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Technical Memorandum

To: Mark Darby, Superior Refining Company, LLC (Husky Energy)
From: Lynette Carney and Martin Bevis, Barr Engineering Co.
Subject: Phase II Investigation Results – Future ALLETE Substation Site
Date: August 24, 2018
Project: 49161423.00

Project Objectives

Barr Engineering Co. (Barr) was retained by Superior Refining Company, LLC (a subsidiary of Husky Energy Inc.) to complete a Phase II investigation of a property owned by Husky Energy Inc. There is historical indication that the property was formerly used as a parking lot and equipment laydown area. Husky intends to lease the Property to ALLETE/Minnesota Power/Superior Water, Light and Power for construction of an electrical substation. The property is located in Section 36 of Township 49 North, Range 14 West in Superior, Douglas County, Wisconsin (Property). The Property location is shown on Figure 1.

In May 2018, Barr performed a Phase I Environmental Site Assessment (ESA) Report (Barr, 2018). No recognized environmental conditions (RECs) were identified, though the report included findings of nine potential sources of hazardous substances or petroleum products near the Property:

1. Adjacent Husky Refinery (North);
2. Adjacent Husky Refinery fire on April 26, 2018;
3. Adjacent Enbridge Energy Terminal site (South);
4. Adjoining Husky Refinery laboratory (East);
5. Adjoining and upgradient railroads (West and South);
6. A small amount of miscellaneous historical debris on the Property;
7. Existing electrical power pole transformers;
8. Surrounding industrial property use and equipment storage on Property; and
9. Various petroleum pipelines located adjacent to the Property.

The objectives of the Phase II investigation were to: characterize soil and groundwater to identify potential impacts and assess baseline conditions at the property prior to leasing.

This report summarizes the results, opinions, and conclusions of the Phase II investigation. Descriptions of the Property background, investigation approach, sample locations and analytical results are summarized below. Additional information is included in the Phase I ESA Report (Barr, 2018).

Background Information

The Property consists of approximately 5.18 acres located in an area between the operating Husky Refinery and a large Enbridge pipeline terminal facility as shown on Figure 1. The Property will be leased to ALLETE/Minnesota Power/Superior Water, Light and Power for construction of an electrical substation. Much of the following Property information was summarized from information presented in Barr's Phase I ESA Report (Barr, 2018):

Topography of the Property is relatievly flat, with a gentle slope down to the east. The property is underlain by clayey till and glaciolacustrine sediment planed by waves of proglacial Lake Duluth (Clayton, 1985). Based on groundwater monitoring at the refinery, which includes groundwater monitoring wells located on and near the Property, shallow groundwater flow direction at the Property is to the northeast towards Newton Creek, ultimately discharging into Lake Superior approximately 1.7 miles northeast of the Property. The depth to shallow groundwater in MW-14, which is located on the Property, is typically less than two feet below the ground surface (Gannett Fleming, 2017). Husky's monitoring wells on and near the Property are shown on Figure 2.

No buildings are currently located on the Property. The Property is accessible via Stinson Avenue (24th Avenue East) and an approximately 80-foot-wide gravel parking lot/equipment laydown area is located along the northwest Property boundary. No drinking water or sanitary service is provided to the Property. Historically the Property has been used as a storage/laydown area associated with the adjacent refinery. A warehouse was previously located on the Property and has since been demolished.

The current use of adjoining properties includes Husky Refinery to the north/northwest, unoccupied grassy/forested land and rail lines to the southwest, Husky Refinery laboratory building and grassy area to the east/northeast, and rail lines and Enbridge petroleum pipeline terminal facility to the south/southeast.

Investigation Approach and Summary of Activities

A Phase II Investigation was completed to assess for soil and groundwater impacts on the Property and to establish baseline environmental data. On June 22 and 23, 2018, Barr and its subcontractor, Twin Ports Testing, used a Geoprobe to advance five direct-push borings (SB-1 through SB-5) to depths of 20 feet below ground surface (bgs) at the locations shown on Figure 2. The borings locations were selected to provide representative coverage of the Property.

At each of the boring locations, one shallow soil sample was collected from depths between 0 and 3 feet bgs and one deeper sample was collected from intervals between 6 and 13 feet bgs. Soil samples were field-screened for organic vapors using headspace sample screening procedures described in our Standard Operating Procedures (included in Attachment A). Additional evidence of contamination such as staining, odor, discoloration, and sheen were evaluated and/or documented in the field. Soils were described according to ASTM D-2488, *Standard Practice for Description and Identification of Soils (Visual/Manual Method)*. Boring locations were surveyed using global positioning system (GPS) methods.

Temporary monitoring wells, with five-foot PVC well screens, were placed into three borings completed on June 21 (SB-1, SB-2, and SB-3). The wells were left in place over night to allow time for groundwater to equilibrate.

Barr submitted ten soil samples to Pace Analytical Laboratories in Minneapolis, MN. The soil samples were analyzed for the following compounds:

- Resource Conservation and Recovery Act (RCRA) list of 8 metals by methods 6010D and 7471B;
- polycyclic aromatic hydrocarbons (PAHs) by method 8270D; and
- volatile organic compounds (VOCs) by method 8260.

Due to poor recovery, only one groundwater sample (SB-3) was collected and submitted for analysis of VOCs by method 8260B and PAHs by method 8270D.

Results

Representative photographs of the boring locations and soil encountered at each location are included as Attachment B. Logs of each soil boring are included as Attachment C. Boring stratigraphy generally consisted of six inches or less of organic-rich topsoil overlying lean clay. The clay was typically of medium plasticity, stiff consistency, moist, red color, and glaciolacustrine origin. There was no staining, odor, discoloration, sheen or other indications of contamination observed in the field with the exception of SB-5, where the top six inches of soil

was composed of 70% angular shiny black sand and gravel – apparent weathered bituminous pavement. Headspace sample organic vapor screening in the field produced headspace readings less than 0.6 parts per million (ppm) across the site, with the exception of the top six inches of SB-5 (described above), where headspace results were 1.2 ppm.

The day following temporary monitoring well installation, approximately 3.5 feet of water was found in SB-1; SB-2 was dry, and SB-3 contained approximately 11 feet of water. Because SB-1 and SB-3 were located in areas of the site with shallow perched water on the ground surface while SB-2 was located in a portion of the site with dry ground, it is possible that water encountered in soil borings SB-1 and SB-3 may have been influenced by perched surface water draining into the open boring holes overnight. Although a small about of water was measured in the SB-1 borehole, an insufficient amount of water remain for sampling after purging only one well volume. Therefore, a groundwater sample was only collected from SB-3.

Tables 1 and 2 summarize the soil samples collected, analyses performed, and analytical results. Table 1 presents the analytical results for detections only or compounds detected at concentrations equal to or greater than laboratory method detection limits (MDLs). Included for comparison are the Wisconsin Department of Natural Resources (WDNR) Remediation & Redevelopment Program Residual Contaminant Levels (RCLs) developed by the WDNR according to the procedures in NR 720.10 and NR 720.12, Wis. Adm. Code. Non-industrial and industrial RCLs are included for comparison.

Table 2 presents all of the analytical results, including those results below the MDLs. Table 3 presents all of the groundwater analytical results compared to enforcement standard (ES) and Preventative Action Limit (PAL) criteria in NR 140.10 Wis. Adm. Code. Copies of the laboratory analytical reports are included in Attachment D.

Soil Analytical Results

Metals Results - Five of the eight RCRA metals were detected in each of the soil samples (Table 1). Arsenic was the only metal detected above the industrial RCLs; and arsenic concentrations exceeded industrial RCLs consistently in all soil samples, except SB-3_8-9 ft., where the concentration was below industrial criteria. Mercury, barium, chromium, and lead were found at concentrations below non-industrial RCLs in each sample. Cadmium, selenium and silver were not found above laboratory quantitation limits in any of the samples.

PAHs - Each of the PAHs were detected in SB-5_0-1 ft., but only the concentration of benzo(a)pyrene was in exceedance of non-industrial RCLs (Table 1). The only other detection of PAHs above laboratory quantitation limits was Benzo(b)fluoranthene in SB-3_8-9 ft.

VOCs - There were no VOCs detected above laboratory quantitation limits. Toluene was detected in SB-5_0-1 ft., but the concentration was below the quantitation limit.

Cumulative - The combined detections for each sample interval were also compared to the WDNR cumulative hazard index. No samples exceeded the Hazard Index or Cumulative Cancer Risk Sample standards. Sample SB-5 from 0-1 ft. was the only interval with any exceedances and had an Exceedance Count of one.

Groundwater Analytical Results

The only analyte detected in groundwater from SB-3 was toluene. This detection was below the WDNR NR 140 ES and PAL. Previous annual groundwater monitoring at wells MW-14 (located on the Property near SB-3) and MW-13/PZ-13 (located just northeast of Property) did not identify detectable concentrations of petroleum VOCs/naphthalene over the past 3 years (Gannett Fleming, 2016, 2017, 2018). As previously identified, it is possible that perched surface water observed at the time of sample collection may have migrated into SB-3.

Conclusions

Field screening at the five direct-push boring locations did not identify petroleum impacts or other concerns in soil. Soils generally consisted of lean, red, glaciolacustrine clay overlain by a few inches of organic topsoil.

Perched surface water is believed to have mixed with the groundwater encountered in SB-3. Only one VOC was detected in the groundwater sample from SB-3 (toluene), but the concentration was below the WDNR ES and PAL. This is consistent with the favorable groundwater monitoring results over the past three years from existing groundwater monitoring wells located on and near the subject Property and Refinery.

With the exception of arsenic, soil concentrations for RCRA metals and PAHs were below WDNR non-industrial RCLs. Arsenic was found at concentrations above the industrial RCLs in nine of the ten soil samples collected. However, given the documented baseline for arsenic in the Superior, Wisconsin area, the arsenic concentrations are believed to be naturally occurring and were universally below WDNR background threshold values (BTVs) as published and defined in their

RCL Spreadsheet and Publication PUB-RR-890. The three other metals detected above laboratory quantitation limits in each of the soil samples (i.e., barium, chromium, and lead) were found at concentrations below the non-industrial RCLs and below the WDNR background threshold values, with the exception of the result from SB-5 0-1 ft., where asphalt/fill soils were encountered at the surface. Metals detected in soil at the Property are therefore unlikely to be the result of past property uses.

In addition to chromium and lead concentrations above WDNR background threshold values, results from SB-5 0-1 ft. included multiple low-level concentration of PAHs, including a concentration of benzo(a)pyrene in exceedance of non-industrial RCLs; and a trace concentration of toluene. This sample contained pieces of apparent weathered asphalt. The chromium, lead, PAHs, and toluene detected at SB-5_0-1 ft. likely derive from the apparent weathered asphalt contained in the sample, not the underlying soil. No other samples at the property exhibited similar elevated analyte concentrations, including other surface samples and the deeper sample collected from the same boring (SB-5_8-9). Therefore, compounds associated with the apparent weathered asphalt do not appear to have leached into underlying soil or to have been distributed across the site.

Trace concentrations of PAHs were detected in SB-1 from 2-3 ft. and SB-3 from 8-9 ft. A trace concentration of toluene in groundwater was detected in soil boring SB-3, which was screened from 14.5-19.5 ft. bgs. The other PAH and VOC concentrations detected were below the RCLs for soil and the ES and PAL for groundwater. Based on WDNR risk-based industrial and non-industrial RCLs, the isolated low concentrations do not present a risk for human health and the environment.

Limitations

The scope of this Phase II investigation was intended to investigate the potential for the presence of specific contaminants at representative locations. Laboratory analysis was performed for those parameters which were identified as potential contaminants prior to conducting this investigation.

Attachments

Table 1 Soil Analytical Summary – Detected Values Only
Table 2 Soil Analytical Summary - All Results
Table 3 Groundwater Analytical Summary

References

ASTM, 2009. *D-2488-09a, Standard Practice for Description and Identification of Soils (Visual/Manual Method)* ASTM International, West Conshohocken, PA; 2009.

Barr, 2018. *Phase I Environmental Site Assessment, Future ALLETE Substation Site, Superior Refining Company, LLC (Husky Energy), Superior, Wisconsin*, prepared for Superior Refining Company, LLC; July 2018.

Clayton, Lee, 1985. *Pleistocene Geology of the Superior Region, Wisconsin,* Wisconsin Geological and Natural History Survey Information Circular 46, Plate 1; 1985.

Gannett Fleming, 2016. *Facility-Wide Groundwater Monitoring Report for 2015, Calumet Superior LLC Refinery, Superior WI*, prepared for Calumet Superior LLC; January 17, 2016.

Gannett Fleming, 2017. *Facility-Wide Groundwater Monitoring Report for 2016, Calumet Superior LLC Refinery, Superior WI*, prepared for Calumet Superior LLC; January 10, 2017.

Gannett Fleming, 2018. *Facility-Wide Groundwater Monitoring Report for 2017, Superior Refining Company LLC, Superior WI*, prepared for Superior Refining Company LLC; January 16, 2018.

Tables

Table 1
Soil Analytical Data Summary Detections Only
Husky Energy Property- Future Substation Site
Superior, WI

				Location	**SB-1**	**SB-1**	**SB-2**	**SB-2**	**SB-3**	**SB-3**	**SB-4**	**SB-4**	**SB-5**	**SB-5**
				Date	**6/21/2018**	**6/21/2018**	**6/21/2018**	**6/21/2018**	**6/21/2018**	**6/21/2018**	**6/22/2018**	**6/22/2018**	**6/22/2018**	**6/22/2018**
				Depth	**2 - 3 ft**	**12 - 13 ft**	**0 - 1 ft**	**6 - 7 ft**	**0 - 2 ft**	**8 - 9 ft**	**0 - 2 ft**	**6 - 7 ft**	**0 - 1 ft**	**8 - 9 ft**
Parameter	Units	Wisconsin Not to Exceed Industrial RCLs	Wisconsin Not to Exceed Non-Industrial RCLs	WDNR Background Threshold Values										
Effective Date		06/01/2018	06/01/2018	06/01/2018										
Exceedance Key		**Bold**	Underline	Reference Only										
General Parameters														
Moisture	%				27.6	35.3	20.3	24.5	24.5	31.6	26.7	29.4	23.3	28.1
Metals														
Mercury	mg/kg	3.13	3.13		0.023 j	0.026 j	0.022 j	0.020 j	0.026 j	0.021 j	0.023 j	0.021 j	0.10	0.017 j
Arsenic	mg/kg	**3**	0.677	8	**3.1**	**3.8**	**3.0**	**3.3**	**3.5**	2.8	**3.0**	**3.0**	**5.1 j**	**3.4**
Barium	mg/kg	100000	15300	364	245	193	145	150	174	176	191	160	287	173
Cadmium	mg/kg	985	71.1	1	--	--	--	--	--	0.11 j	--	0.097 j	0.56 j	--
Chromium	mg/kg	100000 CR3	100000 CR3	44	49.6	42.9	37.0	39.5	41.7	42.6	48.6	39.4	1850	42.0
Lead	mg/kg	800	400	52	10.5	9.5	7.6	8.1	9.0	7.8	9.1	7.7	88.2	8.4
Selenium	mg/kg	5840	391		0.56 j	--	--	--	--	--	--	--	--	--
Silver	mg/kg	5840	391		--	--	--	--	--	--	--	--	1.1 j	--
Semivolatile Organic Compounds														
Acenaphthene	ug/kg	45200000	3590000		--	--	--	--	--	--	--	--	6.9	--
Acenaphthylene	ug/kg				--	--	--	--	--	--	--	--	3.4	--
Anthracene	ug/kg	100000000	17900000		--	--	--	--	--	--	--	--	11.0	--
Benz(a)anthracene	ug/kg	20800	1140		--	--	--	--	--	--	--	--	77.8	--
Benzo(a)pyrene	ug/kg	2110	115		--	--	--	--	--	1.2 j	--	--	128	--
Benzo(b)fluoranthene	ug/kg	21100	1150		1.1 j	--	--	--	--	2.2	--	--	162	--
Benzo(g,h,i)perylene	ug/kg				--	--	--	--	--	2.3 j	--	--	116	--
Benzo(k)fluoranthene	ug/kg	211000	11500		--	--	--	--	--	2.2 j	--	--	55.7	--
Chrysene	ug/kg	2110000	115000		--	--	--	--	--	--	--	--	98.1	--
Dibenz(a,h)anthracene	ug/kg	2110	115		--	--	--	--	--	2.2 j	--	--	32.5	--
Fluoranthene	ug/kg	30100000	2390000		1.8 j	--	--	--	--	1.9 j	--	--	90.4	--
Fluorene	ug/kg	30100000	2390000		--	--	--	--	--	--	--	--	2.5	--
Indeno(1,2,3-cd)pyrene	ug/kg	21100	1150		--	--	--	--	--	2.2 j	--	--	94.4	--
Naphthalene	ug/kg	24100	5520		--	--	--	--	--	--	--	--	4.3	--
Phenanthrene	ug/kg				--	--	--	--	--	--	--	--	39.1	--
Pyrene	ug/kg	22600000	1790000		--	--	--	--	--	--	--	--	75.2	--
Volatile Organic Compounds **														
Toluene	ug/kg	818000	818000		--	--	--	--	--	--	--	--	38.8 j	--
Barr Calculated Comparison - Non-Industrial														
Exceedance Count	no unit	**0**	0		0	0	0	0	0	0	0	0	**1**	0

Note

** Non-detect VOC compounds reported on a wet weight basis per WIDNR requirements.

Table 2
Soil Analytical Data Summary
Husky Energy Property- Future Substation Site
Superior, WI

				Location	**SB-1**	**SB-1**	**SB-2**	**SB-2**	**SB-3**	**SB-3**	**SB-4**	**SB-4**	**SB-5**	**SB-5**
				Date	**6/21/2018**	**6/21/2018**	**6/21/2018**	**6/21/2018**	**6/21/2018**	**6/21/2018**	**6/22/2018**	**6/22/2018**	**6/22/2018**	**6/22/2018**
				Depth	**2 - 3 ft**	**12 - 13 ft**	**0 - 1 ft**	**6 - 7 ft**	**0 - 2 ft**	**8 - 9 ft**	**0 - 2 ft**	**6 - 7 ft**	**0 - 1 ft**	**8 - 9 ft**
Parameter	Units	Wisconsin Not to Exceed Industrial RCLs	Wisconsin Not to Exceed Non-Industrial RCLs	WDNR Background Threshold Values										
Effective Date		06/01/2018	06/01/2018	06/01/2018										
Exceedance Key		**Bold**	Underline	Reference Only										
General Parameters														
Moisture	%				27.6	35.3	20.3	24.5	24.5	31.6	26.7	29.4	23.3	28.1
Metals														
Mercury	mg/kg	3.13	3.13		0.023 j	0.026 j	0.022 j	0.020 j	0.026 j	0.021 j	0.023 j	0.021 j	0.10	0.017 j
Arsenic	mg/kg	**3**	0.677	8	**3.1**	**3.8**	**3.0**	**3.3**	**3.5**	2.8	**3.0**	**3.0**	**5.1 j**	**3.4**
Barium	mg/kg	100000	15300	364	245	193	145	150	174	176	191	160	287	173
Cadmium	mg/kg	985	71.1	1	< 0.075	< 0.082	< 0.065	< 0.070	< 0.069	0.11 j	< 0.071	0.097 j	0.56 j	< 0.073
Chromium	mg/kg	100000 CR3	100000 CR3	44	49.6	42.9	37.0	39.5	41.7	42.6	48.6	39.4	1850	42.0
Lead	mg/kg	800	400	52	10.5	9.5	7.6	8.1	9.0	7.8	9.1	7.7	88.2	8.4
Selenium	mg/kg	5840	391		0.56 j*	< 0.61	< 0.49	< 0.52	< 0.51	< 0.58	< 0.53	< 0.56	< 5.2	< 0.54
Silver	mg/kg	5840	391		< 0.11	< 0.12	< 0.098	< 0.11	< 0.10	< 0.12	< 0.11	< 0.11	1.1 j	< 0.11
Semivolatile Organic Compounds														
Acenaphthene	ug/kg	45200000	3590000		< 0.56	< 0.63	< 0.51	< 0.54	< 0.54	< 0.60	< 0.56	< 0.58	6.9	< 0.57
Acenaphthylene	ug/kg				< 0.68	< 0.76	< 0.62	< 0.66	< 0.65	< 0.72	< 0.67	< 0.70	3.4	< 0.69
Anthracene	ug/kg	100000000	17900000		< 0.65	< 0.72	< 0.59	< 0.62	< 0.62	< 0.68	< 0.64	< 0.66	11.0	< 0.65
Benz(a)anthracene	ug/kg	20800	1140		< 1.5	< 1.7	< 1.4	< 1.4	< 1.4	< 1.6	< 1.5	< 1.5	77.8	< 1.5
Benzo(a)pyrene	ug/kg	2110	115		< 0.95	< 1.1	< 0.86	< 0.91	< 0.91	1.2 j	< 0.94	< 0.97	128	< 0.95
Benzo(b)fluoranthene	ug/kg	21100	1150		1.1 j	< 0.57	< 0.47	< 0.49	< 0.49	2.2	< 0.51	< 0.53	162	< 0.52
Benzo(g,h,i)perylene	ug/kg				< 0.87	< 0.97	< 0.79	< 0.84	< 0.83	2.3 j	< 0.86	< 0.90	116	< 0.88
Benzo(k)fluoranthene	ug/kg	211000	11500		< 1.2	< 1.3	< 1.1	< 1.1	< 1.1	2.2 j	< 1.2	< 1.2	55.7	< 1.2
Chrysene	ug/kg	2110000	115000		< 1.9	< 2.1	< 1.7	< 1.8	< 1.8	< 2.0	< 1.9	< 1.9	98.1	< 1.9
Dibenz(a,h)anthracene	ug/kg	2110	115		< 0.64	< 0.71	< 0.58	< 0.61	< 0.61	2.2 j	< 0.63	< 0.65	32.5	< 0.64
Fluoranthene	ug/kg	30100000	2390000		1.8 j	< 0.66	< 0.54	< 0.57	< 0.56	1.9 j	< 0.58	< 0.61	90.4	< 0.59
Fluorene	ug/kg	30100000	2390000		< 0.43	< 0.48	< 0.39	< 0.41	< 0.41	< 0.46	< 0.43	< 0.44	2.5	< 0.43
Indeno(1,2,3-cd)pyrene	ug/kg	21100	1150		< 0.93	< 1.0	< 0.84	< 0.89	< 0.88	2.2 j	< 0.91	< 0.95	94.4	< 0.93
Naphthalene	ug/kg	24100	5520		< 1.1	< 1.2	< 0.97	< 1.0	< 1.0	< 1.1	< 1.1	< 1.1	4.3	< 1.1
Phenanthrene	ug/kg				< 2.7	< 3.0	< 2.4	< 2.5	< 2.5	< 2.8	< 2.6	< 2.7	39.1	< 2.7
Pyrene	ug/kg	22600000	1790000		< 2.1	< 2.4	< 1.9	< 2.0	< 2.0	< 2.2	< 2.1	< 2.2	75.2	< 2.1

