/2/2016 11:25 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-04  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
<b>Sulfolane</b>	<b>5,900</b>		<b>100</b>	<b>µg/L</b>	10	6/8/2016 11:36 AM
Surr: 2,4,6-Tribromophenol	68.0		38-115	%REC	1	6/7/2016 11:33 PM
Surr: 2-Fluorobiphenyl	67.1		32-100	%REC	1	6/7/2016 11:33 PM
Surr: 2-Fluorophenol	40.5		22-59	%REC	1	6/7/2016 11:33 PM
Surr: 4-Terphenyl-d14	67.7		23-112	%REC	1	6/7/2016 11:33 PM
Surr: Nitrobenzene-d5	77.7		31-93	%REC	1	6/7/2016 11:33 PM
Surr: Phenol-d6	27.6		13-36	%REC	1	6/7/2016 11:33 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.



# ALS Group USA, Corp

Date: 09-Jun-16

Client: Merit Energy  
 Project: Merit (Hartland Gas Plant)  
 Sample ID: TMW-07  
 Collection Date: 6/2/2016 12:00 PM

Work Order: 1606258  
 Lab ID: 1606258-05  
 Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Diisopropanolamine	ND		50	µg/L	1	6/7/2016 11:53 PM
<b>Sulfolane</b>	<b>4,200</b>		<b>100</b>	<b>µg/L</b>	10	6/8/2016 11:56 AM
Surr: 2,4,6-Tribromophenol	74.6		38-115	%REC	1	6/7/2016 11:53 PM
Surr: 2-Fluorobiphenyl	65.8		32-100	%REC	1	6/7/2016 11:53 PM
Surr: 2-Fluorophenol	40.7		22-59	%REC	1	6/7/2016 11:53 PM
Surr: 4-Terphenyl-d14	57.5		23-112	%REC	1	6/7/2016 11:53 PM
Surr: Nitrobenzene-d5	74.8		31-93	%REC	1	6/7/2016 11:53 PM
Surr: Phenol-d6	25.9		13-36	%REC	1	6/7/2016 11:53 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

Client: Merit Energy  
 Project: Merit (Hartland Gas Plant)  
 Sample ID: TMW-07 DUP  
 Collection Date: 6/2/2016 12:00 PM

Work Order: 1606258  
 Lab ID: 1606258-06  
 Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Diisopropanolamine	ND		50	µg/L	1	6/8/2016 12:14 PM
<b>Sulfolane</b>	<b>3,900</b>		<b>100</b>	<b>µg/L</b>	10	6/8/2016 12:16 PM
Surr: 2,4,6-Tribromophenol	70.0		38-115	%REC	1	6/8/2016 12:14 PM
Surr: 2-Fluorobiphenyl	62.9		32-100	%REC	1	6/8/2016 12:14 PM
Surr: 2-Fluorophenol	37.6		22-59	%REC	1	6/8/2016 12:14 PM
Surr: 4-Terphenyl-d14	58.5		23-112	%REC	1	6/8/2016 12:14 PM
Surr: Nitrobenzene-d5	71.6		31-93	%REC	1	6/8/2016 12:14 PM
Surr: Phenol-d6	24.1		13-36	%REC	1	6/8/2016 12:14 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** TMW-010 (90-95')  
**Collection Date:** 6/2/2016 12:20 PM

**Work Order:** 1606258  
**Lab ID:** 1606258-07  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 12:34 PM
Surr: 2,4,6-Tribromophenol	64.8		38-115	%REC	1	6/8/2016 12:34 PM
Surr: 2-Fluorobiphenyl	65.6		32-100	%REC	1	6/8/2016 12:34 PM
Surr: 2-Fluorophenol	37.5		22-59	%REC	1	6/8/2016 12:34 PM
Surr: 4-Terphenyl-d14	64.0		23-112	%REC	1	6/8/2016 12:34 PM
Surr: Nitrobenzene-d5	74.5		31-93	%REC	1	6/8/2016 12:34 PM
Surr: Phenol-d6	22.5		13-36	%REC	1	6/8/2016 12:34 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

Client: Merit Energy  
 Project: Merit (Hartland Gas Plant)  
 Sample ID: TMW-08  
 Collection Date: 6/2/2016 12:45 PM