Table 2
Soil Analytical Data Summary
Husky Energy Property- Future Substation Site
Superior, WI

				Location	SB-1	SB-1	SB-2	SB-2	SB-3	SB-3	SB-4	SB-4	SB-5	SB-5
				Date	6/21/2018	6/21/2018	6/21/2018	6/21/2018	6/21/2018	6/21/2018	6/22/2018	6/22/2018	6/22/2018	6/22/2018
				Depth	2 - 3 ft	12 - 13 ft	0 - 1 ft	6 - 7 ft	0 - 2 ft	8 - 9 ft	0 - 2 ft	6 - 7 ft	0 - 1 ft	8 - 9 ft
Parameter	Units	Wisconsin Not to Exceed Industrial RCLs	Wisconsin Not to Exceed Non-Industrial RCLs	WDNR Background Threshold Values										
Effective Date		06/01/2018	06/01/2018	06/01/2018										
Exceedance Key		**Bold**	Underline	Reference Only										
Volatile Organic Compounds **														
1,1,1-Trichloroethane	ug/kg	640000	640000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,1,2,2-Tetrachloroethane	ug/kg	3600	810		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,1,2-Trichloroethane	ug/kg	7010	1590		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,1-Dichloroethane	ug/kg	22200	5060		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,1-Dichloroethylene	ug/kg	1190000	320000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,2-Dichloroethane	ug/kg	2870	652		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,2-Dichloroethylene, cis	ug/kg	2340000	156000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,2-Dichloroethylene, trans	ug/kg	1850000	1560000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,2-Dichloropropane	ug/kg	15000	3400		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,3-Dichloropropene, cis	ug/kg	1210000	1210000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
1,3-Dichloropropene, trans	ug/kg	1510000	1510000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
2-Hexanone	ug/kg	1760000	237000		< 52.0	< 52.0	< 52.0	< 52.0	< 52.0	< 52.0	< 52.0	< 52.0	< 52.0	< 52.0
Acetone	ug/kg	100000000	63400000		< 77.8	< 77.8	< 77.8	< 77.8	< 77.8	< 77.8	< 77.8	< 77.8	< 77.8	< 77.8
Benzene	ug/kg	7070	1600		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Bromodichloromethane	ug/kg	1830	418		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Bromoform	ug/kg	113000	25400		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Bromomethane	ug/kg	43000	9600		< 69.9	< 69.9	< 69.9	< 69.9	< 69.9	< 69.9	< 69.9	< 69.9	< 69.9	< 69.9
Carbon disulfide	ug/kg	738000	738000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Carbon tetrachloride	ug/kg	4030	916		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Chlorobenzene	ug/kg	761000	370000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Chlorodibromomethane	ug/kg	38900	8280		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Chloroethane	ug/kg	2120000	2120000		< 67.0	< 67.0	< 67.0	< 67.0	< 67.0	< 67.0	< 67.0	< 67.0	< 67.0	< 67.0
Chloroform	ug/kg	1980	454		< 46.4	< 46.4	< 46.4	< 46.4	< 46.4	< 46.4	< 46.4	< 46.4	< 46.4	< 46.4
Chloromethane	ug/kg	669000	159000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Ethyl benzene	ug/kg	35400	8020		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Methyl ethyl ketone (2-butanone)	ug/kg	28400000	28400000		< 107	< 107	< 107	< 107	< 107	< 107	< 107	< 107	< 107	< 107
Methyl isobutyl ketone (MIBK)	ug/kg	3360000	3360000		< 41.1	< 41.1	< 41.1	< 41.1	< 41.1	< 41.1	< 41.1	< 41.1	< 41.1	< 41.1
Methyl tertiary butyl ether (MTBE)	ug/kg	282000	63800		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Methylene chloride	ug/kg	1150000	61800		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Styrene	ug/kg	867000	867000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Tetrachloroethylene	ug/kg	145000	33000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Toluene	ug/kg	818000	818000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	38.8 j	< 25.0
Trichloroethylene (TCE)	ug/kg	8410	1300		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Vinyl chloride	ug/kg	2080	67		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Xylene, m & p	ug/kg	260000 XYL	260000 XYL		< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Xylene, o	ug/kg	434000	434000		< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Xylene, total (Barr Calculation)	ug/kg	260000	260000		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barr Calculated Comparison - Industrial														
Exceedance Count	no unit	0	0		0	0	0	0	0	0	0	0	0	0
Hazard Index	no unit	≤ 1.0	≤ 1.0		0.0004	0.0004	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.1124	0.0011
Cumulative Cancer Risk	no unit	≤ 1E-0.5	≤ 1E-0.5		5.2E-11	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-09	0.0E+00	0.0E+00	9.2E-08	0.0E+00
Barr Calculated Comparison - Non-Industrial														
Exceedance Count	no unit	**0**	0		0	0	0	0	0	0	0	0	**1**	0
Hazard Index	no unit	≤ 1.0	≤ 1.0		0.0029	0.0017	0.0014	0.0013	0.0017	0.0014	0.0015	0.0013	0.2342	0.0003
Cumulative Cancer Risk	no unit	≤ 1E-0.5	≤ 1E-0.5		9.6E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E-08	0.0E+00	0.0E+00	1.7E-06	0.0E+00

Note

** Non-detect VOC compounds reported on a wet weight basis per WIDNR requirements.

Table 3
Groundwater Analytical Data Summary
Husky Energy Property- Future Substation Site
Superior, WI

			Location	**SB-3**
			Date	**6/22/2018**
			Depth	**14.5 - 19.5 ft**
			Sample Type	**N**
Parameter	Units	Wisconsin Groundwater Public Health Enforcement Standards	Wisconsin Groundwater Preventive Action Limits	
Effective Date		07/01/2015	07/01/2015	
Exceedance Key		No Exceed	No Exceed	
Semivolatile Organic Compounds				
Acenaphthene	ug/l			< 0.0043
Acenaphthylene	ug/l			< 0.0063
Anthracene	ug/l	3000	600	< 0.0083
Benz(a)anthracene	ug/l			< 0.0053
Benzo(a)pyrene	ug/l	0.2	0.02	< 0.0054
Benzo(b)fluoranthene	ug/l	0.2	0.02	< 0.017
Benzo(g,h,i)perylene	ug/l			< 0.013
Benzo(k)fluoranthene	ug/l			< 0.014
Chrysene	ug/l	0.2	0.02	< 0.012
Dibenz(a,h)anthracene	ug/l			< 0.012
Fluoranthene	ug/l	400	80	< 0.025
Fluorene	ug/l	400	80	< 0.0080
Indeno(1,2,3-cd)pyrene	ug/l			< 0.018
Naphthalene	ug/l	100	10	< 0.0092
Phenanthrene	ug/l			< 0.014
Pyrene	ug/l	250	50	< 0.020
Volatile Organic Compounds				
1,1,1,2-Tetrachloroethane	ug/l	70	7	< 0.20
1,1,1-Trichloroethane	ug/l	200	40	< 0.14
1,1,2,2-Tetrachloroethane	ug/l	0.2	0.02	< 0.17
1,1,2-Trichloroethane	ug/l	5	0.5	< 0.18
1,1-Dichloroethane	ug/l	850	85	< 0.17
1,1-Dichloroethylene	ug/l	7	0.7	< 0.16
1,1-Dichloropropene	ug/l			< 0.20
1,2,3-Trichlorobenzene	ug/l			< 0.21
1,2,3-Trichloropropane	ug/l	60	12	< 0.26
1,2,4-Trichlorobenzene	ug/l	70	14	< 0.20
1,2,4-Trimethylbenzene	ug/l	480 c	96 c	< 0.20
1,2-Dibromo-3-chloropropane (DBCP)	ug/l	0.2	0.02	< 1.7
1,2-Dibromoethane (EDB)	ug/l	0.05	0.005	< 0.24
1,2-Dichlorobenzene	ug/l	600	60	< 0.14
1,2-Dichloroethane	ug/l	5	0.5	< 0.22
1,2-Dichloroethylene, cis	ug/l	70	7	< 0.15
1,2-Dichloroethylene, trans	ug/l	100	20	< 0.12
1,2-Dichloropropane	ug/l	5	0.5	< 0.16
1,3,5-Trimethylbenzene	ug/l	480 c	96 c	< 0.12
1,3-Dichlorobenzene	ug/l	600	120	< 0.16
1,3-Dichloropropane	ug/l			< 0.070
1,3-Dichloropropene, cis	ug/l	0.4	0.04	< 0.20
1,3-Dichloropropene, trans	ug/l	0.4	0.04	< 0.18
1,4-Dichlorobenzene	ug/l	75	15	< 0.17
2,2-Dichloropropane	ug/l			< 0.17
Acetone	ug/l	9000	1800	< 9.2
Allyl chloride	ug/l			< 0.29
Benzene	ug/l	5	0.5	< 0.10
Bromobenzene	ug/l			< 0.21
Bromochloromethane	ug/l			< 0.27
Bromodichloromethane	ug/l	0.6	0.06	< 0.22
Bromoform	ug/l	4.4	0.44	< 0.80

Table 3
Groundwater Analytical Data Summary
Husky Energy Property- Future Substation Site
Superior, WI

			Location	SB-3
			Date	6/22/2018
			Depth	14.5 - 19.5 ft
			Sample Type	N
Parameter	Units	Wisconsin Groundwater Public Health Enforcement Standards	Wisconsin Groundwater Preventive Action Limits	
Effective Date		07/01/2015	07/01/2015	
Exceedance Key		No Exceed	No Exceed	
Bromomethane	ug/l	10	1	< 1.8
Butylbenzene	ug/l			< 0.24
Butylbenzene, sec	ug/l			< 0.15
Butylbenzene, tert	ug/l			< 0.15
Carbon tetrachloride	ug/l	5	0.5	< 0.19
Chlorobenzene	ug/l	100	20	< 0.17
Chlorodibromomethane	ug/l	60	6	< 0.12
Chloroethane	ug/l	400	80	< 0.49
Chloroform	ug/l	6	0.6	< 0.45
Chloromethane	ug/l	30	3	< 0.16
Chlorotoluene, o	ug/l			< 0.16
Chlorotoluene, p	ug/l			< 0.13
Cumene (isopropyl benzene)	ug/l			< 0.18
Cymene p- (toluene isopropyl p-)	ug/l			< 0.15
Dibromomethane (methylene bromide)	ug/l			< 0.16
Dichlorodifluoromethane (Freon-12)	ug/l	1000	200	< 0.23
Dichlorofluoromethane (Freon-21)	ug/l	7000		< 0.14
Ethyl benzene	ug/l	700	140	< 0.14
Ethyl ether	ug/l	1000	100	< 0.095
Hexachlorobutadiene	ug/l			< 0.31
Methyl ethyl ketone (2-butanone)	ug/l	4000	800	< 0.99
Methyl isobutyl ketone (MIBK)	ug/l	500	50	< 0.42
Methyl tertiary butyl ether (MTBE)	ug/l	60	12	< 0.16
Methylene chloride	ug/l	5	0.5	< 0.98
Naphthalene	ug/l	100	10	< 0.48
Propylbenzene	ug/l			< 0.10
Styrene	ug/l	100	10	< 0.19
Tetrachloroethylene	ug/l	5	0.5	< 0.17
Tetrahydrofuran	ug/l	50	10	< 2.2
Toluene	ug/l	800	160	2.1
Trichloroethylene (TCE)	ug/l	5	0.5	< 0.15
Trichlorofluoromethane (Freon-11)	ug/l	3490	698	< 0.23
Trichlorotrifluoroethane (Freon 113)	ug/l			< 0.22
Vinyl chloride	ug/l	0.2	0.02	< 0.092
Xylene, total	ug/l	2000 (4)	400 (4)	< 0.31

Data Footnotes and Qualifiers

Barr Standard Footnotes and Qualifiers

--	Not analyzed/Not available.
j	Estimated detected value. The reported value is less than the stated laboratory quantitation limit but greater than the laboratory method detection limit.
*	Estimated value, QA/QC criteria not met.
**	Non-detect VOC compounds reported on a wet weight basis per WIDNR requirements.

Wisconsin RCLs

CR3	Value represents the criteria for Chromium(III)
XYL	Value represents the criteria for Xylene, total (m-,o-,p- combined).

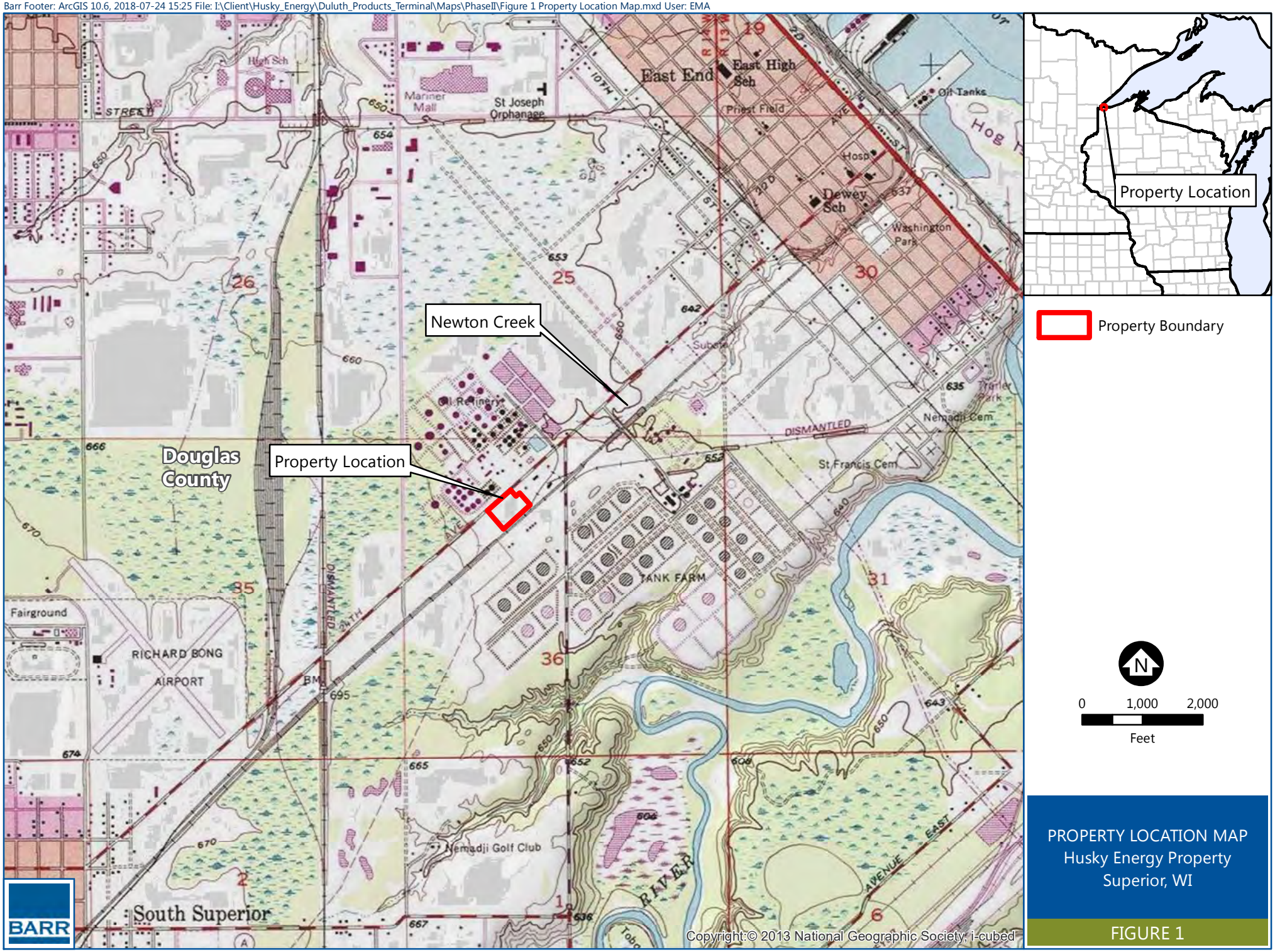
Wisconsin Groundwater Public Health Enforcement Standards

(4)	Xylene includes meta-, ortho-, and para-xylene combined.
c	Value represents the criteria for Trimethylbenzes (1,2,4- and 1,3,5- combined).

Wisconsin Preventive Action Limits

(4)	Xylene includes meta-, ortho-, and para-xylene combined.
c	Value represents the criteria for Trimethylbenzes (1,2,4- and 1,3,5- combined).

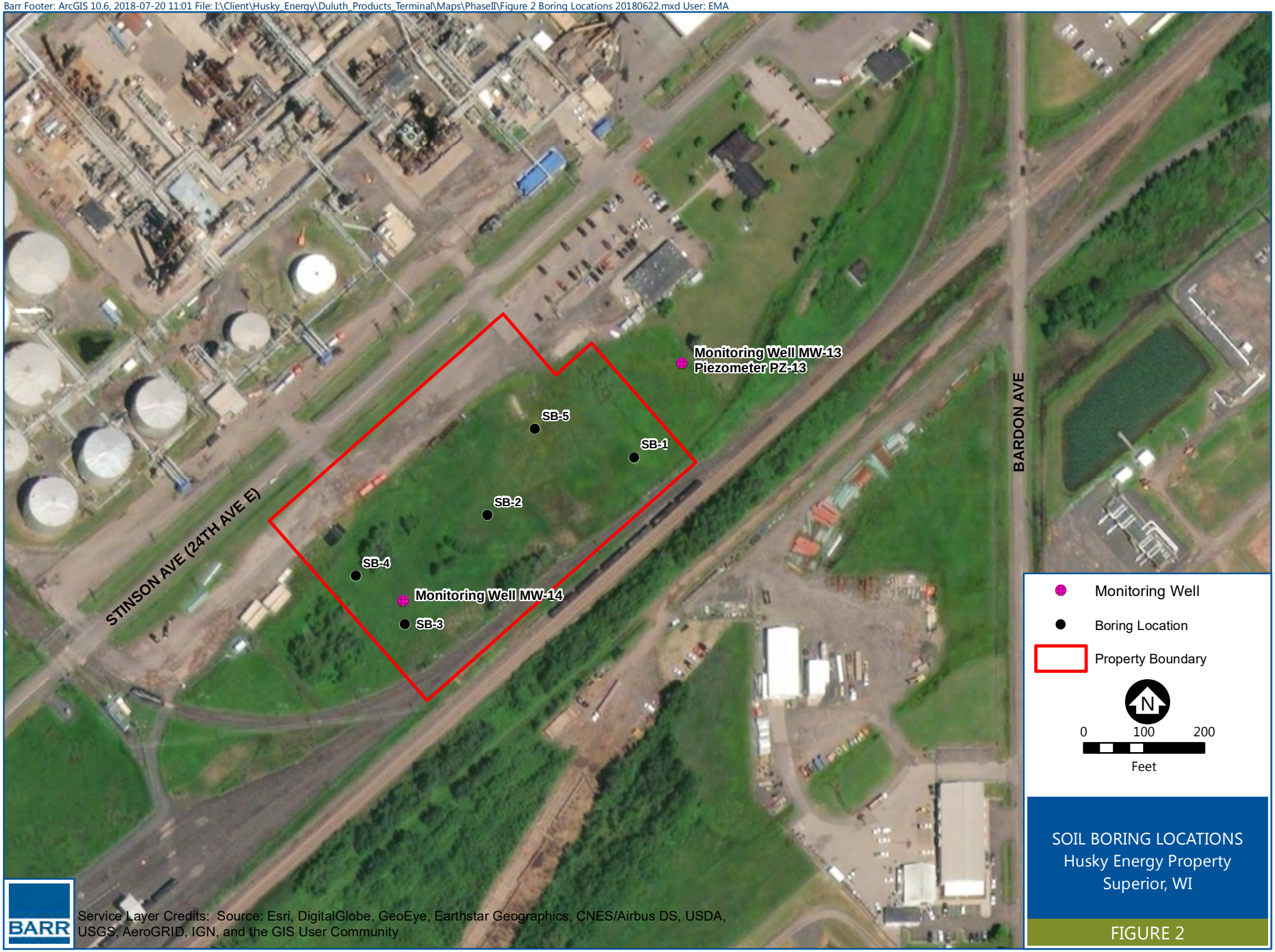
Figures



PROPERTY LOCATION MAP
Husky Energy Property
Superior, WI

FIGURE 1

Barr Footer: ArcGIS 10.6, 2018-07-20 11:01 File: I:\Client\Husky_Energy\Duluth_Products_Terminal\Maps\PhaseII\Figure 2 Boring Locations 20180622.mxd User: EMA



SOIL BORING LOCATIONS
Husky Energy Property
Superior, WI

FIGURE 2

BARR

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Attachments

Attachment A

Standard Operating Procedures

Collection of Groundwater Samples
Collection of Soil Samples
Decontamination of Sampling Equipment
Field Screening of Soil Samples

Standard Operating Procedure

Collection of Groundwater Samples from a Temporary or Permanent Monitoring Well (Includes Well Purging and Stabilization)

Revision 1

April 5, 2016

Approved By:

Kim Johannessen		04/05/16
Print Technical Reviewer	Signature	Date

Terri Olson		04/05/16
Print QA Manager	Signature	Date

Review of the SOP has been performed and the SOP still reflects current practice.

Initials:	Date:
Initials:	Date:
Initials:	Date:
Initials:	Date:

Collection of Groundwater Samples from a Monitoring Well (Includes Well Purging and Stabilization)

1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to describe the methods used for monitoring well purging, stabilization, and sampling (excluding residential/water supply systems). The SOP also provides details regarding the calculation of purge volumes and measurement of groundwater stabilization criteria and identifies the common container, preservative, and holding times for typical groundwater sample analyses.

The recommended procedures in this SOP should be followed unless conditions make it impractical or inappropriate to do so. Modifications should be noted in the applicable documentation and communicated to appropriate personnel. Significant changes may result in a revision or newly created SOP.

2.0 Limitations

- Sample collection methods can vary by project. If not specified in the project scope of work and/or documentation (e.g., Work Plan, Sampling Analysis Plan (SAP), or Quality Assurance Project Plan (QAPP)), consult with the appropriate regulatory agency for guidance.
- Collection of groundwater samples from residential/water supply systems are not discussed within this SOP.
- Dedicated sampling equipment and/or decontamination of sampling equipment is required to prevent cross-contamination.
- Low-flow sampling methods are not discussed within this SOP.
- Sample collection using 'clean hands/dirty hands' methods is not discussed within this SOP.

3.0 Responsibilities

Equipment Technicians are responsible to maintain equipment in working order and aid in troubleshooting equipment issues.

The role of the Project Health and Safety Team Leader is to oversee all aspects of on-site safety activities.

The Project Manager, in conjunction with the client, develops the site specific scope of work (e.g., Work Plan, SAP, etc.).

Experienced Field Technician(s) are responsible for the measurement of well pumping rates, calculation of well purge volume, field screening procedures, field equipment and calibration, proper sample identification, collection of samples, quality control procedures, and documentation.

Project staff are responsible for ordering sample containers prior to the sampling event.

4.0 Safety

Barr staff is responsible for conducting all aspects of the job safely. When applicable, refer to the appropriate Project Health and Safety Plan (PHASP) to understand the hazards associated with suspected

contamination, symptoms of exposure, methods to minimize exposure, personal protection equipment (PPE), and personal air monitoring required when using this SOP. Minimum protection of two pair of chemical resistant gloves (e.g., nitrile) and safety glasses with side shields should be worn to prevent sample contact with the skin and eyes. When sampling waters contaminated with corrosive materials, emergency eye flushing facilities should be available.

5.0 Equipment, Reagents, and Supplies

- Water quality meter (e.g., YSI, or equivalent)
- Polyethylene bailer and rope
- Sample tubing and fittings
- Turbidimeter (optional)
- Coolers
- Ice
- Chemical resistant gloves (e.g., nitrile)
- Custody seal, if applicable
- Calculator
- Locks/keys
- Pump (peristaltic or submersible), power source, and appropriate drive tubing
- Cord reel (optional)
- Graduated measuring container
- Plastic bags
- Waterproof ink pen or pencil
- Clock or stopwatch
- Sample containers (method specific)
- Sample labels
- Chain-of-custody (COC)

6.0 Procedure

This section describes the procedure(s) for calibrating field equipment, measuring pumping rates, calculating purge volumes, well purging, measuring well stabilization, and the sampling, handling, and delivery of groundwater samples. Best practices include setting up the purging, stabilization, and sampling equipment in an upwind direction from any potential source of contamination.

This SOP describes the groundwater collection from a bore hole, temporary well, or permanent monitoring well. Typically, a direct-push (Geoprobe® or equivalent) will be used to create the bore hole or temporary well by advancing the direct-push sampler to the desired sampling interval (sampling depth). When the sampling depth is reached, small diameter extension rods are inserted through the steel probe rods to hold the groundwater sampler screen in place while the rods and screen sheath are retracted, exposing the screen. The groundwater sampler screen can typically be exposed up to 41 inches, but can be exposed a shorter length depending on project requirements. Alternately, a small diameter PVC well screen and riser pipe may be installed in the bore hole for use as a temporary well. Polyethylene (or project specified) tubing is placed into the bore hole or temporary well, and a peristaltic pump (or equivalent) or project specified pump is used to draw water samples to the surface for collection. Well stabilization is not always necessary for temporary well s but if required by the project, see Section 6.2.6 of this SOP.

After each borehole or temporary well is constructed, the probe rods are decontaminated by the drilling contractor in accordance with project requirements. The polyethylene (or project specified) tubing is discarded after each sample is collected and new tubing is used for the collection of the next sample. The

borehole and temporary well locations will be permanently sealed following applicable state and local regulations.

6.1 Calibration

The water quality meter and turbidimeter will be calibrated as per the applicable Barr SOP. The meters will undergo calibration checks, at a minimum, before and after sampling. The calibration check will be documented on a calibration form (as appropriate) and/or in the field notebook. Any significant issues found during the calibration check will be noted in the field notebook and the Equipment Technicians will be notified.

6.2 Purging/Well Stabilization/Sampling

Prior to sampling, purging of the monitoring well is performed to remove stagnant water from within the well and to stabilize the well to allow for representative groundwater sample collection. The term 'purge volume' refers to the amount of water removed from a well before groundwater sample collection occurs.

Purging well volumes and stabilizing to remove stagnant water from a temporary well may not be necessary due to the short time frame between well installation and sampling. Purging and well stabilization procedure for temporary wells may vary by project or by well. Recommended practice is to purge a temporary well until the water clears, if possible, prior to sampling; however, purging prior to sampling may not be possible at all if water is limited (as it might be in a perched water zone), or water recharge is slow (as it would be in a clayey or silty water bearing zone).

6.2.1 Purge Volume

The volume of standing water in the well is calculated to determine the purge volume that needs to be removed from the well. The water level must be measured in order to determine the volume (see applicable Barr SOP). Calculation of the purge volume is addressed in Section 6.3, Data Reduction/Calculation of this SOP and Table 1. If a well is pumped dry, this constitutes an adequate purge and the well can be sampled following recovery. Refer to project documentation for volumes required to be purged.

6.2.2 Bailer Purging

A bailer can be used for slowly recovering wells with minimal water volume and a depth to groundwater greater than 25 feet. A new disposable polyethylene bailer with a check valve can be attached to a cord reel or a downrigger and support assembly. Polyethylene bailers can be hauled using stainless steel wire or new nylon line (rope).

- Put on gloves for skin protection and to prevent sample contamination.
- Secure the bailer and lower slowly into the water column until the bailer is submerged. Avoid rapid movements of the bailer to minimize turbidity. A cord reel can be used to aid in the lowering of the bailer.
- Raise the bailer and empty the water collected from the bailer into a graduated measuring container.
- Sampling may begin once desired volume is purged and the well has stabilized (see Section 6.2.6, Well Stabilization of this SOP).

6.2.3 Peristaltic Pump Purging

A peristaltic pump is used when the water level is within suction lift (e.g., within about 25 feet of the ground surface but may be less at higher altitudes). It usually is a low-volume suction pump with low pumping rates suitable for sampling shallow, small-diameter wells.

- Put on gloves for skin protection and to prevent sample contamination.
- Lower tubing into the well water (1 to 2 feet below surface) and cut to the desired length.
- Connect the well tubing to the drive tubing entering the pump.
- Connect the drive tubing exiting the pump to the short section of tubing entering the flow-through cell or graduated measuring container.
- Turn on pump and set the speed at the desired rate of flow.
- Sampling may begin once desired volume is purged and the well has stabilized (see Section 6.2.6, Well Stabilization of this SOP).

6.2.4 Submersible Pump Purging

A submersible pump is used when the water level is greater than the suction lift associated with a peristaltic pump. It is commonly used in conjunction with a control box to achieve the desired pumping rate (low to high). Variable rate submersible pumps are available to fit inside 2 inch or larger wells.

6.2.4.1 1.5-inch Submersible Pump

This is a type of submersible pump that can be used in 2-inch or larger diameter wells. It can purge water from depths down to 200 feet or greater, depending on pump model and manufacturer.

- Put on gloves for skin protection and to prevent sample contamination.
- Attach appropriate diameter tubing to pump intake, lower pump, and secure at desired depth.
- Cut off tubing, allowing additional tubing length for discharge.
- Plug the pump into the controller. Pump will begin pumping using the variable speed controller. There are a variety of speed controllers available, typically designed for a specific pump.
- Attach the controller to the power supply.
- Turn on the controller and dial the speed control to the desired flow rate. The controller can slow the purge rate down to the optimum rate.

  Note: If the submersible pump is not running, turn off the pump and then disconnect from the power supply. Check connections and try again.
- Attach the flow-through cell for the water quality meter.

  Note: If water is considerably turbid after initial pump start-up, the flow-through cell may be connected after purge water has cleared visually.
- Sampling may begin once desired volume is purged and the well has stabilized (see Section 6.2.6, Well Stabilization of this SOP).

6.2.4.2 3 or 4-inch Submersible Pump

This pump may be used to purge water samples from any depth.

- Put on gloves for skin protection and to prevent sample contamination.

- Attach purging hose to the pipe connected on the top of the submersible pump.
- Lower the submersible pump slowly into the well until it is completely submersed into the water and secure at desired depth.
- Connect the pump to the generator with an extension cord.
- Turn switch to start the generator, put choke on, pull recoil rope, and let generator idle until it is running smoothly
- Turn on power (which is located on the front of the generator).

  Note: Submersible pump should be running; if not, turn off the generator and check connections.
- Adjust flow rate to desired rate with the valve and measure the flow rate with the graduated measuring container.
- Attach the flow-through cell for the water quality meter.

  Note: If water is considerably turbid after initial pump start-up, the flow-through cell may be connected after purge water has cleared visually.
- Sampling may begin once desired volume is purged and the well has stabilized (see Section 6.2.6, Well Stabilization of this SOP).

6.2.5 Well Purging with In-place Plumbing

In-place plumbing consists of dedicated, submersible pumps that are permanently installed in a well.

- Put on gloves for skin protection and to prevent sample contamination.
- Turn switch to start the generator, put choke on, pull recoil rope, and let generator idle until it is running smooth.
- Connect the pump to the generator with an extension cord.
- Connect the pipe, elbow, and valve to the discharge pipe of the submersible pump (located at the top of the well) and turn on the generator.

  Note: If the pump does not start, check the connection from the generator to the pump.
- When water flows from discharge of the pump, adjust the flow according to desired flow rate and measure the flow rate with the graduated measuring container.
- Attach the flow-through cell for the water quality meter.

  Note: If water is considerably turbid after initial pump start-up, the flow-through cell may be connected after purge water has cleared visually.
- Sampling may begin once desired volume is purged and the well has stabilized (see Section 6.2.6, Well Stabilization of this SOP).

  Note: Each dedicated pump has its own pipe, elbow, and valve. These pieces are left at each well.

6.2.6 Well Stabilization

Well stabilization is typically conducted to help verify that the groundwater sample is representative of aquifer conditions. A well is considered 'stabilized' after the well purge volume has been met and the groundwater (or well) stabilization parameter measurements are within acceptable limits for three consecutive readings. Well stabilization parameters may vary by project or regulatory agency but at a minimum typically include pH, temperature, and specific conductance (temperature corrected electrical conductivity). Dissolved oxygen (DO) and oxidation-reduction potential (ORP) may also be used as stabilization parameters.

The procedure to stabilize a well includes recording well stabilization parameter measurements collected with the water quality meter at the beginning of the well purging process and after subsequently purged well volumes. A well volume is measured as the volume of water present inside a well screen and/or casing (i.e., from the base of the well to the water level measurement) and is defined in the footnotes of Table 1. Groundwater aliquots used for stabilization parameter measurements are typically collected by either directing the purge water discharge line through a flow-through cell or by pouring groundwater from a bailer into a container holding the water quality meter probe (depending on the purging method used).

Documentation of the well stabilization process typically includes recording pertinent information such as the pump type, pumping rate, volume pumped, and well stabilization measurements on the field log data sheets or field notebook. If only the minimum parameters are used for stabilization, the DO and ORP should still be measured and recorded as they may be needed to interpret other chemical parameter results. Turbidity is measured with a standalone turbidimeter but is typically not used as a stabilization parameter. A qualitative determination of turbidity may also be noted (e.g. clear, cloudy, very cloudy, etc.).

The well may be sampled after three consecutive measurements (typically one well volume per measurement), collected at the intervals described above, are within specific project criteria or the criteria presented in Section 7.2, Measurement Criteria of this SOP.

If field parameters do not stabilize after five well volumes have been purged, then the field technician will verify that the probes and related equipment are functioning properly and that operator error is not an issue. They will also re-evaluate whether or not water is being withdrawn from the appropriate depth to effectively evacuate the well. If all the checks produce no new insight, a decision will need to be made by the project team on whether to collect samples for laboratory analysis. When samples are collected, it will be clearly documented that stabilization was not achieved; at a minimum, this fact will be reported on the field log data sheets and in the Field Sampling Report.

If the well was purged dry, it shall be allowed to recharge and the samples should then be collected. If there is insufficient sample volume for the analyses being sampled, the project team will need to decide if sampling should be carried out or if a reduced prioritized list of analyses should be collected.

6.2.7 Sampling

The project team will determine the order for sampling the wells but general guidelines are below:

- Where water quality data are available, the least contaminated wells would be sampled first, proceeding to increasingly contaminated wells.
- Where the distribution of contaminants is not known, wells considered to be up gradient from likely sources of contamination would be sampled first and downgradient wells closest to the suspected contamination would be last.
- Make certain to keep records of the order in which wells were sampled.

Similar to purging, sampling requires the use of pumps or bailers. It may be appropriate to use a different device to sample than that which was used to purge. The most common example of this is the use of a pump to purge and a bailer to sample. There are several factors to take into consideration when choosing

a sampling device. The experience of the project team will be used to determine which is appropriate and care should be taken when reviewing the advantages or disadvantages of any one device.

To prevent the possible loss of some volatile organic compounds (VOCs), samples for volatile parameters should be collected first with as little agitation and disturbance as possible, then proceed in order towards the least volatile parameter as listed in Barr's 'Water Sampling Guidelines' form. The 40 mL vials used to collect the VOC samples should be checked for air bubbles. Air bubbles may be caused by insufficient meniscus when sealing the vial, degassing after sample collection or during sample shipment, or reaction between the sample and preservative (HCl). If air bubbles > 6 mm (pea-sized) are observed during sampling, discard the vial and recollect the sample using a new vial. If air bubbles are believed to be due to the sample reacting with the preservative, the sample should be collected in an unpreserved vial if possible.

Put on new sampling gloves at each sampling site to reduce the risk of sample cross-contamination and exposure to skin. Never reuse old gloves.

Prepare sampling containers by filling out the label, using an indelible permanent pen, with the following information at a minimum:

- Sample ID
- Date and time of sample collection
- Preservative
- Sample analysis (if required by the lab)

When filling the containers, do not insert the tubing into the containers and do not overfill preserved containers. When all samples are containerized, place the filled sample containers in a sampling cooler with ice, turn off any equipment, disassemble the sampling apparatus, dispose of all one-time use (disposable) equipment, and decontaminate reusable equipment per Barr's SOP 'Decontamination of Sampling Equipment'.

6.2.7.1 Bailer Sampling

After the well has been purged and stabilized, secure the bailer and slowly lower into the top of the water column making certain not to stir up the water with the bailer, which could result in volatizing the samples. Keep the bailer in the top portion of the water column when collecting the sample.

When the bailer is filled, slowly raise the bailer out of the well. A clean tarp may be used to cover the ground to minimize the contact of the rope with the ground. Fill containers in the order listed in Barr's 'Water Sampling Guidelines' form.

6.2.7.2 Peristaltic / Submersible Pump Sampling

After the well has been purged and stabilized, disconnect the tubing exiting the pump from the flow-through cell, if used and fill containers as listed in Barr's 'Water Sampling Guidelines' form.

6.2.7.3 Check Valve Sampling

Sampling temporary wells through tubing with a check valve may be conducted following a drilling subcontractor's procedure.

6.2.8 Preservation

Container volume, type, and preservative are important considerations in sample collection. Container volume must be adequate to meet laboratory requirements for quality control, split samples, or repeat analyses. The container type varies with the analysis required. Typically, the analytical laboratory will preserve the container before shipment. Preservation and shelf life vary; contact the laboratory to determine if an on-hand container is still useful. Barr's 'Water Sampling Guidelines' form lists the parameter, container type, container volume, and preservative for many of the most common parameters collected.

6.2.9 Handling

The samples will be bubble wrapped or bagged after collection, stored in a sample cooler, and packed on double bagged wet ice. Samples will be kept cold (≤ 6 °C, but not frozen), until receipt at the laboratory (where applicable).

Note: Samples may need to be stored indoors in winter to prevent freezing.

6.2.10 Shipment/Delivery

Once the cooler is packed to prevent breaking of bottles, the proper chain-of-custody (COC) documentation is signed and placed inside a plastic bag then added to the cooler.

All samples will be kept secured to prevent tampering. If sample coolers are left in a vehicle or field office for temporary storage, the area will be locked and secured.

Custody seals may be present, but at a minimum, the coolers must be taped shut to prevent the lid from opening during shipment.

The coolers must be delivered to the laboratory via hand or overnight delivery courier, if possible, in accordance with all Federal, State and Local transportation regulations and Barr's SOP 'Domestic Transport of Samples to the Laboratory'.

6.3 Data Reduction/Calculations

Table 1 provides the volume of water (per foot or meter of depth) based on the diameter of the casing or hole. The following are two examples of calculations used in Table 1:

Volume of Standing Water (V), cubic feet

$$V = (\pi)(r^2)(h)$$

Where: π = 3.1416

r = Well radius (ft)

h = Total well depth (ft) – depth to static water (ft) = Water column height (ft)

Note: For the table calculations, 'h' is equal to one foot.

Well Volume (WV), gallons

$$WV = (V)(7.48)$$

Where: V = Volume of standing water, cubic feet

7.48 = Cubic foot to US Gallons conversion factor

Calculate the volume of water to be purged using the equation below:

$$VP = (WV)(NWV)$$

Where: VP = Volume of water to be purged

WV = Well volume in gallons

NMV = Number of well volumes to be purged per project requirements

6.4 Disposal

Waste generated by this process will be disposed of in accordance with Federal, State and Local regulations and Barr's SOP 'Investigative Derived Waste'. Where reasonably feasible, technological changes have been implemented to minimize the potential for environmental pollution.

7.0 Quality Control and Quality Assurance (QA/QC)

The QC activities described below allow the self-verification of the quality and consistency of the work.

7.1 QA/QC Samples

QA/QC samples are defined in Barr's SOP 'Collection of Quality Control Samples'. The sampling frequency should be performed at the frequency noted in the project scope of work and/or documentation (e.g., Work Plan, SAP, or QAPP).

7.2 Well Stabilization Criteria

Well stabilization criteria to be used if there are no project specific criteria:

- pH ± 0.1 standard units
- Temperature ± 0.5 °C
- Specific conductance ± 5%
- Optional Criteria:
    - ORP ± 10 mV
    - Dissolved oxygen ± 10% (> 0.5 mg/L)

      Note: Three consecutive readings ≤ 0.5 mg/L can be considered stabilized.
    - Turbidity ± 10% (> 5 Nephelometric Turbidity Units (NTU))

      Note: Three consecutive readings ≤ 5 NTU can be considered stabilized.

8.0 Records

The field technician will document the pumping flow rate, well volume, time purged, volume purged, water level, total well depth and stabilization test measurements on the field log data sheet and/or field notebook. They will also document the type and number of bottles on the chain-of-custody record, as appropriate. The analysis for each container and the laboratory used will be documented on the chain-of-custody record. Refer to Barr's SOP 'Documentation on a Chain-of-Custody (COC)' for further information.

Examples of common field documentation are available in Barr's "Compendium of Field Documentation". Field documentation specific to this SOP are listed below:

- Chain-of-custody (COC)

- Sample label
- Custody seal (if applicable)
- Water Level Data Sheet
- Field Log Data Sheet
- Field Log Cover Sheet
- Field Sampling Report
- Water Sampling Guidelines (includes sampling order, container, preservation, and holding time)

The field documents and COCs are provided to a Barr Data Management Administrator for storage on the internal Barr network.

Additional records information can be found in Barr's "Records Management System Manual".

Other Barr SOP subjects referenced within this SOP: water level measurement, water quality meter, turbidimeter, collection of QC samples, decontamination of sampling equipment, and documentation on a COC.

9.0 References

Environmental Protection Agency. *Title 40 of the Code of Federal Regulations, Part 136.3*.

Environmental Protection Agency, EPA/540/P-91/007. 1999. *Compendium of ERT Groundwater Sampling Procedures*.

Minnesota Pollution Control Agency, Water Quality Division. 2006. *Sampling Procedures for Groundwater Monitoring Wells*.

Table 1

Volume of Water in Casing or Hole

Diameter of Casing or Hole (In)	Gallons per Foot of Depth (WV)	Cubic Feet per Foot of Depth (V)	Liters per Meter of Depth	Cubic Meters per Meter of Depth
1	0.041	0.0055	0.509	0.509×10^{-3}
1½	0.092	0.0123	1.142	1.142×10^{-3}
2	0.163	0.0218	2.024	2.024×10^{-3}
2½	0.255	0.0341	3.167	3.167×10^{-3}
3	0.367	0.0491	4.558	4.558×10^{-3}
3½	0.500	0.0668	6.209	6.209×10^{-3}
4	0.653	0.0873	8.110	8.110×10^{-3}
4½	0.826	0.1104	10.26	10.26×10^{-3}
5	1.020	0.1364	12.67	12.67×10^{-3}
5½	1.234	0.1650	15.33	15.33×10^{-3}
6	1.469	0.1963	18.24	18.24×10^{-3}
7	2.000	0.2673	24.84	24.84×10^{-3}
8	2.611	0.3491	32.43	32.43×10^{-3}
9	3.305	0.4418	41.04	42.04×10^{-3}
10	4.080	0.5454	50.67	50.67×10^{-3}
11	4.937	0.6600	61.31	61.31×10^{-3}
12	5.875	0.7854	72.96	72.96×10^{-3}
14	8.000	1.069	99.35	99.35×10^{-3}
16	10.44	1.396	129.65	129.65×10^{-3}
18	13.22	1.767	164.18	164.18×10^{-3}
20	16.32	2.182	202.68	202.68×10^{-3}
22	19.75	2.640	245.28	245.28×10^{-3}
24	23.50	3.142	291.85	291.85×10^{-3}
26	27.58	3.687	342.52	342.52×10^{-3}
28	32.00	4.276	397.41	397.41×10^{-3}
30	36.72	4.909	456.02	456.02×10^{-3}
32	41.78	5.585	518.87	518.87×10^{-3}
34	47.16	6.305	585.68	585.68×10^{-3}
36	52.88	7.069	656.72	656.72×10^{-3}

1 gallon = 3.7854 liters
1 liter = 0.26417 gallons
1 meter = 3.281 feet
1 gallon water weighs 8.33 lbs. = 3.785 kilograms
1 liter water weighs 1 kilogram = 2.205 lbs.
1 gallon per foot of depth = 12.419 liters per foot of depth
1 gallon per meter of depth = 12.419×10^{-3} cubic meters per meter of depth

Standard Operating Procedure

Collection of Soil Samples

Revision 8

February 23, 2016

Approved By:

Kevin McGilp		02/23/16
Print Technical Reviewer	Signature	Date

Terri Olson		02/23/16
Print QA Manager	Signature	Date

Review of the SOP has been performed and the SOP still reflects current practice.