Work Order: 1606258  
 Lab ID: 1606258-08  
 Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Diisopropanolamine	ND		50	µg/L	1	6/8/2016 12:54 PM
<b>Sulfolane</b>	<b>710</b>		<b>10</b>	<b>µg/L</b>	1	6/8/2016 12:54 PM
Surr: 2,4,6-Tribromophenol	62.1		38-115	%REC	1	6/8/2016 12:54 PM
Surr: 2-Fluorobiphenyl	60.5		32-100	%REC	1	6/8/2016 12:54 PM
Surr: 2-Fluorophenol	34.3		22-59	%REC	1	6/8/2016 12:54 PM
Surr: 4-Terphenyl-d14	58.3		23-112	%REC	1	6/8/2016 12:54 PM
Surr: Nitrobenzene-d5	66.3		31-93	%REC	1	6/8/2016 12:54 PM
Surr: Phenol-d6	21.9		13-36	%REC	1	6/8/2016 12:54 PM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** TMW-010 (70-75;)  
**Collection Date:** 6/2/2016 01:00 PM

**Work Order:** 1606258  
**Lab ID:** 1606258-09  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 01:14 AM
Surr: 2,4,6-Tribromophenol	58.3		38-115	%REC	1	6/8/2016 01:14 AM
Surr: 2-Fluorobiphenyl	61.8		32-100	%REC	1	6/8/2016 01:14 AM
Surr: 2-Fluorophenol	32.3		22-59	%REC	1	6/8/2016 01:14 AM
Surr: 4-Terphenyl-d14	63.5		23-112	%REC	1	6/8/2016 01:14 AM
Surr: Nitrobenzene-d5	69.5		31-93	%REC	1	6/8/2016 01:14 AM
Surr: Phenol-d6	21.1		13-36	%REC	1	6/8/2016 01:14 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

Client: Merit Energy  
 Project: Merit (Hartland Gas Plant)  
 Sample ID: TMW-011 (27-32')  
 Collection Date: 6/2/2016 03:25 PM

Work Order: 1606258  
 Lab ID: 1606258-10  
 Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Diisopropanolamine	ND		50	µg/L	1	6/8/2016 01:34 AM
<b>Sulfolane</b>	<b>4,800</b>		<b>100</b>	<b>µg/L</b>	10	6/8/2016 12:36 PM
Surr: 2,4,6-Tribromophenol	68.6		38-115	%REC	1	6/8/2016 01:34 AM
Surr: 2-Fluorobiphenyl	68.3		32-100	%REC	1	6/8/2016 01:34 AM
Surr: 2-Fluorophenol	43.7		22-59	%REC	1	6/8/2016 01:34 AM
Surr: 4-Terphenyl-d14	52.2		23-112	%REC	1	6/8/2016 01:34 AM
Surr: Nitrobenzene-d5	77.4		31-93	%REC	1	6/8/2016 01:34 AM
Surr: Phenol-d6	28.3		13-36	%REC	1	6/8/2016 01:34 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** TMW-01  
**Collection Date:** 6/2/2016 03:40 PM

**Work Order:** 1606258  
**Lab ID:** 1606258-11  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		11	µg/L	1	6/8/2016 01:54 AM
Surr: 2,4,6-Tribromophenol	73.1		38-115	%REC	1	6/8/2016 01:54 AM
Surr: 2-Fluorobiphenyl	65.3		32-100	%REC	1	6/8/2016 01:54 AM
Surr: 2-Fluorophenol	46.8		22-59	%REC	1	6/8/2016 01:54 AM
Surr: 4-Terphenyl-d14	48.8		23-112	%REC	1	6/8/2016 01:54 AM
Surr: Nitrobenzene-d5	74.2		31-93	%REC	1	6/8/2016 01:54 AM
Surr: Phenol-d6	31.1		13-36	%REC	1	6/8/2016 01:54 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** MW-1  
**Collection Date:** 6/3/2016 06:30 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-12  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 02:14 AM
Surr: 2,4,6-Tribromophenol	67.5		38-115	%REC	1	6/8/2016 02:14 AM
Surr: 2-Fluorobiphenyl	59.1		32-100	%REC	1	6/8/2016 02:14 AM
Surr: 2-Fluorophenol	36.6		22-59	%REC	1	6/8/2016 02:14 AM
Surr: 4-Terphenyl-d14	56.8		23-112	%REC	1	6/8/2016 02:14 AM
Surr: Nitrobenzene-d5	66.0		31-93	%REC	1	6/8/2016 02:14 AM
Surr: Phenol-d6	22.9		13-36	%REC	1	6/8/2016 02:14 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.



# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** MW-2  
**Collection Date:** 6/3/2016 07:25 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-13  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 02:34 AM
Surr: 2,4,6-Tribromophenol	41.7		38-115	%REC	1	6/8/2016 02:34 AM
Surr: 2-Fluorobiphenyl	56.4		32-100	%REC	1	6/8/2016 02:34 AM
Surr: 2-Fluorophenol	23.9		22-59	%REC	1	6/8/2016 02:34 AM
Surr: 4-Terphenyl-d14	51.0		23-112	%REC	1	6/8/2016 02:34 AM
Surr: Nitrobenzene-d5	64.0		31-93	%REC	1	6/8/2016 02:34 AM
Surr: Phenol-d6	18.4		13-36	%REC	1	6/8/2016 02:34 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** MW-6  
**Collection Date:** 6/3/2016 08:20 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-14  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 02:54 AM
Surr: 2,4,6-Tribromophenol	54.3		38-115	%REC	1	6/8/2016 02:54 AM
Surr: 2-Fluorobiphenyl	56.7		32-100	%REC	1	6/8/2016 02:54 AM
Surr: 2-Fluorophenol	29.2		22-59	%REC	1	6/8/2016 02:54 AM
Surr: 4-Terphenyl-d14	34.4		23-112	%REC	1	6/8/2016 02:54 AM
Surr: Nitrobenzene-d5	64.5		31-93	%REC	1	6/8/2016 02:54 AM
Surr: Phenol-d6	18.5		13-36	%REC	1	6/8/2016 02:54 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** MW-4  
**Collection Date:** 6/3/2016 09:05 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-15  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 03:14 AM
Surr: 2,4,6-Tribromophenol	66.8		38-115	%REC	1	6/8/2016 03:14 AM
Surr: 2-Fluorobiphenyl	56.8		32-100	%REC	1	6/8/2016 03:14 AM
Surr: 2-Fluorophenol	37.0		22-59	%REC	1	6/8/2016 03:14 AM
Surr: 4-Terphenyl-d14	55.4		23-112	%REC	1	6/8/2016 03:14 AM
Surr: Nitrobenzene-d5	63.5		31-93	%REC	1	6/8/2016 03:14 AM
Surr: Phenol-d6	22.9		13-36	%REC	1	6/8/2016 03:14 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** TMW-010 (45-50')  
**Collection Date:** 6/3/2016 09:05 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-16  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 03:34 AM
Surr: 2,4,6-Tribromophenol	57.2		38-115	%REC	1	6/8/2016 03:34 AM
Surr: 2-Fluorobiphenyl	56.8		32-100	%REC	1	6/8/2016 03:34 AM
Surr: 2-Fluorophenol	38.0		22-59	%REC	1	6/8/2016 03:34 AM
Surr: 4-Terphenyl-d14	61.2		23-112	%REC	1	6/8/2016 03:34 AM
Surr: Nitrobenzene-d5	65.5		31-93	%REC	1	6/8/2016 03:34 AM
Surr: Phenol-d6	23.7		13-36	%REC	1	6/8/2016 03:34 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** MW-5  
**Collection Date:** 6/3/2016 10:00 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-17  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 03:55 AM
Surr: 2,4,6-Tribromophenol	59.0		38-115	%REC	1	6/8/2016 03:55 AM
Surr: 2-Fluorobiphenyl	58.9		32-100	%REC	1	6/8/2016 03:55 AM
Surr: 2-Fluorophenol	42.4		22-59	%REC	1	6/8/2016 03:55 AM
Surr: 4-Terphenyl-d14	51.3		23-112	%REC	1	6/8/2016 03:55 AM
Surr: Nitrobenzene-d5	65.9		31-93	%REC	1	6/8/2016 03:55 AM
Surr: Phenol-d6	26.0		13-36	%REC	1	6/8/2016 03:55 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** MW-3  
**Collection Date:** 6/3/2016 10:15 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-18  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 04:14 AM
Surr: 2,4,6-Tribromophenol	76.6		38-115	%REC	1	6/8/2016 04:14 AM
Surr: 2-Fluorobiphenyl	63.0		32-100	%REC	1	6/8/2016 04:14 AM
Surr: 2-Fluorophenol	41.3		22-59	%REC	1	6/8/2016 04:14 AM
Surr: 4-Terphenyl-d14	73.2		23-112	%REC	1	6/8/2016 04:14 AM
Surr: Nitrobenzene-d5	72.2		31-93	%REC	1	6/8/2016 04:14 AM
Surr: Phenol-d6	25.4		13-36	%REC	1	6/8/2016 04:14 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.