Initials: _____ Date: _____

Initials: _____ Date: _____

Initials: _____ Date: _____

Initials: _____ Date: _____

Collection of Soil Samples

1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to describe the collection of a representative soil sample using a variety of methods (including compositing of discrete samples) and equipment depending on the depth and type of sample required. This procedure applies to the collection of soil samples for volatiles (VOC), semivolatiles (SVOC), metals, and inorganics analyses. It also identifies the container, preservative, and weight required for each analysis type.

The recommended procedures in this SOP should be followed unless conditions make it impractical or inappropriate to do so. Modifications should be noted in the applicable documentation and communicated to appropriate personnel. Significant changes may result in a revision or newly created SOP.

2.0 Limitations

- Sample collection methods can vary by project. If not specified in the project scope of work and/or documentation (e.g., Work Plan, Sampling Analysis Plan (SAP), or Quality Assurance Project Plan (QAPP)), consult with the appropriate regulatory agency for guidance.
- Inadequate homogenization of the samples, where applicable, can result in non-representative samples and results.
- Decontamination of sampling equipment is required to prevent cross-contamination.
- Contact the local utilities hotline prior to digging to have utilities identified at sampling locations.

3.0 Responsibilities

Equipment Technicians are responsible to maintain equipment in working order and aid in troubleshooting equipment issues.

The role of the Project Health and Safety Team Leader is to oversee all aspects of on-site safety activities.

The Project Manager, in conjunction with the client, develops the site specific scope of work (e.g., Work Plan, SAP, etc.).

Experienced Field Technicians are responsible for the proper sample identification, collection of samples, field screening procedures, field equipment and calibration, quality control procedures, and documentation.

Project staff are responsible for ordering sample containers prior to the sampling event.

4.0 Safety

Barr staff is responsible for conducting all aspects of the job safely. When applicable, refer to the appropriate Project Health and Safety Plan (PHASP) to understand the hazards associated with suspected contamination, symptoms of exposure, methods to minimize exposure, personal protection equipment (PPE), and personal air monitoring required when using this SOP. Minimum protection of two pair of chemical resistant gloves (e.g., nitrile) and safety glasses with side shields should be worn to prevent

sample contact with the skin and eyes. When sampling soils contaminated with corrosive materials, emergency eye flushing facilities should be available.

Some of the sample containers may require the use of preservatives. Consult the applicable Safety Data Sheet to review hazards and appropriate PPE to minimize exposure.

5.0 Equipment, Reagents, and Supplies

- Sampling devices/tools
- Stainless steel mixing bowl and spoon
- Sample containers (method specific)
- Balance
- Coolers
- Plastic bags
- Non-phosphorus containing detergent (e.g., Liquinox™)
- Chemical resistant gloves (e.g., nitrile)
- Paper towels/laboratory tissues
- Chain-of-custody (COC)
- Sample label
- Custody seal, if applicable
- Waterproof ink pen or pencil
- Ice

6.0 Procedure

This section describes the procedure(s) for the sampling, handling, and delivery of soil samples.

6.1 Calibration

No specific calibration procedures are required for the actual sampling equipment; however, the calibration of the balance should be verified prior to use. Refer to the applicable Barr SOP.

6.2 Sampling

General considerations to be taken into account when planning and conducting sampling operations are the required sample weight, sample holding times, sample handling, and special precautions for trace contaminant sampling.

To prevent sample cross-contamination, the soil sampling equipment is carefully cleaned before initially sampling and after working at each sampling point per Barr's SOP 'Decontamination of Sampling Equipment'. A new, clean outer pair of disposable gloves will be worn for each sample location and sample containers are placed in separate plastic bags after collecting, preserving and tagging. Sample collection activities will proceed progressively from the least contaminated area to the most contaminated area (when known).

Depending on the project work to be done, soil samples will be collected for analysis by either a drilling apparatus (equipped with a split spoon or core barrel sampler), hand excavation (hand auger, trowel, or shovel), or direct-push (Geoprobe®) technology

- If a drilling apparatus was used, retrieve the split spoon or core barrel sampler from the desired sampling interval and open. If a liner (sleeve) is present and will not be sampled in the field, wrap the ends of the liner with heavy-duty aluminum foil, taking care to not pierce the foil. Tape the foil to the brass liner with duct tape to seal. Cover the ends of the liner with plastic caps or duct tape to fully protect the foil and package for shipment to the laboratory. If a liner is being sampled in the field, open the liner to sample the soil.

- If hand excavating, dig with a trowel or shovel to the desired sampling interval and expose a fresh soil surface to sample. Collect a large sample on a shovel and bring it to the surface or collect the sample directly from the fresh soil surface. The hand excavation technique may be done from the bucket of a backhoe also.
- If direct-push (Geoprobe®) technology is used, soils are typically sampled following the subcontractor's soil sampling procedures. This method generally utilizes a direct-push soil boring rig, steel drive rods and a 2-inch outside diameter (O.D.) soil core sampler with a dedicated 1.75-inch inside diameter (I.D) removable acetate plastic sampler liner. The probe rods and sampling unit are driven to the desired sampling depth by the static weight of the carrier vehicle and hydraulic hammer percussion. Two, four, or five-foot sample cores are typically collected. The assembly is brought to the surface and the soil sample is exposed by cutting open the sampler liner.

In most investigations, the soil samples are field screened for moisture, odor, oil sheen, discoloration and the presence of organic soil vapors and classified in accordance with ASTM D-2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Refer to Barr's SOP 'Screening Soil Samples'.

The form 'Soil Sampling Guidelines' lists the analyses (in order of collection) and describes the weight of sample, preservation, container, and holding time for the most common sampling media (information can vary depending on the laboratory used). The container size, type, preservative, and holding time are important considerations in sample collection. Sample and container size must be adequate to meet laboratory requirements for quality control, split samples, or repeat analyses. The container type varies with the analysis required. Typically, the analytical laboratory will preserve the container before shipment, where applicable. Preservation and shelf life vary; contact the laboratory to determine if an on-hand container is still useful.

Both discrete and composite samples can be used for environmental investigations. A discrete sample is a sample that originated from a specific area at a specific time. The sample may be transferred directly from the sampler or sampling location to the sample container.

A composite sample is a collection of multiple temporary or discrete samples of the same medium that are combined, thoroughly homogenized, and treated as a single sample. Composite samples are valuable in characterizing a large area or volume of soil.

NOTE: Samples collected for analysis of volatile organic compounds (VOC) should not be homogenized or composited, due to aeration of the sample during mixing which may result in loss of VOC.

6.2.1 Volatile Organic Compounds (VOC)

If VOC or similar analyses (e.g., GRO, TPH as Gasoline) are being analyzed, these samples should be collected as soon as possible after the soil is removed from the ground from a representative area of the most undisturbed soil possible. Please refer to Barr's SOP 'Screening Soil Samples'. It is important to note that there are different containers and sampling media available for collecting a soil sample for VOC. Typically, the VOC sample is collected at a 1:1 weight ratio with a preservative. A coring device, such as a Terra Core® or En Core® sampler, is the first choice for sampling. After VOC samples are collected, mix the remaining soil from the sampling locations/intervals prior to filling the rest of the sample containers.

Note: Analytical samples should not be collected from polyethylene bags sometimes used for field screening purposes.

6.2.1.1 Terra Core® Sampler

The Terra Core® Sampler is a single use device that is typically supplied with a 40 mL VOA vial containing preservative (e.g., methanol) and an unpreserved container for % moisture/% solids determination. To use the Terra Core®, make certain the plunger is aligned with, and seated in, the handle. Push the Terra Core® into freshly exposed soil until the sample chamber is filled. Depending on the Terra Core® sampler size, a filled chamber will deliver approximately 5 or 10 g of soil. If a 1:1 ratio of soil to preservative is needed, verify the correct size sampler is being used.

Wipe the outside of the sampler, check that the soil plug is flush with the mouth of the sampler, and remove any excess soil. Rotate the plunger 90° until it is aligned with the slots in the body. Extrude the sample into the appropriate container by pushing the plunger down. To provide a good sealing surface, wipe the container lip and screw threads to remove soil and immediately screw on the lid. If preservative is present in the container, swirl to immerse the sample. Record the sample ID on the container and package for shipment to the laboratory.

6.2.1.2 En Core® Sampler

The disposable En Core® sampler is a single use device that is pushed into the soil using a reusable En Core® T-handle. Two, 5 g samplers are typically supplied with an unpreserved container for % moisture/% solids determination. Hold the En Core® coring body and push plunger down until the small O-ring rests against the tabs so the plunger moves freely.

Depress the locking lever on the T-handle. Place coring body plunger end first into the open end of the T-Handle, aligning the slots on the coring body with the locking pins in the T-Handle. Twist coring body clockwise to lock pins in slots. Make certain that the sampler is locked in place.

Turn T-handle with T-up and coring body down. This will position the plunger bottom flush with bottom of coring body. Using T-handle, push sampler into soil until coring body is completely full. When full the small O-ring will be centered in the T-handle viewing hole. Remove excess soil from the coring body exterior.

Cap the coring body while it is still on the T-handle by pushing and twisting the cap over the bottom until grooves on locking arms seat over ridge on coring body. Remove the coring body from the T-handle and lock plunger by rotating extended plunger rod fully counterclockwise until wings rest firmly against tabs.

Attach the accompanying label and package for shipment to the laboratory.

6.2.1.3 Other

If no coring device is available, an estimate of the amount of soil needed to provide the desired weight can be determined. Place an extra laboratory container, disposable weigh boat, paper towel, or laboratory tissue on a balance pan. Using a stainless steel spoon, add the desired weight (10 g or 25 g) of a representative soil sample on the balance. Once the amount has been established, discard the soil used in the estimation and collect the sample as per form 'Soil Sampling Guidelines'.

If allowed by applicable regulations for VOC sample collection, the VOC aliquot may be weighed directly into the sample container by placing the pre-weighed sample container on the balance, taring the balance, then adding the appropriate amount of soil to the container to reach the desired aliquot weight. This should be done quickly to reduce the possible loss of VOCs.

6.2.2 Compositing Discrete Samples

Discrete samples, to be used for compositing, are stored at ≤ 6 °C until each individual sample is obtained. A minimum volume of soil obtained during discrete sampling will be dependent on the final analytical requirements for the composite sample; however, a minimum weight of eight ounces should be sufficient for analysis of semivolatiles (SVOC), PCBs, pesticides, and metals.

After discrete samples have been obtained, record the locations to be included in a final composited sample in the field documentation. Appropriate laboratory containers should be labeled with this final sample identifier and the date of collection.

Retrieve the samples selected for compositing from storage. One container from each discrete sample location should remain in storage in case individual sample confirmations are necessary. Empty the entire contents of each container into a stainless steel mixing bowl, removing any large debris or rocks, and mix thoroughly.

6.2.3 Diesel Range Organics (DRO) / SVOC / General Chemistry / Metals

Using either a composited sample or a homogenized, discrete sample, fill the remaining containers in the order listed on form 'Soil Sampling Guidelines'. Unless aliquot weights are listed, pack the soil into the sample jars leaving no headspace. If allowed by applicable regulations, the WIDRO sample may be weighed directly into the sample container by placing the pre-weighed sample container on the field balance, taring the field balance, then adding the appropriate amount of soil to the container to reach the desired sample weight (~25 g).

Wipe the container lip and screw threads to remove soil and provide a good sealing surface, and immediately screw on the lid.

6.2.4 Handling

After collection, all samples should be handled as few times as possible. Samplers should use extreme care to ensure that samples are not contaminated. Immediately after samples are collected, they are bubble wrap or bagged and placed in a cooler containing bagged ice. Samples will be kept cold (≤ 6 °C, but not frozen) until receipt at the laboratory, where they are to be stored in a refrigerated area.

Keep samples secure to prevent tampering. If sample coolers are left in a vehicle or field office for temporary storage, the area will be locked and secured.

6.2.5 Shipment/Delivery

Once the cooler is packed to prevent breaking of containers, the proper COC documentation is relinquished by the sampler, placed into a plastic bag, and included in the cooler. Custody seals may be used, and the coolers should be taped shut if not hand delivered.

The coolers must be delivered to the laboratory via hand or overnight delivery courier in accordance with all Federal, State and Local transportation regulations and Barr's SOP 'Domestic Transport of Samples to the Laboratory'.

Note: Samples may have to be stored indoors in winter to prevent freezing.

6.3 Data Reduction/Calculations

No data reduction or calculations are associated with this procedure.

6.4 Disposal

Waste generated by this process will be disposed of in accordance with Federal, State and Local regulations and Barr's SOP 'Investigative Derived Waste'. Where reasonably feasible, technological changes have been implemented to minimize the potential for environmental pollution.

7.0 Quality Control and Quality Assurance (QA/QC)

The QC activities described below allow the self-verification of the quality and consistency of the work.

7.1 QA/QC Samples

QA/QC samples are defined in Barr's SOP 'Collection of Quality Control Samples'. The sampling frequency should be performed as written in the project scope of work and/or documentation (e.g., Work Plan, SAP, or QAPP).

7.2 Measurement Criteria

No specific criteria apply to the implementation of this SOP.

8.0 Records

The field technician will document the soil sampling event in a project dedicated field logbook or on field log data sheets. The analysis for each container, the number of bottles, and the laboratory used will be documented on the chain-of-custody record. Refer to Barr's SOP 'Documentation on a Chain-of-Custody (COC)' for further information.

Examples of common field documentation are available in Barr's "Compendium of Field Documentation". Field documentation specific to this SOP are listed below:

- Field Sampling Report
- Field Log Data Sheet
- COC
- Sample label
- Custody seal (if applicable)
- Soil Sampling Guidelines (includes sampling order, container, preservation, and holding time)

Field documentation and COC are provided to a Barr Data Management Administrator for storage on the internal Barr network.

Additional records information can be found in Barr's "Records Management System Manual."

Other Barr SOP subjects referenced within this SOP: screening soil samples, balance calibration, collection of QC samples, decontamination of sampling equipment, investigative derived waste, domestic transport of samples, and documentation on a COC.

9.0 References

USEPA Environmental Response Team. 2000. *SOP for Soil Sampling*.

Standard Operating Procedure

Decontamination of Sampling Equipment

Revision 1

March 15, 2018

Approved By:

John W. Juntilla		03/15/18
Print Technical Reviewer	Signature	Date

Terri Olson		03/15/18
Print QA Manager	Signature	Date

Review of the SOP has been performed and the SOP still reflects current practice.

Initials:		Date:	
Initials:		Date:	
Initials:		Date:	
Initials:		Date:	

Decontamination of Sampling Equipment

1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to define the process used for decontaminating environmental sampling-related equipment including pumps, meters, and materials coming into contact with actual sampling equipment or with sampling personnel. This procedure is applicable to all personnel who are collecting samples and/or decontaminating sampling and field equipment.

The recommended procedures in this SOP should be followed unless conditions make it impractical or inappropriate to do so. Modifications should be noted in the applicable documentation and communicated to appropriate personnel. Significant changes may result in a revision or newly created SOP.

2.0 Limitations

- Equipment used once and discarded such as bailers, protective gear, and filtration devices are not part of this SOP.

3.0 Responsibilities

The equipment technician is responsible for ensuring field equipment has been thoroughly decontaminated and prepared for use out in the field. The field technician(s) are responsible for decontamination in the field at each individual sampling point and for ensuring adherence to any investigative derived waste (IDW) project-specific requirements set forth in a QAPP or SAP (if applicable).

The role of the Field Safety Representative is to oversee on-site safety activities.

4.0 Safety

Barr staff is responsible for implementing aspects of the job safely. Where available, refer to the appropriate Project Health and Safety Plan (PHASP) to determine the proper personal protection equipment (PPE) required when using this SOP. Barr staff is responsible for conducting all aspects of the job safely. When applicable, refer to the appropriate Project Health and Safety Plan (PHASP) to understand the hazards associated with suspected contamination, symptoms of exposure, methods to minimize exposure, personal protection equipment (PPE), and personal air monitoring required when using this SOP. Minimum protection of one pair of chemical resistant gloves (e.g., nitrile) and safety glasses with side shields should be worn to prevent sample contact with the skin and eyes. When sampling soils contaminated with corrosive materials, emergency eye flushing facilities should be available.

Some of the sample containers may require the use of preservatives. Consult the applicable Safety Data Sheet to review hazards and appropriate PPE to minimize exposure.

5.0 Equipment, Reagents, and Supplies

- Non-phosphorus detergent (e.g., Liquinox™)
- Scrub brush made of inert materials
- Oven
- Bucket
- Tap water
- Analyte-free water (e.g., distilled or deionized (DI) water, or equivalent)
- Kimwipes®, or equivalent
- Chemical resistant gloves (e.g., nitrile)
- Spray bottle
- Organic solvent (e.g. methanol)

6.0 Procedure

This section describes the procedure(s) for the decontamination of equipment used to sample water, soil, or air.

6.1 Calibration

Calibration is not applicable to this SOP.

6.2 Operation

Decontamination of sampling equipment will be performed before sampling and after working at each sampling point, if applicable.

6.2.1 Water Sampling Equipment

Equipment that does not contact sample water or the inside of the well should be rinsed with analyte-free water and inspected for remaining particles or surface film. If these are noted, repeat cleaning and rinse procedures.

Equipment that contacts sample water or the inside of the well should be cleaned (inside and outside where possible) with a non-phosphorus detergent solution applied with a spray bottle and/or scrub brush (if needed). Rinse with analyte-free water and containerize with other IDW if required by the SAP or QAPP and inspect for remaining particles or surface film. If these are noted, repeat cleaning and rinse procedures. Shake off remaining water and allow to air dry.

The internal surfaces of pumps and tubing that cannot be adequately cleaned by the above methods alone will also be cleaned by first circulating a non-phosphorus detergent solution through them followed by circulating analyte-free water. Special care will be exercised to ensure that the "rinse" fluids will be circulated in sufficient quantities to completely flush out contaminants and detergents.

When transporting or storing equipment after cleaning, the equipment will be stored in a manner that minimizes the potential for contamination.

6.2.2 Soil/Sediment Sampling Equipment

A variety of samplers (split-barrel, split-barrel with brass liners, piston sampler, backhoe, hand-auger, or shovel) may be used to retrieve soil from sampling locations. The soil sample will either be sealed within the sampler (e.g., collecting volatile samples) or the soil sample will be transferred to laboratory-supplied containers depending on the analysis to be conducted on the soil sample. The equipment required to transfer the soil from the sampler to the laboratory-supplied sample containers includes: stainless-steel

spoons or scoops and the appropriate personal protective equipment necessary for collection and handling of soil samples as described in the PHASP.

All soil sampling equipment, including split-barrels, stainless-steel spoons and scoops, will be carefully cleaned before and during sampling with a tap water and non-phosphorus detergent solution, using a brush if necessary to remove particulate matter and films. The equipment is then rinsed three times with tap water and/or three times with analyte-free water. Inspect equipment and repeat procedure if any residual soil or visible contaminants are present. Dry sampler with a Kimwipes®. Organic solvents (e.g., methanol) may be used to aid with desorbing organic material but should be kept to a minimum and must be collected and containerized if used.

At the completion of the work day, the samplers should be decontaminated following the procedure above and stored in a manner that minimizes the potential for contamination.

6.2.3 Air Sampling Equipment

For non-laboratory manifold equipment, methanol soak manifold components for a minimum of two hours. Remove from the methanol bath and place in an oven pre-heated to 90 °C and continue to heat manifold components for at least 3 hours or until interior and exterior surface inspections of the manifold components indicate that they are free of liquid methanol.

6.2.4 Handling

All equipment will be handled in a manner that minimizes cross-contamination between points. After cleaning, the equipment will be visibly inspected to detect any residues or other substances that may exist after normal cleaning. If inspection reveals that decontamination was insufficient, the decontamination procedures will be repeated.

6.3 Data Reduction/Calculations

No data reduction or calculations are associated with this procedure.

6.4 Disposal

IDW generated by this process will be disposed of in accordance with Federal, State and Local regulations and/or as required by project-specific SAP or Work Plan. Where reasonably feasible, technological changes have been implemented to minimize the potential for environmental pollution.

7.0 Quality Control and Quality Assurance (QA/QC)

The QC activities described below allow the self-verification of the quality and consistency of the work.

7.1 QA/QC Samples

Decontamination procedures may be monitored through the use of an equipment blank which consists of analyte-free water processed through non-disposable or non-dedicated aqueous or solid sampling equipment after equipment decontamination and before field sample collection. The equipment blank is analyzed for the same parameters as the samples at a project specific frequency (e.g., one per twenty samples).

7.2 Measurement Criteria

Equipment blank results should be below the laboratory's method detection limit or reporting limit (depending on the data quality objectives).

8.0 Records

When required, the field technician(s) will document the field equipment decontamination procedures in a project dedicated field logbook or on field log data sheets.

Examples of common field documentation are available in Barr's "Compendium of Field Documentation". Field documentation is listed in the applicable sample collection SOP.

Field documentation and COC are provided to a Barr Data Management Administrator for storage on the internal Barr network.

Additional records information can be found in Barr's "Records Management System Manual."

Other Barr SOP subjects referenced within this SOP: collection of samples and investigative derived waste.

9.0 References

ASTM. 2015. Standard Practice for Decontamination of Field Equipment Used at Waste Sites.

Standard Operating Procedure

Field Screening Soil Samples

Revision 7

April 27, 2017

Approved By:

John W. Juntilla		04/27/17
Print Technical Reviewer	Signature	Date

Terri A. Olson		04/27/17
Print QA Manager	Signature	Date

Review of the SOP has been performed and the SOP still reflects current practice.

Initials:		Date:	
Initials:		Date:	
Initials:		Date:	
Initials:		Date:	

Field Screening of Soil Samples

1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to describe the procedure for properly screening soil or sediment samples in the field. This procedure applies to all field technicians responsible for field screening soil or sediment samples.

The recommended procedures in this SOP should be followed unless conditions make it impractical or inappropriate to do so. Modifications should be noted in the applicable documentation and communicated to appropriate personnel. Significant changes may result in a revision or newly created SOP.

2.0 Limitations

- Screening techniques can vary by project. If not specified in the project scope of work and/or documentation (e.g., Work Plan, Sampling Analysis Plan (SAP), or Quality Assurance Project Plan (QAPP)), consult with the appropriate regulatory agency for guidance, if applicable.
- Interferences on the test can be caused by any contaminant that can cause an oil sheen on water. The samples will be carefully observed for characteristic appearance or odors which may indicate a possible contaminant other than coal tar or petroleum substances.
- Sunlight and low temperatures may interfere with headspace development.
- Water and soil particles may interfere with PID and FID measurements.
- Decontamination of screening equipment is required to prevent cross-contamination.
- Contact the local utilities hotline prior to digging to have utilities identified at sampling locations.

3.0 Responsibilities

Equipment Technicians are responsible to maintain equipment in working order and aid in troubleshooting equipment issues.

The role of the Project Health and Safety Team Leader is to oversee all aspects of on-site safety activities.

The Project Manager, in conjunction with the client, develops the site specific scope of work (e.g., Work Plan, SAP, etc.).

Experienced Field Technicians are responsible for the proper sample identification, field screening procedures, field equipment and calibration, quality control procedures, and documentation.

4.0 Safety

Barr staff is responsible for conducting all aspects of the job safely. When applicable, refer to the appropriate Project Health and Safety Plan (PHASP) to understand the hazards associated with suspected contamination, symptoms of exposure, methods to minimize exposure, personal protection equipment (PPE), and personal air monitoring required when using this SOP. Minimum protection of two pair of chemical resistant gloves (e.g., nitrile) and safety glasses with side shields should be worn to prevent sample contact with the skin and eyes. When screening soils contaminated with corrosive materials, emergency eye flushing facilities should be available.

Consult the applicable Safety Data Sheet to review hazards and appropriate PPE to minimize exposure.

5.0 Equipment, Reagents, and Supplies

- Photoionization detector (PID)
- Flame ionization detector (FID)
- Squirt bottle with tap water
- Waterproof ink pen or pencil
- Chemical resistant gloves (e.g., nitrile)
- Stainless steel spoon
- Polyethylene bags

6.0 Procedure

The field screening techniques for soils are as follows: visual examination, odor, headspace organic vapor screening, and oil sheen. The results of these four screening procedures may be used to screen soil samples for possible contamination.

6.1 Calibration

The PID or FID shall be calibrated or checked against a known concentration of a calibration gas standard prior to collection of field measurements. Calibration of the PID or FID shall follow the recommended procedures as described in the manufacturer's operation manual or as per the applicable Barr SOP.

Regular calibration checks (bump tests) are expected to be performed by the field technician a minimum of once per day of use in the field. It is recommended that bump tests be conducted around mid-day and at the end of the day. More frequent bump testing may be completed if warranted by field conditions. The bump testing results should be recorded in the field log book or field log data sheets.

If problems occur during calibration, during bump tests, or if the unit will not stay calibrated, the field technician should document the issue in the field notes then contact the equipment technician or project manager for assistance.

6.2 Screening Techniques

The field screening techniques for soils are as follows: visual examination, odor, headspace organic vapor screening, and oil sheen. The results of these four screening procedures may be used to screen soil samples for possible contamination. To prevent sample cross-contamination, the screening equipment is carefully cleaned before and after working with each sample per Barr's SOP 'Decontamination of Sampling Equipment'.

6.2.1 Visual Examination

A visual examination of the soil sample will include noting any discoloration of the soil or visible oiliness or tar.

6.2.2 Odor

The field technician will note odor only if noticed incidentally while handling the soil sample. Field technicians will not unduly expose themselves to sample odors. Odor will be described as trace, light, moderate, or strong, and appropriate description of the type of odor, if evident.

6.2.3 Headspace Organic Vapor Screening

The polyethylene bag headspace method recommended by the Minnesota Pollution Control Agency will be used in the field to screen soils suspected to contain volatile organic compounds. The screening method is intended to be used in conjunction with other "real time" observations.

The following equipment is required to conduct headspace organic vapor screening: PID or FID, polyethylene bag, log book or record sheet, and appropriate PPE. Soil samples collected from a split-barrel sampler or a direct-push (i.e., Geoprobe) sample liner will be collected immediately after opening the barrel or liner. If the sample is collected from an excavation wall, soil pile, or backhoe bucket, it will be collected from a freshly exposed surface.

- Half-fill the bag with the sample to be analyzed using a stainless-steel spoon or a gloved hand and immediately seal it. Agitate the bag for 15 seconds and manually break up any soil clumps within the bag.
- Allow headspace development for approximately 10 minutes. The sample should be kept in a shaded area out of direct sunlight. Ambient temperatures during headspace development should be recorded. When ambient temperatures are below 50°F, headspace development should be conducted inside a heated vehicle or building. After completing the headspace development, agitate the bag for an additional 15 seconds.
- Quickly puncture the bag with the sampling probe of the PID or FID at a point about one-half of the headspace depth. Exercise care to avoid uptake of water droplets or soil particles.
- Record the highest PID or FID meter response as the headspace concentration. The maximum response will likely occur between 0 to 5 seconds.
- When using a FID, it may be necessary to correct for methane. In this case, take a reading first with the carbon filter, then without. This will require two duplicate bag samples. The second reading less the first is the headspace adjusted for methane. Adjusted readings less than zero are considered zero. Methane correction is not necessary if a PID is used.

6.2.4 Oil Sheen Test

The oil sheen or hydrocarbon test is a method used to immediately determine the approximate magnitude of coal tar or petroleum contamination in soil by observation of the sample in the field. The test is useful in soils which do not have a high binding capacity with petroleum compounds or polycyclic aromatic hydrocarbons (PAHs) (i.e., petroleum compounds or PAHs are free on the surface of the soil particles and can be released by a stream of water).

The equipment required to conduct the oil sheen test includes: a stainless-steel spoon, a squirt bottle filled with tap water, a log book or field log data sheet, and the appropriate personal protective equipment necessary for collection and handling of soil samples as described in the Project Health and Safety Plan.

The procedure for conducting the oil sheen test consists of obtaining approximately 50 grams (about 30 cc) of representative soil with the spoon and then directing a stream of water onto the soil in the spoon with the squirt bottle until the soil is saturated and water begins to collect around the soil. The amount of oil sheen present on the water is determined by observation and the results of the test are reported as a magnitude of oil sheen observed: none, trace, light, moderate, heavy or rainbow. The test results, sample location, and observations of the sample's appearance and odor are recorded in the log book or field log data sheet.

The specific soil types at the area of investigation should be accounted for when performing the oil sheen test. The best results are obtained in silts, sands, and/or gravels with low organic content. The results obtained from clay soils may appear deceptively low. Typical descriptions of each test result are provided in the table below.

Oil Sheen Test Result	Description
None	No sheen detected.
Trace	Possible or faint oil sheen observed (may not continue to generate sheen as additional water is added).
Light	Obvious sheen that may not cover entire water surface
Moderate	Definite oil sheen that covers entire surface, but "rainbow colors" not distinguishable.
Heavy	Definite oil film or product that does not display rainbow colors.
Rainbow	Definite oil sheen, film or product that displays rainbow colors.

6.3 Data Reduction/Calculations

No data reduction or calculations are associated with this procedure.

6.4 Disposal

Waste generated by this process will be disposed of in accordance with Federal, State and Local regulations and Barr's SOP 'Investigative Derived Waste'. Where reasonably feasible, technological changes have been implemented to minimize the potential for environmental pollution.

7.0 Quality Control and Quality Assurance (QA/QC)

Field background readings are measured for the headspace organic vapor screening. PID and FID readings should be duplicated every 20 field samples.

8.0 Records

The field technician(s) will document the field screening activities and measurements in a project dedicated field logbook or on field log data sheets.

Examples of common field documentation are available in Barr's "Compendium of Field Documentation". Field documentation specific to this SOP are listed below:

- Field Sampling Report
- Field Log Data Sheet

Field documentation are provided to a Barr Data Management Administrator for storage on the internal Barr network.

Additional records information can be found in Barr's "Records Management System Manual."

Other Barr SOP subjects referenced within this SOP: PID and FID equipment, decontamination of sampling equipment, and investigative derived waste.

9.0 References

PID and FID operation manuals.

Attachment B

Representative Photographs

Photo 1: Setting up at SB-1.

Photo 2: Typical soil boring recovery. Pictured is recovery from SB-4, 0-5 feet bgs. Thin layer of organic topsoil visible on right (top) end of sample sleeve. Soil below is stiff glaciolacustrine lean clay.

Photo 3: Advancing sampler at SB-4.

Photo 4: Attempting to sample the temporary monitoring well at SB-1.

Attachment C

Soil Boring Logs

Barr Engineering Company
325 South Lake Avenue, Suite 700
Duluth, MN 55802
Telephone: 218-529-8200

LOG OF BORING SB-1

Project:	Husky/MNPower Phase II 49161423.00 200	Surface Elevation:	6/21/2018
Project No.:	Superior, WI	Drilling Method:	Direct Push
Location:	UTM 15T N:5170970.147m,	Sampling Method:	Macro-Core
Coordinates:	E:571189.0276m NAD 83	Completion Depth:	20.0 ft
Datum:			

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0			**PID:**0.3 **D/O/S:**N/ N/ N	OL		ORGANIC SOIL (OL): brown; moist; medium stiff; with 20% grass fibers and trace medium to coarse-grained angular sand and fine gravel.		
						LEAN CLAY (CL): Red-brown; moist; medium stiff; medium to high plasticity; no dilatancy; glacialacustrine deposit; with trace medium to coarse-grained angular sand and fine gravel.		
						SB-1_2-3 ft collected for VOCs, RCRA 8 metals and PAHs.		
			PID:0.3 **D/O/S:**N/ N/ N					
5			**PID:**0.8 **D/O/S:**N/ N/ N	CL				
							–Temporary Monitoring Well	
			PID:0.6 **D/O/S:**N/ N/ N					
10			**PID:**0.5 **D/O/S:**N/ N/ N					
						SB-1_12-13 ft collected for VOCs, RCRA 8 metals and PAHs.		
						FAT CLAY (CH): Red-brown; moist; soft; high plasticity; no dilatancy; glacialacustrine deposit; with trace medium to coarse-grained angular sand and fine gravel.		
			PID:0.5 **D/O/S:**N/ N/ N					
15							–Screened 14.5-19.5 ft bgs.	
			PID:0.4 **D/O/S:**N/ N/ N	CH			–Water at 16.7 ft bgs on 6/22/18, one day after installation. Likely surface water draining into boring.	
						Very soft, 15-20 ft.		
			PID:0.2 **D/O/S:**N/ N/ N				–Well produced approximately 250 mL and purged dry before sample could be collected.	
20						End of boring 20.0 feet Target depth reached.		

Date Boring Started:	6/21/18 2:00 pm
Date Boring Completed:	6/22/18 11:05 am
Logged By:	MAB
Drilling Contractor:	Twin Ports Testing
Drill Rig:	Geoprobe 7822DT

Remarks: Boring advanced in SE corner of property. Ground surface was hummocky, covered with recently chipped brush, vegetated with marsh grass, and submerged with approximately 2 inches of standing water.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

P:\MPLS\49 WI\16\49161423 SUPERIOR REFINING CO ENV ASSIS\WORKFILES\PHASE II INVESTIGATION\BORING LOGS\HUSKY MNPOWER LIM PH II.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
325 South Lake Avenue, Suite 700
Duluth, MN 55802
Telephone: 218-529-8200

LOG OF BORING SB-2

Project:	Husky/MNPower Phase II 49161423.00 200	Surface Elevation:	6/21/2018
Project No.:	Superior, WI	Drilling Method:	Direct Push
Location:	UTM 15T N:5170941.164m,	Sampling Method:	Macro-Core
Coordinates:	E:571114.8391m NAD 83	Completion Depth:	20.0 ft
Datum:			

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0			**PID:**0.1 **D/O/S:**N/ N/ N	OL		ORGANIC SOIL WITH GRAVEL (OL): dark brown; moist; soft; with 30% angular basalt fine gravel.		
						LEAN CLAY (CL): brown; moist; stiff; medium to high plasticity; no dilatancy; glacialacustrine deposit; with trace angular medium to coarse-grained sand and fine gravel. SB-2_0-1 ft collected for VOCs, RCRA 8 metals and PAHs.		
						Red-brown below 5 ft bgs.		
			PID:0.2 **D/O/S:**N/ N/ N					
5			**PID:**0.2 **D/O/S:**N/ N/ N			With 1-2mm long planar gray mottles, 5-7 ft bgs. SB-2_6-7 ft collected for VOCs, RCRA 8 metals and PAHs.		
			PID:0.3 **D/O/S:**N/ N/ N					
10			**PID:**0.4 **D/O/S:**N/ N/ N	CL				
			PID:0.4 **D/O/S:**N/ N/ N					
15			**PID:**0.4 **D/O/S:**N/ N/ N					
			PID:0.4 **D/O/S:**N/ N/ N					
20						End of boring 20.0 feet Target depth reached.		

WELL DETAIL: Temporary Monitoring Well; Screened at 14-19'; Well was dry on 6/22/18, one day after installation.

Date Boring Started:	6/21/18 3:05 pm
Date Boring Completed:	6/22/18 11:10 am
Logged By:	MAB
Drilling Contractor:	Twin Ports Testing
Drill Rig:	Geoprobe 7822DT

Remarks: Boring advanced in center of property. Ground surface was dry, flat, and grass-covered.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

P:\MPLS\49 WI\16\49161423 SUPERIOR REFINING CO ENV ASSIS\WORKFILES\PHASE II INVESTIGATION\BORING LOGS\HUSKY MNPOWER LIM PH II.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
325 South Lake Avenue, Suite 700
Duluth, MN 55802
Telephone: 218-529-8200

LOG OF BORING SB-3

Project:	Husky/MNPower Phase II 49161423.00 200	Surface Elevation:	657.3 ft
Project No.:	Superior, WI	Drilling Method:	Direct Push
Location:	UTM 15T N:5170886.079m,	Sampling Method:	Macro-Core
Coordinates:	E:571073.1286m NAD 83	Completion Depth:	20.0 ft
Datum:			

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0			**PID:**0.1 **D/O/S:**N/ N/ N	OL		ORGANIC SOIL (OL): dark brown; moist; soft; with 20% grass fibers.		
						LEAN CLAY (CL): red-brown; moist; stiff; medium to high plasticity; no dilatancy; glacialacustrine deposit; with trace angular medium to coarse-grained sand and fine gravel. SB-3_0-2 ft collected for VOCs, RCRA 8 metals and PAHs.		655
5			**PID:**0.1 **D/O/S:**N/ N/ N					
			PID:0.1 **D/O/S:**N/ N/ N			With trace faint 1mm-long brown-gray mottling, 5-10' bgs.	Temporary Monitoring Well	650
			PID:0.2 **D/O/S:**N/ N/ N			SB-3_8-9 ft collected for VOCs, RCRA 8 metals and PAHs.		
10				CL				
			PID:0.2 **D/O/S:**N/ N/ N			Medium soft consistency from 9-13.5 ft bgs.		
						Trace weathered fine gravel from 10-15 ft bgs.		645
			PID:0.2 **D/O/S:**N/ N/ N			Soft consistency below 13.5 ft bgs.		
15			**PID:**0.2 **D/O/S:**N/ N/ N				Screened at 14.5-19.5' Water at 9.5 ft bgs on 6/22/18, one day after installation. Likely surface water draining into boring.	640
			PID:0.2 **D/O/S:**N/ N/ N					
20						End of boring 20.0 feet Target depth reached.	SB-3_14.5-19.5 (groundwater) collected for VOCs and PAHs	

Date Boring Started:	6/22/18 4:15 pm
Date Boring Completed:	6/22/18 11:30 am
Logged By:	MAB
Drilling Contractor:	Twin Ports Testing
Drill Rig:	Geoprobe 7822DT

Remarks: Boring advanced in SW corner of property. Ground surface was soft, vegetated with marsh grass and submerged by approximately one inch of standing water.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
325 South Lake Avenue, Suite 700
Duluth, MN 55802
Telephone: 218-529-8200

LOG OF BORING SB-4

Project:	Husky/MNPower Phase II 49161423.00 200	Surface Elevation:	657.4 ft
Project No.:	Superior, WI	Drilling Method:	Direct Push
Location:	UTM 15T N:5170910.454m,	Sampling Method:	Macro-Core
Coordinates:	E:571048.3472m NAD 83	Completion Depth:	20.0 ft
Datum:			

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0			**PID:**0.3 **D/O/S:**N/ N/ N	OL		ORGANIC SOIL (OL): dark brown; moist; soft; with 30% grass fibers.	
						LEAN CLAY (CL): red-brown; moist; stiff; medium plasticity; no dilatancy; glacialacustrine deposit; with trace angular medium to coarse-grained sand and fine gravel. SB-4_0-2 ft collected for VOCs, RCRA 8 metals and PAHs.	655
			PID:0.2 **D/O/S:**N/ N/ N				
5			**PID:**0.1 **D/O/S:**N/ N/ N			SB-4_6-7 ft collected for VOCs, RCRA 8 metals and PAHs.	650
			PID:0.0 **D/O/S:**N/ N/ N			1/2-inch diameter very weathered basalt clast at 8.5 ft bgs.	
10			**PID:**0.0 **D/O/S:**N/ N/ N	CL			645
			PID:0.0 **D/O/S:**N/ N/ N				
15			**PID:**0.0 **D/O/S:**N/ N/ N				640
			PID:0.0 **D/O/S:**N/ N/ N				
20						End of boring 20.0 feet Target depth reached.	

Date Boring Started:	6/22/18 8:35 am
Date Boring Completed:	6/22/18 9:00 am
Logged By:	MAB
Drilling Contractor:	Twin Ports Testing
Drill Rig:	Geoprobe 7822DT

Remarks: Boring advanced in NW corner of property. Ground surface was hummocky, covered with recently chipped brush, vegetated with marsh grass, and covered in approximately 2 inches of standing water.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
325 South Lake Avenue, Suite 700
Duluth, MN 55802
Telephone: 218-529-8200

LOG OF BORING SB-5

Project:	Husky/MNPower Phase II 49161423.00	Surface Elevation:	657.6 ft
Project No.:	200	Drilling Method:	Direct Push
Location:	Superior, WI	Sampling Method:	Macro-Core
Coordinates:	UTM 15T N:5170984.65m, E:571138.864m	Completion Depth:	20.0 ft
Datum:	NAD 83		

Depth, feet	Sample Type & Recovery	Sample No.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0				SM		FILL; SILTY SAND WITH GRAVEL (SM): black; moist; 70% shiny black angular fine to coarse-grained sand and fine gravel; apparent weathered asphalt pavement with topsoil.	
			PID:1.2 **D/O/S:**Black/ N/ N			SB-5_0-1 ft collected for VOCs, RCRA 8 metals and PAHs.	
						LEAN CLAY (CL): red-brown; moist; stiff; medium plasticity; no dilatancy; glacialacustrine deposit; with trace medium to coarse-grained angular sand and fine gravel.	655
			PID:N/A **D/O/S:**N/ N/ N			Insufficent recovery for headspace reading.	
5							
			PID:0.4 **D/O/S:**N/ N/ N				650
			PID:0.5 **D/O/S:**N/ N/ N			SB-5_8-9 ft collected for VOCs, RCRA 8 metals and PAHs.	
10				CL		With trace 1-2mm-long, planar gray mottles from 5-15 ft bgs.	
			PID:0.3 **D/O/S:**N/ N/ N				
							645
			PID:0.3 **D/O/S:**N/ N/ N				
15							
			PID:0.3 **D/O/S:**N/ N/ N				640
			PID:0.3 **D/O/S:**N/ N/ N				
20						End of boring 20.0 feet Target depth reached.	