# ALS Group USA, Corp

Date: 09-Jun-16

Client: Merit Energy  
 Project: Merit (Hartland Gas Plant)  
 Sample ID: MW-7  
 Collection Date: 6/3/2016 10:45 AM

Work Order: 1606258  
 Lab ID: 1606258-19  
 Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Diisopropanolamine	ND		56	µg/L	1	6/8/2016 04:35 AM
<b>Sulfolane</b>	<b>450</b>		<b>11</b>	<b>µg/L</b>	1	6/8/2016 04:35 AM
Surr: 2,4,6-Tribromophenol	68.8		38-115	%REC	1	6/8/2016 04:35 AM
Surr: 2-Fluorobiphenyl	63.5		32-100	%REC	1	6/8/2016 04:35 AM
Surr: 2-Fluorophenol	46.9		22-59	%REC	1	6/8/2016 04:35 AM
Surr: 4-Terphenyl-d14	65.4		23-112	%REC	1	6/8/2016 04:35 AM
Surr: Nitrobenzene-d5	73.1		31-93	%REC	1	6/8/2016 04:35 AM
Surr: Phenol-d6	30.7		13-36	%REC	1	6/8/2016 04:35 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

Client: Merit Energy  
 Project: Merit (Hartland Gas Plant)  
 Sample ID: MW-7 DUP  
 Collection Date: 6/3/2016 10:45 AM

Work Order: 1606258  
 Lab ID: 1606258-20  
 Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/6/16	Analyst: <b>RM</b>
Diisopropanolamine	ND		50	µg/L	1	6/8/2016 04:54 AM
<b>Sulfolane</b>	<b>510</b>		<b>10</b>	<b>µg/L</b>	1	6/8/2016 04:54 AM
Surr: 2,4,6-Tribromophenol	68.8		38-115	%REC	1	6/8/2016 04:54 AM
Surr: 2-Fluorobiphenyl	62.4		32-100	%REC	1	6/8/2016 04:54 AM
Surr: 2-Fluorophenol	43.8		22-59	%REC	1	6/8/2016 04:54 AM
Surr: 4-Terphenyl-d14	70.7		23-112	%REC	1	6/8/2016 04:54 AM
Surr: Nitrobenzene-d5	73.3		31-93	%REC	1	6/8/2016 04:54 AM
Surr: Phenol-d6	27.6		13-36	%REC	1	6/8/2016 04:54 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

# ALS Group USA, Corp

Date: 09-Jun-16

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**Sample ID:** TWM-02  
**Collection Date:** 6/3/2016 11:10 AM

**Work Order:** 1606258  
**Lab ID:** 1606258-21  
**Matrix:** GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>			<b>SW846 8270D</b>		Prep: SW3510 / 6/7/16	Analyst: <b>RM</b>
Sulfolane	ND		10	µg/L	1	6/8/2016 05:14 AM
Surr: 2,4,6-Tribromophenol	70.9		38-115	%REC	1	6/8/2016 05:14 AM
Surr: 2-Fluorobiphenyl	57.6		32-100	%REC	1	6/8/2016 05:14 AM
Surr: 2-Fluorophenol	41.4		22-59	%REC	1	6/8/2016 05:14 AM
Surr: 4-Terphenyl-d14	67.8		23-112	%REC	1	6/8/2016 05:14 AM
Surr: Nitrobenzene-d5	71.0		31-93	%REC	1	6/8/2016 05:14 AM
Surr: Phenol-d6	25.9		13-36	%REC	1	6/8/2016 05:14 AM

**Note:** See Qualifiers page for a list of qualifiers and their definitions.

**Client:** Merit Energy  
**Work Order:** 1606258  
**Project:** Merit (Hartland Gas Plant)

**QC BATCH REPORT**

Batch ID: **86917** Instrument ID: **SVMS8** Method: **SW846 8270D**

MBLK		Sample ID: <b>SBLKW1-86917-86917</b>				Units: <b>µg/L</b>		Analysis Date: <b>6/7/2016 06:44 PM</b>		
Client ID:		Run ID: <b>SVMS8_160607A</b>		SeqNo: <b>3866078</b>		Prep Date: <b>6/6/2016</b>		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPC	RPD Limit	Qual
Diisopropanolamine	ND	50								
Sulfolane	ND	10								
<i>Surr: 2,4,6-Tribromophenol</i>	29.94	0	50	0	59.9	38-115	0			
<i>Surr: 2-Fluorobiphenyl</i>	33.19	0	50	0	66.4	32-100	0			
<i>Surr: 2-Fluorophenol</i>	20.74	0	50	0	41.5	22-59	0			
<i>Surr: 4-Terphenyl-d14</i>	37.98	0	50	0	76	23-112	0			
<i>Surr: Nitrobenzene-d5</i>	36.62	0	50	0	73.2	31-93	0			
<i>Surr: Phenol-d6</i>	12.62	0	50	0	25.2	13-36	0			

LCS		Sample ID: <b>SLCSW1-86917-86917</b>				Units: <b>µg/L</b>		Analysis Date: <b>6/7/2016 07:04 PM</b>		
Client ID:		Run ID: <b>SVMS8_160607A</b>		SeqNo: <b>3866079</b>		Prep Date: <b>6/6/2016</b>		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPC	RPD Limit	Qual
Diisopropanolamine	8.78	50	100	0	8.78	5-40	0			
Sulfolane	46.4	10	100	0	46.4	30-100	0			
<i>Surr: 2,4,6-Tribromophenol</i>	27.05	0	50	0	54.1	38-115	0			
<i>Surr: 2-Fluorobiphenyl</i>	29.34	0	50	0	58.7	32-100	0			
<i>Surr: 2-Fluorophenol</i>	15.07	0	50	0	30.1	22-59	0			
<i>Surr: 4-Terphenyl-d14</i>	38.87	0	50	0	77.7	23-112	0			
<i>Surr: Nitrobenzene-d5</i>	30.78	0	50	0	61.6	31-93	0			
<i>Surr: Phenol-d6</i>	10.16	0	50	0	20.3	13-36	0			

MS		Sample ID: <b>1606258-01A MS</b>				Units: <b>µg/L</b>		Analysis Date: <b>6/7/2016 09:53 PM</b>		
Client ID: <b>TMW-03</b>		Run ID: <b>SVMS8_160607A</b>		SeqNo: <b>3866083</b>		Prep Date: <b>6/6/2016</b>		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPC	RPD Limit	Qual
Diisopropanolamine	8.48	50	100	0	8.48	5-40	0			
Sulfolane	53.71	10	100	0	53.7	30-100	0			
<i>Surr: 2,4,6-Tribromophenol</i>	29.62	0	50	0	59.2	38-115	0			
<i>Surr: 2-Fluorobiphenyl</i>	32.61	0	50	0	65.2	32-100	0			
<i>Surr: 2-Fluorophenol</i>	17.67	0	50	0	35.3	22-59	0			
<i>Surr: 4-Terphenyl-d14</i>	28.72	0	50	0	57.4	23-112	0			
<i>Surr: Nitrobenzene-d5</i>	36.98	0	50	0	74	31-93	0			
<i>Surr: Phenol-d6</i>	10.77	0	50	0	21.5	13-36	0			

**Note:** See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Merit Energy  
 Work Order: 1606258  
 Project: Merit (Hartland Gas Plant)

# QC BATCH REPORT

Batch ID: **86917** Instrument ID: **SVMS8** Method: **SW846 8270D**

DUP		Sample ID: <b>1606258-02A DUP</b>				Units: <b>µg/L</b>		Analysis Date: <b>6/7/2016 10:33 PM</b>		
Client ID: <b>TMW-04</b>		Run ID: <b>SVMS8_160607A</b>				SeqNo: <b>3866085</b>		Prep Date: <b>6/6/2016</b>		DF: <b>1</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Diisopropanolamine	ND	50	0	0	0		0	0	50	
<i>Surr: 2,4,6-Tribromophenol</i>	<i>33.94</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>67.9</i>	<i>38-115</i>	<i>35.86</i>	<i>5.5</i>	<i>40</i>	
<i>Surr: 2-Fluorobiphenyl</i>	<i>33.61</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>67.2</i>	<i>32-100</i>	<i>35.21</i>	<i>4.65</i>	<i>40</i>	
<i>Surr: 2-Fluorophenol</i>	<i>20.77</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>41.5</i>	<i>22-59</i>	<i>20.2</i>	<i>2.78</i>	<i>40</i>	
<i>Surr: 4-Terphenyl-d14</i>	<i>30.92</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>61.8</i>	<i>23-112</i>	<i>31.51</i>	<i>1.89</i>	<i>40</i>	
<i>Surr: Nitrobenzene-d5</i>	<i>38.11</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>76.2</i>	<i>31-93</i>	<i>38.69</i>	<i>1.51</i>	<i>40</i>	
<i>Surr: Phenol-d6</i>	<i>13.75</i>	<i>0</i>	<i>50</i>	<i>0</i>	<i>27.5</i>	<i>13-36</i>	<i>12.83</i>	<i>6.92</i>	<i>40</i>	

DUP		Sample ID: <b>1606258-02A DUP</b>				Units: <b>µg/L</b>		Analysis Date: <b>6/8/2016 10:35 AM</b>		
Client ID: <b>TMW-04</b>		Run ID: <b>SVMS8_160607A</b>				SeqNo: <b>3866103</b>		Prep Date: <b>6/6/2016</b>		DF: <b>10</b>
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane	2872	100	0	0	0		2581	10.7	50	

The following samples were analyzed in this batch:

1606258-01A	1606258-02A	1606258-03A
1606258-04A	1606258-05A	1606258-06A
1606258-07A	1606258-08A	1606258-09A
1606258-10A	1606258-11A	1606258-12A
1606258-13A	1606258-14A	1606258-15A
1606258-16A	1606258-17A	1606258-18A
1606258-19A	1606258-20A	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Merit Energy  
 Work Order: 1606258  
 Project: Merit (Hartland Gas Plant)