Date Boring Started:	6/22/18 9:30 am
Date Boring Completed:	6/22/18 9:55 am
Logged By:	MAB
Drilling Contractor:	Twin Ports Testing
Drill Rig:	Geoprobe 7822DT

Remarks: Boring advanced in NE corner of property. Ground surface was dry, level, and covered with grass and gravel.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

Attachment D

Soil and Groundwater Laboratory Analytical Reports

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

July 03, 2018

Jim Taraldsen
Barr Engineering Company
325 S Lake Ave
Duluth, MN 55802

RE: Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Dear Jim Taraldsen:
Enclosed are the analytical results for sample(s) received by the laboratory on June 22, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Amanda J Albrecht

Amanda Albrecht
amanda.albrecht@pacelabs.com
(612)607-6382
Project Manager

Enclosures

cc: BarrDM, Barr Engineering

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Minnesota Certification IDs

1700 Elm Street SE, Suite 200, Minneapolis, MN 55414-2485
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas Certification #: 88-0680
California Certification #: 2929
CNMI Saipan Certification #:MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Massachusetts Certification #: M-MN064
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: MN00064
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon NwTPH Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DW Certification #: 9952 C
West Virginia DEP Certification #: 382
Wisconsin Certification #: 999407970

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

Pace Analytical Services, LLC
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SAMPLE SUMMARY

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10436863001	**SB-1_2-3**	Solid	06/21/18 14:05	06/22/18 20:00
10436863002	**SB-1_12-13**	Solid	06/21/18 14:30	06/22/18 20:00
10436863003	**SB-2_0-1**	Solid	06/21/18 15:15	06/22/18 20:00
10436863004	**SB-2_6-7**	Solid	06/21/18 15:30	06/22/18 20:00
10436863005	**SB-3_0-2**	Solid	06/21/18 16:20	06/22/18 20:00
10436863006	**SB-3_8-9**	Solid	06/21/18 16:35	06/22/18 20:00
10436863007	**SB-4_0-2**	Solid	06/22/18 08:40	06/22/18 20:00
10436863008	**SB-4_6-7**	Solid	06/22/18 08:55	06/22/18 20:00
10436863009	**SB-5_0-1**	Solid	06/22/18 09:35	06/22/18 20:00
10436863010	**SB-5_8-9**	Solid	06/22/18 09:50	06/22/18 20:00
10436863011	**SB-3_14.5-19.5**	Water	06/22/18 11:20	06/22/18 20:00
10436863012	**Trip Blank**	Water	06/21/18 00:00	06/22/18 20:00
10436863013	**MeOH Trip Blank**	Solid	06/21/18 00:00	06/22/18 20:00

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SAMPLE ANALYTE COUNT

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10436863001	**SB-1_2-3**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863002	**SB-1_12-13**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863003	**SB-2_0-1**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863004	**SB-2_6-7**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863005	**SB-3_0-2**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863006	**SB-3_8-9**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863007	**SB-4_0-2**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863008	**SB-4_6-7**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863009	**SB-5_0-1**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863010	**SB-5_8-9**	EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260	SMT	39	PASI-G
10436863011	**SB-3_14.5-19.5**	EPA 8270D by SIM	STB	18	PASI-M
		EPA 8260B	DS2	70	PASI-M
10436863012	**Trip Blank**	EPA 8260B	DS2	70	PASI-M
10436863013	**MeOH Trip Blank**	EPA 8260	SMT	39	PASI-G

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-1_2-3 **Lab ID: 10436863001** Collected: 06/21/18 14:05 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**3.1**	mg/kg	1.6	0.48	1	06/26/18 04:58	06/27/18 06:54	7440-38-2	M1
Barium	**245**	mg/kg	4.2	1.3	5	06/26/18 04:58	06/27/18 15:29	7440-39-3	M1
Cadmium	**<0.075**	mg/kg	0.25	0.075	1	06/26/18 04:58	06/27/18 06:54	7440-43-9	
Chromium	**49.6**	mg/kg	5.1	1.5	5	06/26/18 04:58	06/27/18 15:29	7440-47-3	
Lead	**10.5**	mg/kg	5.3	1.6	5	06/26/18 04:58	06/27/18 15:29	7439-92-1	
Selenium	**0.56J**	mg/kg	1.9	0.56	1	06/26/18 04:58	06/27/18 06:54	7782-49-2	M1
Silver	**<0.11**	mg/kg	0.38	0.11	1	06/26/18 04:58	06/27/18 06:54	7440-22-4	M1
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.023J**	mg/kg	0.033	0.0098	1	06/25/18 07:21	06/28/18 17:46	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**27.6**	%	0.10	0.10	1		06/27/18 16:25		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**<0.56**	ug/kg	1.9	0.56	1	06/25/18 06:31	06/26/18 18:00	83-32-9	
Acenaphthylene	**<0.68**	ug/kg	2.3	0.68	1	06/25/18 06:31	06/26/18 18:00	208-96-8	
Anthracene	**<0.65**	ug/kg	2.2	0.65	1	06/25/18 06:31	06/26/18 18:00	120-12-7	
Benzo(a)anthracene	**<1.5**	ug/kg	5.0	1.5	1	06/25/18 06:31	06/26/18 18:00	56-55-3	
Benzo(a)pyrene	**<0.95**	ug/kg	3.2	0.95	1	06/25/18 06:31	06/26/18 18:00	50-32-8	
Benzo(b)fluoranthene	**1.1J**	ug/kg	1.7	0.52	1	06/25/18 06:31	06/26/18 18:00	205-99-2	
Benzo(g,h,i)perylene	**<0.87**	ug/kg	2.9	0.87	1	06/25/18 06:31	06/26/18 18:00	191-24-2	
Benzo(k)fluoranthene	**<1.2**	ug/kg	3.9	1.2	1	06/25/18 06:31	06/26/18 18:00	207-08-9	
Chrysene	**<1.9**	ug/kg	6.3	1.9	1	06/25/18 06:31	06/26/18 18:00	218-01-9	
Dibenz(a,h)anthracene	**<0.64**	ug/kg	2.1	0.64	1	06/25/18 06:31	06/26/18 18:00	53-70-3	
Fluoranthene	**1.8J**	ug/kg	2.0	0.59	1	06/25/18 06:31	06/26/18 18:00	206-44-0	
Fluorene	**<0.43**	ug/kg	1.4	0.43	1	06/25/18 06:31	06/26/18 18:00	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.93**	ug/kg	3.1	0.93	1	06/25/18 06:31	06/26/18 18:00	193-39-5	
Naphthalene	**<1.1**	ug/kg	3.5	1.1	1	06/25/18 06:31	06/26/18 18:00	91-20-3	
Phenanthrene	**<2.7**	ug/kg	8.8	2.7	1	06/25/18 06:31	06/26/18 18:00	85-01-8	
Pyrene	**<2.1**	ug/kg	7.0	2.1	1	06/25/18 06:31	06/26/18 18:00	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	58	%.	42-125		1	06/25/18 06:31	06/26/18 18:00	321-60-8	
p-Terphenyl-d14 (S)	75	%.	57-125		1	06/25/18 06:31	06/26/18 18:00	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 18:02	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 18:02	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-1_2-3 **Lab ID: 10436863001** Collected: 06/21/18 14:05 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 18:02	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 18:02	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 18:02	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 18:02	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 18:02	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 18:02	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:02	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	107	%	57-148		1	06/28/18 11:30	06/28/18 18:02	1868-53-7	
Toluene-d8 (S)	95	%	58-142		1	06/28/18 11:30	06/28/18 18:02	2037-26-5	
4-Bromofluorobenzene (S)	81	%	48-130		1	06/28/18 11:30	06/28/18 18:02	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-1_12-13 **Lab ID: 10436863002** Collected: 06/21/18 14:30 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**3.8**	mg/kg	1.8	0.53	1	06/26/18 04:58	06/27/18 07:02	7440-38-2	
Barium	**193**	mg/kg	0.92	0.28	1	06/26/18 04:58	06/27/18 07:02	7440-39-3	
Cadmium	**<0.082**	mg/kg	0.27	0.082	1	06/26/18 04:58	06/27/18 07:02	7440-43-9	
Chromium	**42.9**	mg/kg	1.1	0.34	1	06/26/18 04:58	06/27/18 07:02	7440-47-3	
Lead	**9.5**	mg/kg	1.2	0.35	1	06/26/18 04:58	06/27/18 07:02	7439-92-1	
Selenium	**<0.61**	mg/kg	2.0	0.61	1	06/26/18 04:58	06/27/18 07:02	7782-49-2	
Silver	**<0.12**	mg/kg	0.41	0.12	1	06/26/18 04:58	06/27/18 07:02	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.026J**	mg/kg	0.039	0.012	1	06/25/18 07:21	06/28/18 17:52	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**35.3**	%	0.10	0.10	1		06/27/18 16:26		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**<0.63**	ug/kg	2.1	0.63	1	06/25/18 06:31	06/26/18 18:23	83-32-9	
Acenaphthylene	**<0.76**	ug/kg	2.5	0.76	1	06/25/18 06:31	06/26/18 18:23	208-96-8	
Anthracene	**<0.72**	ug/kg	2.4	0.72	1	06/25/18 06:31	06/26/18 18:23	120-12-7	
Benzo(a)anthracene	**<1.7**	ug/kg	5.5	1.7	1	06/25/18 06:31	06/26/18 18:23	56-55-3	
Benzo(a)pyrene	**<1.1**	ug/kg	3.5	1.1	1	06/25/18 06:31	06/26/18 18:23	50-32-8	
Benzo(b)fluoranthene	**<0.57**	ug/kg	1.9	0.57	1	06/25/18 06:31	06/26/18 18:23	205-99-2	
Benzo(g,h,i)perylene	**<0.97**	ug/kg	3.2	0.97	1	06/25/18 06:31	06/26/18 18:23	191-24-2	
Benzo(k)fluoranthene	**<1.3**	ug/kg	4.3	1.3	1	06/25/18 06:31	06/26/18 18:23	207-08-9	
Chrysene	**<2.1**	ug/kg	7.0	2.1	1	06/25/18 06:31	06/26/18 18:23	218-01-9	
Dibenz(a,h)anthracene	**<0.71**	ug/kg	2.4	0.71	1	06/25/18 06:31	06/26/18 18:23	53-70-3	
Fluoranthene	**<0.66**	ug/kg	2.2	0.66	1	06/25/18 06:31	06/26/18 18:23	206-44-0	
Fluorene	**<0.48**	ug/kg	1.6	0.48	1	06/25/18 06:31	06/26/18 18:23	86-73-7	
Indeno(1,2,3-cd)pyrene	**<1.0**	ug/kg	3.4	1.0	1	06/25/18 06:31	06/26/18 18:23	193-39-5	
Naphthalene	**<1.2**	ug/kg	4.0	1.2	1	06/25/18 06:31	06/26/18 18:23	91-20-3	
Phenanthrene	**<3.0**	ug/kg	9.8	3.0	1	06/25/18 06:31	06/26/18 18:23	85-01-8	
Pyrene	**<2.4**	ug/kg	7.8	2.4	1	06/25/18 06:31	06/26/18 18:23	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	60	%.	42-125		1	06/25/18 06:31	06/26/18 18:23	321-60-8	
p-Terphenyl-d14 (S)	78	%.	57-125		1	06/25/18 06:31	06/26/18 18:23	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 18:25	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 18:25	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-1_12-13 **Lab ID: 10436863002** Collected: 06/21/18 14:30 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 18:25	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 18:25	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 18:25	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 18:25	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 18:25	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 18:25	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:25	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	110	%	57-148		1	06/28/18 11:30	06/28/18 18:25	1868-53-7	
Toluene-d8 (S)	94	%	58-142		1	06/28/18 11:30	06/28/18 18:25	2037-26-5	
4-Bromofluorobenzene (S)	80	%	48-130		1	06/28/18 11:30	06/28/18 18:25	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-2_0-1 **Lab ID: 10436863003** Collected: 06/21/18 15:15 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**3.0**	mg/kg	1.4	0.42	1	06/26/18 04:58	06/27/18 07:04	7440-38-2	
Barium	**145**	mg/kg	0.73	0.22	1	06/26/18 04:58	06/27/18 07:04	7440-39-3	
Cadmium	**<0.065**	mg/kg	0.22	0.065	1	06/26/18 04:58	06/27/18 07:04	7440-43-9	
Chromium	**37.0**	mg/kg	0.89	0.27	1	06/26/18 04:58	06/27/18 07:04	7440-47-3	
Lead	**7.6**	mg/kg	0.93	0.28	1	06/26/18 04:58	06/27/18 07:04	7439-92-1	
Selenium	**<0.49**	mg/kg	1.6	0.49	1	06/26/18 04:58	06/27/18 07:04	7782-49-2	
Silver	**<0.098**	mg/kg	0.33	0.098	1	06/26/18 04:58	06/27/18 07:04	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.022J**	mg/kg	0.028	0.0084	1	06/25/18 07:21	06/28/18 17:54	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**20.3**	%	0.10	0.10	1		06/27/18 16:26		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**<0.51**	ug/kg	1.7	0.51	1	06/25/18 06:31	06/26/18 18:46	83-32-9	
Acenaphthylene	**<0.62**	ug/kg	2.1	0.62	1	06/25/18 06:31	06/26/18 18:46	208-96-8	
Anthracene	**<0.59**	ug/kg	2.0	0.59	1	06/25/18 06:31	06/26/18 18:46	120-12-7	
Benzo(a)anthracene	**<1.4**	ug/kg	4.5	1.4	1	06/25/18 06:31	06/26/18 18:46	56-55-3	
Benzo(a)pyrene	**<0.86**	ug/kg	2.9	0.86	1	06/25/18 06:31	06/26/18 18:46	50-32-8	
Benzo(b)fluoranthene	**<0.47**	ug/kg	1.6	0.47	1	06/25/18 06:31	06/26/18 18:46	205-99-2	
Benzo(g,h,i)perylene	**<0.79**	ug/kg	2.6	0.79	1	06/25/18 06:31	06/26/18 18:46	191-24-2	
Benzo(k)fluoranthene	**<1.1**	ug/kg	3.5	1.1	1	06/25/18 06:31	06/26/18 18:46	207-08-9	
Chrysene	**<1.7**	ug/kg	5.7	1.7	1	06/25/18 06:31	06/26/18 18:46	218-01-9	
Dibenz(a,h)anthracene	**<0.58**	ug/kg	1.9	0.58	1	06/25/18 06:31	06/26/18 18:46	53-70-3	
Fluoranthene	**<0.54**	ug/kg	1.8	0.54	1	06/25/18 06:31	06/26/18 18:46	206-44-0	
Fluorene	**<0.39**	ug/kg	1.3	0.39	1	06/25/18 06:31	06/26/18 18:46	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.84**	ug/kg	2.8	0.84	1	06/25/18 06:31	06/26/18 18:46	193-39-5	
Naphthalene	**<0.97**	ug/kg	3.2	0.97	1	06/25/18 06:31	06/26/18 18:46	91-20-3	
Phenanthrene	**<2.4**	ug/kg	8.0	2.4	1	06/25/18 06:31	06/26/18 18:46	85-01-8	
Pyrene	**<1.9**	ug/kg	6.4	1.9	1	06/25/18 06:31	06/26/18 18:46	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	60	%.	42-125		1	06/25/18 06:31	06/26/18 18:46	321-60-8	
p-Terphenyl-d14 (S)	74	%.	57-125		1	06/25/18 06:31	06/26/18 18:46	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 18:47	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 18:47	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-2_0-1 **Lab ID: 10436863003** Collected: 06/21/18 15:15 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 18:47	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 18:47	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 18:47	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 18:47	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 18:47	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 18:47	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 18:47	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	117	%	57-148		1	06/28/18 11:30	06/28/18 18:47	1868-53-7	
Toluene-d8 (S)	102	%	58-142		1	06/28/18 11:30	06/28/18 18:47	2037-26-5	
4-Bromofluorobenzene (S)	87	%	48-130		1	06/28/18 11:30	06/28/18 18:47	460-00-4	

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-2_6-7 **Lab ID: 10436863004** Collected: 06/21/18 15:30 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**3.3**	mg/kg	1.5	0.45	1	06/26/18 04:58	06/27/18 07:06	7440-38-2	
Barium	**150**	mg/kg	0.79	0.24	1	06/26/18 04:58	06/27/18 07:06	7440-39-3	
Cadmium	**<0.070**	mg/kg	0.23	0.070	1	06/26/18 04:58	06/27/18 07:06	7440-43-9	
Chromium	**39.5**	mg/kg	0.96	0.29	1	06/26/18 04:58	06/27/18 07:06	7440-47-3	
Lead	**8.1**	mg/kg	1.0	0.30	1	06/26/18 04:58	06/27/18 07:06	7439-92-1	
Selenium	**<0.52**	mg/kg	1.7	0.52	1	06/26/18 04:58	06/27/18 07:06	7782-49-2	
Silver	**<0.11**	mg/kg	0.35	0.11	1	06/26/18 04:58	06/27/18 07:06	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.020J**	mg/kg	0.032	0.0097	1	06/25/18 07:21	06/28/18 17:56	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**24.5**	%	0.10	0.10	1		06/27/18 16:26		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**<0.54**	ug/kg	1.8	0.54	1	06/25/18 06:31	06/26/18 19:10	83-32-9	
Acenaphthylene	**<0.66**	ug/kg	2.2	0.66	1	06/25/18 06:31	06/26/18 19:10	208-96-8	
Anthracene	**<0.62**	ug/kg	2.1	0.62	1	06/25/18 06:31	06/26/18 19:10	120-12-7	
Benzo(a)anthracene	**<1.4**	ug/kg	4.8	1.4	1	06/25/18 06:31	06/26/18 19:10	56-55-3	
Benzo(a)pyrene	**<0.91**	ug/kg	3.0	0.91	1	06/25/18 06:31	06/26/18 19:10	50-32-8	
Benzo(b)fluoranthene	**<0.49**	ug/kg	1.6	0.49	1	06/25/18 06:31	06/26/18 19:10	205-99-2	
Benzo(g,h,i)perylene	**<0.84**	ug/kg	2.8	0.84	1	06/25/18 06:31	06/26/18 19:10	191-24-2	
Benzo(k)fluoranthene	**<1.1**	ug/kg	3.7	1.1	1	06/25/18 06:31	06/26/18 19:10	207-08-9	
Chrysene	**<1.8**	ug/kg	6.0	1.8	1	06/25/18 06:31	06/26/18 19:10	218-01-9	
Dibenz(a,h)anthracene	**<0.61**	ug/kg	2.0	0.61	1	06/25/18 06:31	06/26/18 19:10	53-70-3	
Fluoranthene	**<0.57**	ug/kg	1.9	0.57	1	06/25/18 06:31	06/26/18 19:10	206-44-0	
Fluorene	**<0.41**	ug/kg	1.4	0.41	1	06/25/18 06:31	06/26/18 19:10	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.89**	ug/kg	3.0	0.89	1	06/25/18 06:31	06/26/18 19:10	193-39-5	
Naphthalene	**<1.0**	ug/kg	3.4	1.0	1	06/25/18 06:31	06/26/18 19:10	91-20-3	
Phenanthrene	**<2.5**	ug/kg	8.5	2.5	1	06/25/18 06:31	06/26/18 19:10	85-01-8	
Pyrene	**<2.0**	ug/kg	6.7	2.0	1	06/25/18 06:31	06/26/18 19:10	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	55	%.	42-125		1	06/25/18 06:31	06/26/18 19:10	321-60-8	
p-Terphenyl-d14 (S)	75	%.	57-125		1	06/25/18 06:31	06/26/18 19:10	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 17:40	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 17:40	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-2_6-7 **Lab ID: 10436863004** Collected: 06/21/18 15:30 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 17:40	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 17:40	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 17:40	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 17:40	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 17:40	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 17:40	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:40	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	109	%	57-148		1	06/28/18 11:30	06/28/18 17:40	1868-53-7	
Toluene-d8 (S)	105	%	58-142		1	06/28/18 11:30	06/28/18 17:40	2037-26-5	
4-Bromofluorobenzene (S)	89	%	48-130		1	06/28/18 11:30	06/28/18 17:40	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-3_0-2 **Lab ID: 10436863005** Collected: 06/21/18 16:20 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**3.5**	mg/kg	1.5	0.44	1	06/26/18 04:58	06/27/18 07:10	7440-38-2	
Barium	**174**	mg/kg	0.77	0.23	1	06/26/18 04:58	06/27/18 07:10	7440-39-3	
Cadmium	**<0.069**	mg/kg	0.23	0.069	1	06/26/18 04:58	06/27/18 07:10	7440-43-9	
Chromium	**41.7**	mg/kg	0.94	0.28	1	06/26/18 04:58	06/27/18 07:10	7440-47-3	
Lead	**9.0**	mg/kg	0.99	0.30	1	06/26/18 04:58	06/27/18 07:10	7439-92-1	
Selenium	**<0.51**	mg/kg	1.7	0.51	1	06/26/18 04:58	06/27/18 07:10	7782-49-2	
Silver	**<0.10**	mg/kg	0.35	0.10	1	06/26/18 04:58	06/27/18 07:10	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.026J**	mg/kg	0.031	0.0094	1	06/25/18 07:21	06/28/18 18:03	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**24.5**	%	0.10	0.10	1		06/27/18 16:26		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**<0.54**	ug/kg	1.8	0.54	1	06/25/18 06:31	06/26/18 19:33	83-32-9	
Acenaphthylene	**<0.65**	ug/kg	2.2	0.65	1	06/25/18 06:31	06/26/18 19:33	208-96-8	
Anthracene	**<0.62**	ug/kg	2.1	0.62	1	06/25/18 06:31	06/26/18 19:33	120-12-7	
Benzo(a)anthracene	**<1.4**	ug/kg	4.7	1.4	1	06/25/18 06:31	06/26/18 19:33	56-55-3	
Benzo(a)pyrene	**<0.91**	ug/kg	3.0	0.91	1	06/25/18 06:31	06/26/18 19:33	50-32-8	
Benzo(b)fluoranthene	**<0.49**	ug/kg	1.6	0.49	1	06/25/18 06:31	06/26/18 19:33	205-99-2	
Benzo(g,h,i)perylene	**<0.83**	ug/kg	2.8	0.83	1	06/25/18 06:31	06/26/18 19:33	191-24-2	
Benzo(k)fluoranthene	**<1.1**	ug/kg	3.7	1.1	1	06/25/18 06:31	06/26/18 19:33	207-08-9	
Chrysene	**<1.8**	ug/kg	6.0	1.8	1	06/25/18 06:31	06/26/18 19:33	218-01-9	
Dibenz(a,h)anthracene	**<0.61**	ug/kg	2.0	0.61	1	06/25/18 06:31	06/26/18 19:33	53-70-3	
Fluoranthene	**<0.56**	ug/kg	1.9	0.56	1	06/25/18 06:31	06/26/18 19:33	206-44-0	
Fluorene	**<0.41**	ug/kg	1.4	0.41	1	06/25/18 06:31	06/26/18 19:33	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.88**	ug/kg	2.9	0.88	1	06/25/18 06:31	06/26/18 19:33	193-39-5	
Naphthalene	**<1.0**	ug/kg	3.4	1.0	1	06/25/18 06:31	06/26/18 19:33	91-20-3	
Phenanthrene	**<2.5**	ug/kg	8.4	2.5	1	06/25/18 06:31	06/26/18 19:33	85-01-8	
Pyrene	**<2.0**	ug/kg	6.7	2.0	1	06/25/18 06:31	06/26/18 19:33	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	79	%.	42-125		1	06/25/18 06:31	06/26/18 19:33	321-60-8	
p-Terphenyl-d14 (S)	77	%.	57-125		1	06/25/18 06:31	06/26/18 19:33	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 19:10	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 19:10	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-3_0-2 **Lab ID: 10436863005** Collected: 06/21/18 16:20 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 19:10	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 19:10	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 19:10	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 19:10	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 19:10	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 19:10	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:10	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	109	%	57-148		1	06/28/18 11:30	06/28/18 19:10	1868-53-7	
Toluene-d8 (S)	99	%	58-142		1	06/28/18 11:30	06/28/18 19:10	2037-26-5	
4-Bromofluorobenzene (S)	83	%	48-130		1	06/28/18 11:30	06/28/18 19:10	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-3_8-9 **Lab ID: 10436863006** Collected: 06/21/18 16:35 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**2.8**	mg/kg	1.7	0.50	1	06/26/18 04:58	06/27/18 07:12	7440-38-2	
Barium	**176**	mg/kg	0.87	0.26	1	06/26/18 04:58	06/27/18 07:12	7440-39-3	
Cadmium	**0.11J**	mg/kg	0.26	0.077	1	06/26/18 04:58	06/27/18 07:12	7440-43-9	
Chromium	**42.6**	mg/kg	1.1	0.32	1	06/26/18 04:58	06/27/18 07:12	7440-47-3	
Lead	**7.8**	mg/kg	1.1	0.33	1	06/26/18 04:58	06/27/18 07:12	7439-92-1	
Selenium	**<0.58**	mg/kg	1.9	0.58	1	06/26/18 04:58	06/27/18 07:12	7782-49-2	
Silver	**<0.12**	mg/kg	0.39	0.12	1	06/26/18 04:58	06/27/18 07:12	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.021J**	mg/kg	0.037	0.011	1	06/25/18 07:21	06/28/18 18:05	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**31.6**	%	0.10	0.10	1		06/27/18 16:27		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**<0.60**	ug/kg	2.0	0.60	1	06/25/18 06:31	06/26/18 19:57	83-32-9	
Acenaphthylene	**<0.72**	ug/kg	2.4	0.72	1	06/25/18 06:31	06/26/18 19:57	208-96-8	
Anthracene	**<0.68**	ug/kg	2.3	0.68	1	06/25/18 06:31	06/26/18 19:57	120-12-7	
Benzo(a)anthracene	**<1.6**	ug/kg	5.3	1.6	1	06/25/18 06:31	06/26/18 19:57	56-55-3	
Benzo(a)pyrene	**1.2J**	ug/kg	3.3	1.0	1	06/25/18 06:31	06/26/18 19:57	50-32-8	
Benzo(b)fluoranthene	**2.2**	ug/kg	1.8	0.55	1	06/25/18 06:31	06/26/18 19:57	205-99-2	
Benzo(g,h,i)perylene	**2.3J**	ug/kg	3.1	0.93	1	06/25/18 06:31	06/26/18 19:57	191-24-2	
Benzo(k)fluoranthene	**2.2J**	ug/kg	4.1	1.2	1	06/25/18 06:31	06/26/18 19:57	207-08-9	
Chrysene	**<2.0**	ug/kg	6.6	2.0	1	06/25/18 06:31	06/26/18 19:57	218-01-9	
Dibenz(a,h)anthracene	**2.2J**	ug/kg	2.2	0.67	1	06/25/18 06:31	06/26/18 19:57	53-70-3	
Fluoranthene	**1.9J**	ug/kg	2.1	0.63	1	06/25/18 06:31	06/26/18 19:57	206-44-0	
Fluorene	**<0.46**	ug/kg	1.5	0.46	1	06/25/18 06:31	06/26/18 19:57	86-73-7	
Indeno(1,2,3-cd)pyrene	**2.2J**	ug/kg	3.3	0.98	1	06/25/18 06:31	06/26/18 19:57	193-39-5	
Naphthalene	**<1.1**	ug/kg	3.8	1.1	1	06/25/18 06:31	06/26/18 19:57	91-20-3	
Phenanthrene	**<2.8**	ug/kg	9.3	2.8	1	06/25/18 06:31	06/26/18 19:57	85-01-8	
Pyrene	**<2.2**	ug/kg	7.4	2.2	1	06/25/18 06:31	06/26/18 19:57	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	60	%.	42-125		1	06/25/18 06:31	06/26/18 19:57	321-60-8	
p-Terphenyl-d14 (S)	77	%.	57-125		1	06/25/18 06:31	06/26/18 19:57	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 19:32	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 19:32	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-3_8-9 **Lab ID: 10436863006** Collected: 06/21/18 16:35 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 19:32	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 19:32	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 19:32	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 19:32	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 19:32	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 19:32	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:32	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	103	%	57-148		1	06/28/18 11:30	06/28/18 19:32	1868-53-7	
Toluene-d8 (S)	98	%	58-142		1	06/28/18 11:30	06/28/18 19:32	2037-26-5	
4-Bromofluorobenzene (S)	82	%	48-130		1	06/28/18 11:30	06/28/18 19:32	460-00-4	