# QC BATCH REPORT

Batch ID: **87000** Instrument ID: **SVMS8** Method: **SW846 8270D**

MBLK		Sample ID: <b>SBLKW1-87000-87000</b>				Units: <b>µg/L</b>		Analysis Date: <b>6/7/2016 08:04 PM</b>		
Client ID:		Run ID: <b>SVMS8_160607A</b>		SeqNo: <b>3866080</b>		Prep Date: <b>6/7/2016</b>		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane	ND	10								
Surr: 2,4,6-Tribromophenol	31.84	0	50	0	63.7	38-115	0			
Surr: 2-Fluorobiphenyl	34.21	0	50	0	68.4	32-100	0			
Surr: 2-Fluorophenol	21.01	0	50	0	42	22-59	0			
Surr: 4-Terphenyl-d14	40.1	0	50	0	80.2	23-112	0			
Surr: Nitrobenzene-d5	36.83	0	50	0	73.7	31-93	0			
Surr: Phenol-d6	13.09	0	50	0	26.2	13-36	0			

LCS		Sample ID: <b>SLCSW1-87000-87000</b>				Units: <b>µg/L</b>		Analysis Date: <b>6/7/2016 08:24 PM</b>		
Client ID:		Run ID: <b>SVMS8_160607A</b>		SeqNo: <b>3866081</b>		Prep Date: <b>6/7/2016</b>		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane	57.74	10	100	0	57.7	30-100	0			
Surr: 2,4,6-Tribromophenol	30.92	0	50	0	61.8	38-115	0			
Surr: 2-Fluorobiphenyl	35.13	0	50	0	70.3	32-100	0			
Surr: 2-Fluorophenol	20.04	0	50	0	40.1	22-59	0			
Surr: 4-Terphenyl-d14	37.91	0	50	0	75.8	23-112	0			
Surr: Nitrobenzene-d5	37.17	0	50	0	74.3	31-93	0			
Surr: Phenol-d6	12.13	0	50	0	24.3	13-36	0			

LCSD		Sample ID: <b>SLCSDW1-87000-87000</b>				Units: <b>µg/L</b>		Analysis Date: <b>6/7/2016 08:44 PM</b>		
Client ID:		Run ID: <b>SVMS8_160607A</b>		SeqNo: <b>3866082</b>		Prep Date: <b>6/7/2016</b>		DF: <b>1</b>		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Sulfolane	63.07	10	100	0	63.1	30-100	57.74	8.82	50	
Surr: 2,4,6-Tribromophenol	33.1	0	50	0	66.2	38-115	30.92	6.81	40	
Surr: 2-Fluorobiphenyl	35.7	0	50	0	71.4	32-100	35.13	1.61	40	
Surr: 2-Fluorophenol	23.08	0	50	0	46.2	22-59	20.04	14.1	40	
Surr: 4-Terphenyl-d14	37.99	0	50	0	76	23-112	37.91	0.211	40	
Surr: Nitrobenzene-d5	38.93	0	50	0	77.9	31-93	37.17	4.63	40	
Surr: Phenol-d6	14.12	0	50	0	28.2	13-36	12.13	15.2	40	

The following samples were analyzed in this batch: 1606258-21A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

**Client:** Merit Energy  
**Project:** Merit (Hartland Gas Plant)  
**WorkOrder:** 1606258

**QUALIFIERS,  
ACRONYMS, UNITS**

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and PQL, sample results may exhibit background or reagent contamination at the observed level.

<u>Acronym</u>	<u>Description</u>
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCS D	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

<u>Units Reported</u>	<u>Description</u>
µg/L	Micrograms per Liter

Sample Receipt Checklist

Client Name: **MERITENERGY**

Date/Time Received: **04-Jun-16 08:00**

Work Order: **1606258**

Received by: **DS**

Checklist completed by Diane Shaw 04-Jun-16  
eSignature Date

Reviewed by: Gary Byar 05-Jun-16  
eSignature Date

Matrices: Groundwater  
 Carrier name: Courier

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample(s) received on ice?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temperature(s)/Thermometer(s):	<u>2.6/2.6, 2.0/2.0, 3.4/3.4, 3.4/3.4 c</u>		<u>SR2</u>
Cooler(s)/Kit(s):	<u></u>		
Date/Time sample(s) sent to storage:	<u>6/4/2016 9:16:33 AM</u>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>
pH adjusted by:	<u></u>		

Login Notes:

Client Contacted: \_\_\_\_\_ Date Contacted: \_\_\_\_\_ Person Contacted: \_\_\_\_\_  
 Contacted By: \_\_\_\_\_ Regarding: \_\_\_\_\_

Comments:

CorrectiveAction





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# Chain of Custody Form

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COC ID: 16599

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+1 281 530 5656

Middletown, PA  
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Spring City, PA  
+1 610 948 4903

Salt Lake City, UT  
+1 801 266 7700

South Charleston, WV  
+1 304 356 3168

York, PA  
+1 717 505 5280

ALS Project Manager:

ALS Work Order #: 1606258

Customer Information		Project Information		Parameter/Method Request for Analysis												
Purchase Order		Project Name	HARLAND GAS PLANT	A	SULFOLANE											
Work Order		Project Number	130685 - 2000	B	DIPA											
Company Name	ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.	Bill To Company	MERIT ENERGY COMPANY	C												
Send Report To	JEREMY LEWANDOWSKI / SEAN CRAVEN	Invoice Attn	SEAN CRAVEN	D												
Address	3399 VETERANS DR.	Address	1510 THOMAS RD.	E												
City/State/Zip	TROVASE CITY MI 49684	City/State/Zip	KALKASKA MI 49646	F												
Phone	231-946-8200	Phone		G												
Fax		Fax		H												
e-Mail Address	jlewandowski@actinc.com	e-Mail Address		I												
				J												

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	TMW-03	6-2-16	0918	GW	8	2	X										
2	TMW-04		1000				X	X									
3	TMW-05		1030				X										
4	TMW-09		1125				X										
5	TMW-07		1200				X	X									
6	TMW-07 DUP		1200				X	X									
7	TMW-010 (90-95')		1220				X										
8	FAAW-010 (TMW-08)		1245				X	X									
9	TMW-010 (70-75')		1300				X										
10	TMW-011 (27-32')		1525				X	X									

Sampler(s) Please Print & Sign <i>Brian Bumann</i> BRIAN BUMANN		Shipment Method		Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> Other <u>30AV</u>				Results Due Date:			
<input checked="" type="checkbox"/> STD 10 Wk Days		<input type="checkbox"/> 5 Wk Days		<input type="checkbox"/> 2 Wk Days		<input type="checkbox"/> 24 Hour					
Relinquished by <i>Brian Bumann</i>	Date: 6-2-16	Time: 1800	Received by: ECT STORAGE	Notes: <u>Rec'd 10/4/16 0800 Q-57 Q</u>							
Relinquished by: ECT STORAGE	Date: 6-3-16	Time: 0500	Received by (Laboratory): <i>Brian Bumann</i>	Cooler ID	Cooler Temp	QC Package: (Check One Box Below)					
Logged by (Laboratory): <i>GRB</i>	Date: 6-3-16	Time: 1320	Checked by (Laboratory): <i>GRB</i>		2.6°C	<input type="checkbox"/> Level II Std QC	<input type="checkbox"/> TRRP Checklist				
Preservative Key: 1-HCl 2-HNO <sub>3</sub> 3-H <sub>2</sub> SO <sub>4</sub> 4-NaOH 5-Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> 6-NaHSO <sub>4</sub> 7-Other 8-4°C 9-5035					2.0°C	<input type="checkbox"/> Level III Std. QC/Raw Data	<input type="checkbox"/> TRRP Level IV				
					3.4°C	<input type="checkbox"/> Level IV SW846/CLP					
					3.4°C	<input type="checkbox"/> Other					

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.  
 2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.  
 3. The Chain of Custody is a legal document. All information must be completed accurately.

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# Chain of Custody Form

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COC ID: 16600

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Middletown, PA  
+1 717 944 5541

Spring City, PA  
+1 610 948 4903

Salt Lake City, UT  
+1 801 266 7700

South Charleston, WV  
+1 304 356 3168

York, PA  
+1 717 505 5280

ALS Project Manager:

ALS Work Order #: 1606758

Customer Information		Project Information		Parameter/Method Request for Analysis											
Purchase Order		Project Name	HARLAND GAS PLANT	A	SULFOLANE										
Work Order		Project Number	130685-2000	B	DIPA										
Company Name	ENVIRONMENTAL CONSULTING TECHNOLOGIES, LLC	Bill To Company	MERIT ENERGY COMPANY	C											
Send Report To	JEREMY LEWANDOWSKI / SEAN CRAVEN	Invoice Attn	SEAN CRAVEN	D											
Address	3399 VETERANS DRIVE	Address	1510 THOMAS RD.	E											
City/State/Zip	TRAVERSE CITY, MI 49684	City/State/Zip	KALKASKA MI 49646	F											
Phone	231-946-8200	Phone		G											
Fax		Fax		H											
e-Mail Address	jlewandowski@ectmc.com	e-Mail Address		I											
				J											