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-4_0-2 **Lab ID: 10436863007** Collected: 06/22/18 08:40 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**3.0**	mg/kg	1.5	0.46	1	06/26/18 04:58	06/27/18 07:14	7440-38-2	
Barium	**191**	mg/kg	0.79	0.24	1	06/26/18 04:58	06/27/18 07:14	7440-39-3	
Cadmium	**<0.071**	mg/kg	0.24	0.071	1	06/26/18 04:58	06/27/18 07:14	7440-43-9	
Chromium	**48.6**	mg/kg	0.97	0.29	1	06/26/18 04:58	06/27/18 07:14	7440-47-3	
Lead	**9.1**	mg/kg	1.0	0.30	1	06/26/18 04:58	06/27/18 07:14	7439-92-1	
Selenium	**<0.53**	mg/kg	1.8	0.53	1	06/26/18 04:58	06/27/18 07:14	7782-49-2	
Silver	**<0.11**	mg/kg	0.36	0.11	1	06/26/18 04:58	06/27/18 07:14	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.023J**	mg/kg	0.032	0.0097	1	06/25/18 07:21	06/28/18 18:07	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**26.7**	%	0.10	0.10	1		06/27/18 16:27		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**<0.56**	ug/kg	1.9	0.56	1	06/25/18 06:31	06/26/18 20:20	83-32-9	
Acenaphthylene	**<0.67**	ug/kg	2.2	0.67	1	06/25/18 06:31	06/26/18 20:20	208-96-8	
Anthracene	**<0.64**	ug/kg	2.1	0.64	1	06/25/18 06:31	06/26/18 20:20	120-12-7	
Benzo(a)anthracene	**<1.5**	ug/kg	4.9	1.5	1	06/25/18 06:31	06/26/18 20:20	56-55-3	
Benzo(a)pyrene	**<0.94**	ug/kg	3.1	0.94	1	06/25/18 06:31	06/26/18 20:20	50-32-8	
Benzo(b)fluoranthene	**<0.51**	ug/kg	1.7	0.51	1	06/25/18 06:31	06/26/18 20:20	205-99-2	
Benzo(g,h,i)perylene	**<0.86**	ug/kg	2.9	0.86	1	06/25/18 06:31	06/26/18 20:20	191-24-2	
Benzo(k)fluoranthene	**<1.2**	ug/kg	3.8	1.2	1	06/25/18 06:31	06/26/18 20:20	207-08-9	
Chrysene	**<1.9**	ug/kg	6.2	1.9	1	06/25/18 06:31	06/26/18 20:20	218-01-9	
Dibenz(a,h)anthracene	**<0.63**	ug/kg	2.1	0.63	1	06/25/18 06:31	06/26/18 20:20	53-70-3	
Fluoranthene	**<0.58**	ug/kg	1.9	0.58	1	06/25/18 06:31	06/26/18 20:20	206-44-0	
Fluorene	**<0.43**	ug/kg	1.4	0.43	1	06/25/18 06:31	06/26/18 20:20	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.91**	ug/kg	3.0	0.91	1	06/25/18 06:31	06/26/18 20:20	193-39-5	
Naphthalene	**<1.1**	ug/kg	3.5	1.1	1	06/25/18 06:31	06/26/18 20:20	91-20-3	
Phenanthrene	**<2.6**	ug/kg	8.7	2.6	1	06/25/18 06:31	06/26/18 20:20	85-01-8	
Pyrene	**<2.1**	ug/kg	6.9	2.1	1	06/25/18 06:31	06/26/18 20:20	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	64	%.	42-125		1	06/25/18 06:31	06/26/18 20:20	321-60-8	
p-Terphenyl-d14 (S)	74	%.	57-125		1	06/25/18 06:31	06/26/18 20:20	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 19:55	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 19:55	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-4_0-2 **Lab ID: 10436863007** Collected: 06/22/18 08:40 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 19:55	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 19:55	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 19:55	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 19:55	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 19:55	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 19:55	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 19:55	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	109	%	57-148		1	06/28/18 11:30	06/28/18 19:55	1868-53-7	
Toluene-d8 (S)	97	%	58-142		1	06/28/18 11:30	06/28/18 19:55	2037-26-5	
4-Bromofluorobenzene (S)	80	%	48-130		1	06/28/18 11:30	06/28/18 19:55	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-4_6-7 **Lab ID: 10436863008** Collected: 06/22/18 08:55 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**3.0**	mg/kg	1.6	0.48	1	06/26/18 04:58	06/27/18 07:15	7440-38-2	
Barium	**160**	mg/kg	0.84	0.25	1	06/26/18 04:58	06/27/18 07:15	7440-39-3	
Cadmium	**0.097J**	mg/kg	0.25	0.075	1	06/26/18 04:58	06/27/18 07:15	7440-43-9	
Chromium	**39.4**	mg/kg	1.0	0.31	1	06/26/18 04:58	06/27/18 07:15	7440-47-3	
Lead	**7.7**	mg/kg	1.1	0.32	1	06/26/18 04:58	06/27/18 07:15	7439-92-1	
Selenium	**<0.56**	mg/kg	1.9	0.56	1	06/26/18 04:58	06/27/18 07:15	7782-49-2	
Silver	**<0.11**	mg/kg	0.38	0.11	1	06/26/18 04:58	06/27/18 07:15	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.021J**	mg/kg	0.038	0.011	1	06/25/18 07:21	06/28/18 18:09	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**29.4**	%	0.10	0.10	1		06/27/18 16:27		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**<0.58**	ug/kg	1.9	0.58	1	06/25/18 06:31	06/26/18 20:44	83-32-9	
Acenaphthylene	**<0.70**	ug/kg	2.3	0.70	1	06/25/18 06:31	06/26/18 20:44	208-96-8	
Anthracene	**<0.66**	ug/kg	2.2	0.66	1	06/25/18 06:31	06/26/18 20:44	120-12-7	
Benzo(a)anthracene	**<1.5**	ug/kg	5.1	1.5	1	06/25/18 06:31	06/26/18 20:44	56-55-3	
Benzo(a)pyrene	**<0.97**	ug/kg	3.2	0.97	1	06/25/18 06:31	06/26/18 20:44	50-32-8	
Benzo(b)fluoranthene	**<0.53**	ug/kg	1.8	0.53	1	06/25/18 06:31	06/26/18 20:44	205-99-2	
Benzo(g,h,i)perylene	**<0.90**	ug/kg	3.0	0.90	1	06/25/18 06:31	06/26/18 20:44	191-24-2	
Benzo(k)fluoranthene	**<1.2**	ug/kg	4.0	1.2	1	06/25/18 06:31	06/26/18 20:44	207-08-9	
Chrysene	**<1.9**	ug/kg	6.4	1.9	1	06/25/18 06:31	06/26/18 20:44	218-01-9	
Dibenz(a,h)anthracene	**<0.65**	ug/kg	2.2	0.65	1	06/25/18 06:31	06/26/18 20:44	53-70-3	
Fluoranthene	**<0.61**	ug/kg	2.0	0.61	1	06/25/18 06:31	06/26/18 20:44	206-44-0	
Fluorene	**<0.44**	ug/kg	1.5	0.44	1	06/25/18 06:31	06/26/18 20:44	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.95**	ug/kg	3.2	0.95	1	06/25/18 06:31	06/26/18 20:44	193-39-5	
Naphthalene	**<1.1**	ug/kg	3.6	1.1	1	06/25/18 06:31	06/26/18 20:44	91-20-3	
Phenanthrene	**<2.7**	ug/kg	9.0	2.7	1	06/25/18 06:31	06/26/18 20:44	85-01-8	
Pyrene	**<2.2**	ug/kg	7.2	2.2	1	06/25/18 06:31	06/26/18 20:44	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	75	%.	42-125		1	06/25/18 06:31	06/26/18 20:44	321-60-8	
p-Terphenyl-d14 (S)	74	%.	57-125		1	06/25/18 06:31	06/26/18 20:44	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 20:18	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 20:18	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-4_6-7 **Lab ID: 10436863008** Collected: 06/22/18 08:55 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 20:18	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 20:18	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 20:18	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 20:18	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 20:18	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 20:18	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:18	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	108	%	57-148		1	06/28/18 11:30	06/28/18 20:18	1868-53-7	
Toluene-d8 (S)	93	%	58-142		1	06/28/18 11:30	06/28/18 20:18	2037-26-5	
4-Bromofluorobenzene (S)	80	%	48-130		1	06/28/18 11:30	06/28/18 20:18	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-5_0-1 **Lab ID: 10436863009** Collected: 06/22/18 09:35 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**5.1J**	mg/kg	7.5	2.3	5	06/26/18 04:58	06/27/18 07:19	7440-38-2	D3
Barium	**287**	mg/kg	3.9	1.2	5	06/26/18 04:58	06/27/18 07:19	7440-39-3	
Cadmium	**0.56J**	mg/kg	1.2	0.35	5	06/26/18 04:58	06/27/18 07:19	7440-43-9	D3
Chromium	**1850**	mg/kg	9.5	2.9	10	06/26/18 04:58	06/27/18 07:20	7440-47-3	
Lead	**88.2**	mg/kg	10.0	3.0	10	06/26/18 04:58	06/27/18 07:20	7439-92-1	
Selenium	**<5.2**	mg/kg	17.4	5.2	10	06/26/18 04:58	06/27/18 07:20	7782-49-2	D3
Silver	**1.1J**	mg/kg	3.5	1.1	10	06/26/18 04:58	06/27/18 07:20	7440-22-4	D3
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.10**	mg/kg	0.033	0.0098	1	06/25/18 07:21	06/28/18 18:11	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**23.3**	%	0.10	0.10	1		06/27/18 16:27		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**6.9**	ug/kg	1.8	0.53	1	06/25/18 06:31	06/26/18 21:07	83-32-9	
Acenaphthylene	**3.4**	ug/kg	2.1	0.64	1	06/25/18 06:31	06/26/18 21:07	208-96-8	
Anthracene	**11.0**	ug/kg	2.0	0.61	1	06/25/18 06:31	06/26/18 21:07	120-12-7	
Benzo(a)anthracene	**77.8**	ug/kg	4.7	1.4	1	06/25/18 06:31	06/26/18 21:07	56-55-3	
Benzo(a)pyrene	**128**	ug/kg	3.0	0.89	1	06/25/18 06:31	06/26/18 21:07	50-32-8	
Benzo(b)fluoranthene	**162**	ug/kg	1.6	0.49	1	06/25/18 06:31	06/26/18 21:07	205-99-2	
Benzo(g,h,i)perylene	**116**	ug/kg	2.7	0.82	1	06/25/18 06:31	06/26/18 21:07	191-24-2	
Benzo(k)fluoranthene	**55.7**	ug/kg	3.7	1.1	1	06/25/18 06:31	06/26/18 21:07	207-08-9	
Chrysene	**98.1**	ug/kg	5.9	1.8	1	06/25/18 06:31	06/26/18 21:07	218-01-9	
Dibenz(a,h)anthracene	**32.5**	ug/kg	2.0	0.60	1	06/25/18 06:31	06/26/18 21:07	53-70-3	
Fluoranthene	**90.4**	ug/kg	1.9	0.56	1	06/25/18 06:31	06/26/18 21:07	206-44-0	
Fluorene	**2.5**	ug/kg	1.4	0.41	1	06/25/18 06:31	06/26/18 21:07	86-73-7	
Indeno(1,2,3-cd)pyrene	**94.4**	ug/kg	2.9	0.87	1	06/25/18 06:31	06/26/18 21:07	193-39-5	
Naphthalene	**4.3**	ug/kg	3.3	1.0	1	06/25/18 06:31	06/26/18 21:07	91-20-3	
Phenanthrene	**39.1**	ug/kg	8.3	2.5	1	06/25/18 06:31	06/26/18 21:07	85-01-8	
Pyrene	**75.2**	ug/kg	6.6	2.0	1	06/25/18 06:31	06/26/18 21:07	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	77	%.	42-125		1	06/25/18 06:31	06/26/18 21:07	321-60-8	
p-Terphenyl-d14 (S)	85	%.	57-125		1	06/25/18 06:31	06/26/18 21:07	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 20:40	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 20:40	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-5_0-1 **Lab ID: 10436863009** Collected: 06/22/18 09:35 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 20:40	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 20:40	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 20:40	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 20:40	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 20:40	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	127-18-4	W
Toluene	**38.8J**	ug/kg	78.3	32.6	1	06/28/18 11:30	06/28/18 20:40	108-88-3	
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 20:40	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 20:40	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	111	%	57-148		1	06/28/18 11:30	06/28/18 20:40	1868-53-7	
Toluene-d8 (S)	99	%	58-142		1	06/28/18 11:30	06/28/18 20:40	2037-26-5	
4-Bromofluorobenzene (S)	83	%	48-130		1	06/28/18 11:30	06/28/18 20:40	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-5_8-9 **Lab ID: 10436863010** Collected: 06/22/18 09:50 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050								
Arsenic	**3.4**	mg/kg	1.6	0.47	1	06/26/18 04:58	06/27/18 07:22	7440-38-2	
Barium	**173**	mg/kg	0.82	0.25	1	06/26/18 04:58	06/27/18 07:22	7440-39-3	
Cadmium	**<0.073**	mg/kg	0.24	0.073	1	06/26/18 04:58	06/27/18 07:22	7440-43-9	
Chromium	**42.0**	mg/kg	1.0	0.30	1	06/26/18 04:58	06/27/18 07:22	7440-47-3	
Lead	**8.4**	mg/kg	1.0	0.31	1	06/26/18 04:58	06/27/18 07:22	7439-92-1	
Selenium	**<0.54**	mg/kg	1.8	0.54	1	06/26/18 04:58	06/27/18 07:22	7782-49-2	
Silver	**<0.11**	mg/kg	0.37	0.11	1	06/26/18 04:58	06/27/18 07:22	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B								
Mercury	**0.017J**	mg/kg	0.032	0.0096	1	06/25/18 07:21	06/28/18 18:13	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974								
Percent Moisture	**28.1**	%	0.10	0.10	1		06/27/18 16:28		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550								
Acenaphthene	**<0.57**	ug/kg	1.9	0.57	1	06/25/18 06:31	06/26/18 21:31	83-32-9	
Acenaphthylene	**<0.69**	ug/kg	2.3	0.69	1	06/25/18 06:31	06/26/18 21:31	208-96-8	
Anthracene	**<0.65**	ug/kg	2.2	0.65	1	06/25/18 06:31	06/26/18 21:31	120-12-7	
Benzo(a)anthracene	**<1.5**	ug/kg	5.0	1.5	1	06/25/18 06:31	06/26/18 21:31	56-55-3	
Benzo(a)pyrene	**<0.95**	ug/kg	3.2	0.95	1	06/25/18 06:31	06/26/18 21:31	50-32-8	
Benzo(b)fluoranthene	**<0.52**	ug/kg	1.7	0.52	1	06/25/18 06:31	06/26/18 21:31	205-99-2	
Benzo(g,h,i)perylene	**<0.88**	ug/kg	2.9	0.88	1	06/25/18 06:31	06/26/18 21:31	191-24-2	
Benzo(k)fluoranthene	**<1.2**	ug/kg	3.9	1.2	1	06/25/18 06:31	06/26/18 21:31	207-08-9	
Chrysene	**<1.9**	ug/kg	6.3	1.9	1	06/25/18 06:31	06/26/18 21:31	218-01-9	
Dibenz(a,h)anthracene	**<0.64**	ug/kg	2.1	0.64	1	06/25/18 06:31	06/26/18 21:31	53-70-3	
Fluoranthene	**<0.59**	ug/kg	2.0	0.59	1	06/25/18 06:31	06/26/18 21:31	206-44-0	
Fluorene	**<0.43**	ug/kg	1.4	0.43	1	06/25/18 06:31	06/26/18 21:31	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.93**	ug/kg	3.1	0.93	1	06/25/18 06:31	06/26/18 21:31	193-39-5	
Naphthalene	**<1.1**	ug/kg	3.6	1.1	1	06/25/18 06:31	06/26/18 21:31	91-20-3	
Phenanthrene	**<2.7**	ug/kg	8.9	2.7	1	06/25/18 06:31	06/26/18 21:31	85-01-8	
Pyrene	**<2.1**	ug/kg	7.1	2.1	1	06/25/18 06:31	06/26/18 21:31	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	60	%.	42-125		1	06/25/18 06:31	06/26/18 21:31	321-60-8	
p-Terphenyl-d14 (S)	74	%.	57-125		1	06/25/18 06:31	06/26/18 21:31	1718-51-0	
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 21:03	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 21:03	591-78-6	W