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	TMW-01	6-2-16	1540	GW	8	2	X										
2	<del>TMW-01</del>		<del>1600</del>														
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign <i>Brian Bauman</i>		Shipment Method		Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> Other <u>3 DAY</u>				Results Due Date:			
Relinquished by: <i>B.B.</i>		Date: 6-2-16	Time: 1800	Received by: <i>ECT STORAGE</i>		Notes: <i>Rec'd 6/4/16 0800 D. ZLL</i>					
Relinquished by: <i>ECT STORAGE</i>		Date: 6-3-16	Time: 0800	Received by (Laboratory): <i>[Signature]</i>		Cooler ID:	Cooler Temp:	QC Package: (Check One Box Below)			
Loaded by (Laboratory): <i>[Signature]</i>		Date: 6-3-16	Time: 1320	Checked by (Laboratory): <i>GRB</i>			26 °C	<input type="checkbox"/> Level II Std QC	<input type="checkbox"/> TRAP Checklist		
Preservative Key: 1-HCl 2-HNO <sub>3</sub> 3-H <sub>2</sub> SO <sub>4</sub> 4-NaOH 5-Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> 6-NaHSO <sub>4</sub> 7-Other 8-4°C 9-5035							20 °C	<input type="checkbox"/> Level III Std QC/Raw Data	<input type="checkbox"/> TRAP Level IV		
							3.4 °C	<input type="checkbox"/> Level IV SW846/CLP	<input type="checkbox"/> Other		



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# Chain of Custody Form

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COC ID: 16601

Houston, TX  
+1 281 530 5656

Middletown, PA  
+1 717 944 5541

Spring City, PA  
+1 610 948 4903

Salt Lake City, UT  
+1 801 266 7700

South Charleston, WV  
+1 304 356 3168

York, PA  
+1 717 505 5280

ALS Project Manager:

ALS Work Order #: 1606258

Customer Information		Project Information		Parameter/Method Request for Analysis											
Purchase Order		Project Name	HORLAND GAS PLANT	A	SULFOLANE										
Work Order		Project Number	130685-2000	B	DIPA										
Company Name	ECT, INC.	Bill To Company	MERIT ENERGY COMPANY	C											
Send Report To	JEREMY LEWANDOWSKI/SEAN CRAVEN	Invoice Attn	SEAN CRAVEN	D											
Address	3399 VETERANS DR.	Address	1510 THOMAS RD.	E											
City/State/Zip	TRAVERSE CITY MI 49684	City/State/Zip	KALKASKA MI 49646	F											
Phone	231-946-8200	Phone		G											
Fax		Fax		H											
e-Mail Address	jlewandowski@ectinc.com	e-Mail Address		I											
				J											

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold	
1	MW-1	6-3-16	0630	6W	8	2	X											
2	MW-2		0725				X											
3	MW-6		0820				X											
4	MW-4		0905				X											
5	TMW-010 (45-50')		0905				X											
6	MW-5		1000				X											
7	MW-3		1015				X											
8	MW-7		1045				X	X										
9	MW-7 DUP		1045				X	X										
10	TMW-02		1110			24	X											

Sampler(s) Please Print & Sign <i>Sean Craven</i>		Shipment Method		Required Turnaround Time: (Check Box) <input checked="" type="checkbox"/> Other 3 DAY				Results Due Date:			
				<input type="checkbox"/> STD 10 Wk Days <input type="checkbox"/> 5 Wk Days <input type="checkbox"/> 2 Wk Days <input type="checkbox"/> 24 Hour							
Relinquished to: <i>B. Craven</i>	Date: 6-3-16	Time: 1320	Received by: <i>[Signature]</i>	Notes: Roc'd 6/11/16 0800							
Relinquished by: <i>[Signature]</i>	Date: 6.3.16	Time: 1900	Received by (Laboratory):	Cooler ID	Cooler Temp	QC Package: (Check One Box Below)					
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory): <i>GRB</i>		2.6°C	<input type="checkbox"/> Level II Std QC	<input type="checkbox"/> TRAP Checklist				
Preservative Key: 1-HCl 2-HNO <sub>3</sub> 3-H <sub>2</sub> SO <sub>4</sub> 4-NaOH 5-Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> 6-NaHSO <sub>4</sub> 7-Other 8-4°C 9-5035					2.0°C	<input type="checkbox"/> Level III Std QC/Raw Date	<input type="checkbox"/> TRAP Level IV				
					3.4°C	<input type="checkbox"/> Level IV SW846/CLP					
					3.4°C	<input type="checkbox"/> Other					

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