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-5_8-9 **Lab ID: 10436863010** Collected: 06/22/18 09:50 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 21:03	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 21:03	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 21:03	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 21:03	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 21:03	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 21:03	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 21:03	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	103	%	57-148		1	06/28/18 11:30	06/28/18 21:03	1868-53-7	
Toluene-d8 (S)	94	%	58-142		1	06/28/18 11:30	06/28/18 21:03	2037-26-5	
4-Bromofluorobenzene (S)	82	%	48-130		1	06/28/18 11:30	06/28/18 21:03	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-3_14.5-19.5 **Lab ID: 10436863011** Collected: 06/22/18 11:20 Received: 06/22/18 20:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA Mod. 3510C								
Acenaphthene	**<0.0043**	ug/L	0.014	0.0043	1	06/26/18 14:37	06/27/18 17:24	83-32-9	
Acenaphthylene	**<0.0063**	ug/L	0.021	0.0063	1	06/26/18 14:37	06/27/18 17:24	208-96-8	
Anthracene	**<0.0083**	ug/L	0.028	0.0083	1	06/26/18 14:37	06/27/18 17:24	120-12-7	
Benzo(a)anthracene	**<0.0053**	ug/L	0.018	0.0053	1	06/26/18 14:37	06/27/18 17:24	56-55-3	
Benzo(a)pyrene	**<0.0054**	ug/L	0.018	0.0054	1	06/26/18 14:37	06/27/18 17:24	50-32-8	
Benzo(b)fluoranthene	**<0.017**	ug/L	0.057	0.017	1	06/26/18 14:37	06/27/18 17:24	205-99-2	
Benzo(g,h,i)perylene	**<0.013**	ug/L	0.044	0.013	1	06/26/18 14:37	06/27/18 17:24	191-24-2	
Benzo(k)fluoranthene	**<0.014**	ug/L	0.047	0.014	1	06/26/18 14:37	06/27/18 17:24	207-08-9	
Chrysene	**<0.012**	ug/L	0.041	0.012	1	06/26/18 14:37	06/27/18 17:24	218-01-9	
Dibenz(a,h)anthracene	**<0.012**	ug/L	0.041	0.012	1	06/26/18 14:37	06/27/18 17:24	53-70-3	
Fluoranthene	**<0.025**	ug/L	0.082	0.025	1	06/26/18 14:37	06/27/18 17:24	206-44-0	
Fluorene	**<0.0080**	ug/L	0.027	0.0080	1	06/26/18 14:37	06/27/18 17:24	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.018**	ug/L	0.060	0.018	1	06/26/18 14:37	06/27/18 17:24	193-39-5	
Naphthalene	**<0.0092**	ug/L	0.031	0.0092	1	06/26/18 14:37	06/27/18 17:24	91-20-3	
Phenanthrene	**<0.014**	ug/L	0.047	0.014	1	06/26/18 14:37	06/27/18 17:24	85-01-8	
Pyrene	**<0.020**	ug/L	0.066	0.020	1	06/26/18 14:37	06/27/18 17:24	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	72	%.	30-145		1	06/26/18 14:37	06/27/18 17:24	321-60-8	A5
p-Terphenyl-d14 (S)	88	%.	30-149		1	06/26/18 14:37	06/27/18 17:24	1718-51-0	
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<9.2**	ug/L	30.8	9.2	1		06/27/18 15:59	67-64-1	
Allyl chloride	**<0.29**	ug/L	0.97	0.29	1		06/27/18 15:59	107-05-1	
Benzene	**<0.10**	ug/L	0.34	0.10	1		06/27/18 15:59	71-43-2	
Bromobenzene	**<0.21**	ug/L	0.69	0.21	1		06/27/18 15:59	108-86-1	
Bromochloromethane	**<0.27**	ug/L	0.91	0.27	1		06/27/18 15:59	74-97-5	
Bromodichloromethane	**<0.22**	ug/L	0.72	0.22	1		06/27/18 15:59	75-27-4	
Bromoform	**<0.80**	ug/L	2.7	0.80	1		06/27/18 15:59	75-25-2	
Bromomethane	**<1.8**	ug/L	6.1	1.8	1		06/27/18 15:59	74-83-9	
2-Butanone (MEK)	**<0.99**	ug/L	3.3	0.99	1		06/27/18 15:59	78-93-3	
n-Butylbenzene	**<0.24**	ug/L	0.80	0.24	1		06/27/18 15:59	104-51-8	
sec-Butylbenzene	**<0.15**	ug/L	0.50	0.15	1		06/27/18 15:59	135-98-8	
tert-Butylbenzene	**<0.15**	ug/L	0.49	0.15	1		06/27/18 15:59	98-06-6	
Carbon tetrachloride	**<0.19**	ug/L	0.63	0.19	1		06/27/18 15:59	56-23-5	
Chlorobenzene	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:59	108-90-7	
Chloroethane	**<0.49**	ug/L	1.6	0.49	1		06/27/18 15:59	75-00-3	
Chloroform	**<0.45**	ug/L	1.5	0.45	1		06/27/18 15:59	67-66-3	
Chloromethane	**<0.16**	ug/L	0.52	0.16	1		06/27/18 15:59	74-87-3	
2-Chlorotoluene	**<0.16**	ug/L	0.54	0.16	1		06/27/18 15:59	95-49-8	
4-Chlorotoluene	**<0.13**	ug/L	0.45	0.13	1		06/27/18 15:59	106-43-4	
1,2-Dibromo-3-chloropropane	**<1.7**	ug/L	5.5	1.7	1		06/27/18 15:59	96-12-8	
Dibromochloromethane	**<0.12**	ug/L	0.41	0.12	1		06/27/18 15:59	124-48-1	
1,2-Dibromoethane (EDB)	**<0.24**	ug/L	0.80	0.24	1		06/27/18 15:59	106-93-4	
Dibromomethane	**<0.16**	ug/L	0.54	0.16	1		06/27/18 15:59	74-95-3	
1,2-Dichlorobenzene	**<0.14**	ug/L	0.46	0.14	1		06/27/18 15:59	95-50-1	
1,3-Dichlorobenzene	**<0.16**	ug/L	0.54	0.16	1		06/27/18 15:59	541-73-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: SB-3_14.5-19.5 **Lab ID: 10436863011** Collected: 06/22/18 11:20 Received: 06/22/18 20:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
1,4-Dichlorobenzene	**<0.17**	ug/L	0.56	0.17	1		06/27/18 15:59	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	0.78	0.23	1		06/27/18 15:59	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:59	75-34-3	
1,2-Dichloroethane	**<0.22**	ug/L	0.73	0.22	1		06/27/18 15:59	107-06-2	
1,1-Dichloroethene	**<0.16**	ug/L	0.53	0.16	1		06/27/18 15:59	75-35-4	
cis-1,2-Dichloroethene	**<0.15**	ug/L	0.51	0.15	1		06/27/18 15:59	156-59-2	
trans-1,2-Dichloroethene	**<0.12**	ug/L	0.39	0.12	1		06/27/18 15:59	156-60-5	
Dichlorofluoromethane	**<0.14**	ug/L	0.47	0.14	1		06/27/18 15:59	75-43-4	N2
1,2-Dichloropropane	**<0.16**	ug/L	0.55	0.16	1		06/27/18 15:59	78-87-5	
1,3-Dichloropropane	**<0.070**	ug/L	0.23	0.070	1		06/27/18 15:59	142-28-9	
2,2-Dichloropropane	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:59	594-20-7	
1,1-Dichloropropene	**<0.20**	ug/L	0.66	0.20	1		06/27/18 15:59	563-58-6	
cis-1,3-Dichloropropene	**<0.20**	ug/L	0.68	0.20	1		06/27/18 15:59	10061-01-5	
trans-1,3-Dichloropropene	**<0.18**	ug/L	0.61	0.18	1		06/27/18 15:59	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.095**	ug/L	0.32	0.095	1		06/27/18 15:59	60-29-7	
Ethylbenzene	**<0.14**	ug/L	0.46	0.14	1		06/27/18 15:59	100-41-4	
Hexachloro-1,3-butadiene	**<0.31**	ug/L	1.0	0.31	1		06/27/18 15:59	87-68-3	
Isopropylbenzene (Cumene)	**<0.18**	ug/L	0.62	0.18	1		06/27/18 15:59	98-82-8	
p-Isopropyltoluene	**<0.15**	ug/L	0.51	0.15	1		06/27/18 15:59	99-87-6	
Methylene Chloride	**<0.98**	ug/L	3.3	0.98	1		06/27/18 15:59	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.42**	ug/L	1.4	0.42	1		06/27/18 15:59	108-10-1	
Methyl-tert-butyl ether	**<0.16**	ug/L	0.54	0.16	1		06/27/18 15:59	1634-04-4	
Naphthalene	**<0.48**	ug/L	1.6	0.48	1		06/27/18 15:59	91-20-3	
n-Propylbenzene	**<0.10**	ug/L	0.34	0.10	1		06/27/18 15:59	103-65-1	
Styrene	**<0.19**	ug/L	0.62	0.19	1		06/27/18 15:59	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	0.65	0.20	1		06/27/18 15:59	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:59	79-34-5	
Tetrachloroethene	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:59	127-18-4	
Tetrahydrofuran	**<2.2**	ug/L	7.4	2.2	1		06/27/18 15:59	109-99-9	
Toluene	**2.1**	ug/L	0.28	0.083	1		06/27/18 15:59	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	0.69	0.21	1		06/27/18 15:59	87-61-6	
1,2,4-Trichlorobenzene	**<0.20**	ug/L	0.66	0.20	1		06/27/18 15:59	120-82-1	
1,1,1-Trichloroethane	**<0.14**	ug/L	0.45	0.14	1		06/27/18 15:59	71-55-6	
1,1,2-Trichloroethane	**<0.18**	ug/L	0.60	0.18	1		06/27/18 15:59	79-00-5	
Trichloroethene	**<0.15**	ug/L	0.50	0.15	1		06/27/18 15:59	79-01-6	
Trichlorofluoromethane	**<0.23**	ug/L	0.77	0.23	1		06/27/18 15:59	75-69-4	
1,2,3-Trichloropropane	**<0.26**	ug/L	0.86	0.26	1		06/27/18 15:59	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.22**	ug/L	0.72	0.22	1		06/27/18 15:59	76-13-1	
1,2,4-Trimethylbenzene	**<0.20**	ug/L	0.65	0.20	1		06/27/18 15:59	95-63-6	
1,3,5-Trimethylbenzene	**<0.12**	ug/L	0.41	0.12	1		06/27/18 15:59	108-67-8	
Vinyl chloride	**<0.092**	ug/L	0.31	0.092	1		06/27/18 15:59	75-01-4	
Xylene (Total)	**<0.31**	ug/L	1.0	0.31	1		06/27/18 15:59	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		06/27/18 15:59	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		06/27/18 15:59	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		06/27/18 15:59	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: Trip Blank **Lab ID: 10436863012** Collected: 06/21/18 00:00 Received: 06/22/18 20:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<9.2**	ug/L	30.8	9.2	1		06/27/18 15:42	67-64-1	
Allyl chloride	**<0.29**	ug/L	0.97	0.29	1		06/27/18 15:42	107-05-1	
Benzene	**<0.10**	ug/L	0.34	0.10	1		06/27/18 15:42	71-43-2	
Bromobenzene	**<0.21**	ug/L	0.69	0.21	1		06/27/18 15:42	108-86-1	
Bromochloromethane	**<0.27**	ug/L	0.91	0.27	1		06/27/18 15:42	74-97-5	
Bromodichloromethane	**<0.22**	ug/L	0.72	0.22	1		06/27/18 15:42	75-27-4	
Bromoform	**<0.80**	ug/L	2.7	0.80	1		06/27/18 15:42	75-25-2	
Bromomethane	**<1.8**	ug/L	6.1	1.8	1		06/27/18 15:42	74-83-9	
2-Butanone (MEK)	**<0.99**	ug/L	3.3	0.99	1		06/27/18 15:42	78-93-3	
n-Butylbenzene	**<0.24**	ug/L	0.80	0.24	1		06/27/18 15:42	104-51-8	
sec-Butylbenzene	**<0.15**	ug/L	0.50	0.15	1		06/27/18 15:42	135-98-8	
tert-Butylbenzene	**<0.15**	ug/L	0.49	0.15	1		06/27/18 15:42	98-06-6	
Carbon tetrachloride	**<0.19**	ug/L	0.63	0.19	1		06/27/18 15:42	56-23-5	
Chlorobenzene	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:42	108-90-7	
Chloroethane	**<0.49**	ug/L	1.6	0.49	1		06/27/18 15:42	75-00-3	
Chloroform	**<0.45**	ug/L	1.5	0.45	1		06/27/18 15:42	67-66-3	
Chloromethane	**<0.16**	ug/L	0.52	0.16	1		06/27/18 15:42	74-87-3	
2-Chlorotoluene	**<0.16**	ug/L	0.54	0.16	1		06/27/18 15:42	95-49-8	
4-Chlorotoluene	**<0.13**	ug/L	0.45	0.13	1		06/27/18 15:42	106-43-4	
1,2-Dibromo-3-chloropropane	**<1.7**	ug/L	5.5	1.7	1		06/27/18 15:42	96-12-8	
Dibromochloromethane	**<0.12**	ug/L	0.41	0.12	1		06/27/18 15:42	124-48-1	
1,2-Dibromoethane (EDB)	**<0.24**	ug/L	0.80	0.24	1		06/27/18 15:42	106-93-4	
Dibromomethane	**<0.16**	ug/L	0.54	0.16	1		06/27/18 15:42	74-95-3	
1,2-Dichlorobenzene	**<0.14**	ug/L	0.46	0.14	1		06/27/18 15:42	95-50-1	
1,3-Dichlorobenzene	**<0.16**	ug/L	0.54	0.16	1		06/27/18 15:42	541-73-1	
1,4-Dichlorobenzene	**<0.17**	ug/L	0.56	0.17	1		06/27/18 15:42	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	0.78	0.23	1		06/27/18 15:42	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:42	75-34-3	
1,2-Dichloroethane	**<0.22**	ug/L	0.73	0.22	1		06/27/18 15:42	107-06-2	
1,1-Dichloroethene	**<0.16**	ug/L	0.53	0.16	1		06/27/18 15:42	75-35-4	
cis-1,2-Dichloroethene	**<0.15**	ug/L	0.51	0.15	1		06/27/18 15:42	156-59-2	
trans-1,2-Dichloroethene	**<0.12**	ug/L	0.39	0.12	1		06/27/18 15:42	156-60-5	
Dichlorofluoromethane	**<0.14**	ug/L	0.47	0.14	1		06/27/18 15:42	75-43-4	N2
1,2-Dichloropropane	**<0.16**	ug/L	0.55	0.16	1		06/27/18 15:42	78-87-5	
1,3-Dichloropropane	**<0.070**	ug/L	0.23	0.070	1		06/27/18 15:42	142-28-9	
2,2-Dichloropropane	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:42	594-20-7	
1,1-Dichloropropene	**<0.20**	ug/L	0.66	0.20	1		06/27/18 15:42	563-58-6	
cis-1,3-Dichloropropene	**<0.20**	ug/L	0.68	0.20	1		06/27/18 15:42	10061-01-5	
trans-1,3-Dichloropropene	**<0.18**	ug/L	0.61	0.18	1		06/27/18 15:42	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.095**	ug/L	0.32	0.095	1		06/27/18 15:42	60-29-7	
Ethylbenzene	**<0.14**	ug/L	0.46	0.14	1		06/27/18 15:42	100-41-4	
Hexachloro-1,3-butadiene	**<0.31**	ug/L	1.0	0.31	1		06/27/18 15:42	87-68-3	
Isopropylbenzene (Cumene)	**<0.18**	ug/L	0.62	0.18	1		06/27/18 15:42	98-82-8	
p-Isopropyltoluene	**<0.15**	ug/L	0.51	0.15	1		06/27/18 15:42	99-87-6	
Methylene Chloride	**<0.98**	ug/L	3.3	0.98	1		06/27/18 15:42	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.42**	ug/L	1.4	0.42	1		06/27/18 15:42	108-10-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: Trip Blank **Lab ID: 10436863012** Collected: 06/21/18 00:00 Received: 06/22/18 20:00 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.16**	ug/L	0.54	0.16	1		06/27/18 15:42	1634-04-4	
Naphthalene	**<0.48**	ug/L	1.6	0.48	1		06/27/18 15:42	91-20-3	
n-Propylbenzene	**<0.10**	ug/L	0.34	0.10	1		06/27/18 15:42	103-65-1	
Styrene	**<0.19**	ug/L	0.62	0.19	1		06/27/18 15:42	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	0.65	0.20	1		06/27/18 15:42	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:42	79-34-5	
Tetrachloroethene	**<0.17**	ug/L	0.57	0.17	1		06/27/18 15:42	127-18-4	
Tetrahydrofuran	**<2.2**	ug/L	7.4	2.2	1		06/27/18 15:42	109-99-9	
Toluene	**<0.083**	ug/L	0.28	0.083	1		06/27/18 15:42	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	0.69	0.21	1		06/27/18 15:42	87-61-6	
1,2,4-Trichlorobenzene	**<0.20**	ug/L	0.66	0.20	1		06/27/18 15:42	120-82-1	
1,1,1-Trichloroethane	**<0.14**	ug/L	0.45	0.14	1		06/27/18 15:42	71-55-6	
1,1,2-Trichloroethane	**<0.18**	ug/L	0.60	0.18	1		06/27/18 15:42	79-00-5	
Trichloroethene	**<0.15**	ug/L	0.50	0.15	1		06/27/18 15:42	79-01-6	
Trichlorofluoromethane	**<0.23**	ug/L	0.77	0.23	1		06/27/18 15:42	75-69-4	
1,2,3-Trichloropropane	**<0.26**	ug/L	0.86	0.26	1		06/27/18 15:42	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.22**	ug/L	0.72	0.22	1		06/27/18 15:42	76-13-1	
1,2,4-Trimethylbenzene	**<0.20**	ug/L	0.65	0.20	1		06/27/18 15:42	95-63-6	
1,3,5-Trimethylbenzene	**<0.12**	ug/L	0.41	0.12	1		06/27/18 15:42	108-67-8	
Vinyl chloride	**<0.092**	ug/L	0.31	0.092	1		06/27/18 15:42	75-01-4	
Xylene (Total)	**<0.31**	ug/L	1.0	0.31	1		06/27/18 15:42	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		06/27/18 15:42	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		06/27/18 15:42	2037-26-5	
4-Bromofluorobenzene (S)	96	%.	75-125		1		06/27/18 15:42	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Sample: MeOH Trip Blank **Lab ID: 10436863013** Collected: 06/21/18 00:00 Received: 06/22/18 20:00 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Med Level Normal List	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,1,1-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	71-55-6	W
1,1,2,2-Tetrachloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	79-34-5	W
1,1,2-Trichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	79-00-5	W
1,1-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	75-34-3	W
1,1-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	75-35-4	W
1,2-Dichloroethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	107-06-2	W
1,2-Dichloropropane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	78-87-5	W
2-Butanone (MEK)	**<107**	ug/kg	250	107	1	06/28/18 11:30	06/28/18 17:17	78-93-3	W
2-Hexanone	**<52.0**	ug/kg	250	52.0	1	06/28/18 11:30	06/28/18 17:17	591-78-6	W
4-Methyl-2-pentanone (MIBK)	**<41.1**	ug/kg	250	41.1	1	06/28/18 11:30	06/28/18 17:17	108-10-1	W
Acetone	**<77.8**	ug/kg	250	77.8	1	06/28/18 11:30	06/28/18 17:17	67-64-1	W
Benzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	71-43-2	W
Bromodichloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	75-27-4	W
Bromoform	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	75-25-2	W
Bromomethane	**<69.9**	ug/kg	250	69.9	1	06/28/18 11:30	06/28/18 17:17	74-83-9	W
Carbon disulfide	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	75-15-0	W
Carbon tetrachloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	56-23-5	W
Chlorobenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	108-90-7	W
Chloroethane	**<67.0**	ug/kg	250	67.0	1	06/28/18 11:30	06/28/18 17:17	75-00-3	W
Chloroform	**<46.4**	ug/kg	250	46.4	1	06/28/18 11:30	06/28/18 17:17	67-66-3	W
Chloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	74-87-3	W
Dibromochloromethane	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	124-48-1	W
Ethylbenzene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	100-41-4	W
Methyl-tert-butyl ether	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	1634-04-4	W
Methylene Chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	75-09-2	W
Styrene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	100-42-5	W
Tetrachloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	127-18-4	W
Toluene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	108-88-3	W
Trichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	79-01-6	W
Vinyl chloride	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	75-01-4	W
cis-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	156-59-2	W
cis-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	10061-01-5	W
m&p-Xylene	**<50.0**	ug/kg	120	50.0	1	06/28/18 11:30	06/28/18 17:17	179601-23-1	W
o-Xylene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	95-47-6	W
trans-1,2-Dichloroethene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	156-60-5	W
trans-1,3-Dichloropropene	**<25.0**	ug/kg	60.0	25.0	1	06/28/18 11:30	06/28/18 17:17	10061-02-6	W
Surrogates									
Dibromofluoromethane (S)	110	%	57-148		1	06/28/18 11:30	06/28/18 17:17	1868-53-7	
Toluene-d8 (S)	102	%	58-142		1	06/28/18 11:30	06/28/18 17:17	2037-26-5	
4-Bromofluorobenzene (S)	94	%	48-130		1	06/28/18 11:30	06/28/18 17:17	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

QC Batch: 546627 Analysis Method: EPA 7471B
QC Batch Method: EPA 7471B Analysis Description: 7471B Mercury Solids
Associated Lab Samples: 10436863001, 10436863002, 10436863003, 10436863004, 10436863005, 10436863006, 10436863007, 10436863008, 10436863009, 10436863010

METHOD BLANK: 2972710 Matrix: Solid
Associated Lab Samples: 10436863001, 10436863002, 10436863003, 10436863004, 10436863005, 10436863006, 10436863007, 10436863008, 10436863009, 10436863010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.0080	0.027	06/28/18 17:42	

LABORATORY CONTROL SAMPLE: 2972711

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.47	0.46	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2972712 2972713

Parameter	Units	10436863001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.023J	.62	.62	0.63	0.64	97	98	75-125	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

QC Batch: 546886 Analysis Method: EPA 6010D
QC Batch Method: EPA 3050 Analysis Description: 6010D Solids
Associated Lab Samples: 10436863001, 10436863002, 10436863003, 10436863004, 10436863005, 10436863006, 10436863007, 10436863008, 10436863009, 10436863010

METHOD BLANK: 2973660 Matrix: Solid
Associated Lab Samples: 10436863001, 10436863002, 10436863003, 10436863004, 10436863005, 10436863006, 10436863007, 10436863008, 10436863009, 10436863010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	<0.35	1.2	06/27/18 06:51	
Barium	mg/kg	<0.18	0.60	06/27/18 06:51	
Cadmium	mg/kg	<0.054	0.18	06/27/18 06:51	
Chromium	mg/kg	<0.22	0.74	06/27/18 06:51	
Lead	mg/kg	<0.23	0.77	06/27/18 06:51	
Selenium	mg/kg	<0.40	1.3	06/27/18 06:51	
Silver	mg/kg	<0.082	0.27	06/27/18 06:51	

LABORATORY CONTROL SAMPLE: 2973661

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	50	48.7	97	80-120	
Barium	mg/kg	50	51.9	104	80-120	
Cadmium	mg/kg	50	50.8	102	80-120	
Chromium	mg/kg	50	52.0	104	80-120	
Lead	mg/kg	50	51.9	104	80-120	
Selenium	mg/kg	50	47.4	95	80-120	
Silver	mg/kg	25	25.0	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2973662 2973663

Parameter	Units	10436863001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	3.1	67.7	67.7	50.0	54.7	69	76	75-125	9	20	M1
Barium	mg/kg	245	67.7	67.7	326	284	119	57	75-125	14	20	M1
Cadmium	mg/kg	<0.075	67.7	67.7	50.8	55.8	75	82	75-125	9	20	
Chromium	mg/kg	49.6	67.7	67.7	113	123	94	108	75-125	8	20	
Lead	mg/kg	10.5	67.7	67.7	70.8	78.8	89	101	75-125	11	20	
Selenium	mg/kg	0.56J	67.7	67.7	45.5	48.9	66	71	75-125	7	20	M1
Silver	mg/kg	<0.11	33.9	33.9	24.4	27.0	72	80	75-125	10	20	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

QC Batch: 547426 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight / %M by ASTM D2974
Associated Lab Samples: 10436863001, 10436863002, 10436863003, 10436863004, 10436863005, 10436863006, 10436863007, 10436863008, 10436863009, 10436863010

SAMPLE DUPLICATE: 2975910

Parameter	Units	10436863001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	27.6	27.4	1	30	

SAMPLE DUPLICATE: 2975911

Parameter	Units	10436863010 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	28.1	28.4	1	30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

QC Batch: 293184 Analysis Method: EPA 8260
QC Batch Method: EPA 5035/5030B Analysis Description: 8260 MSV Med Level Normal List
Associated Lab Samples: 10436863001, 10436863002, 10436863003, 10436863004, 10436863005, 10436863006, 10436863007, 10436863008, 10436863009, 10436863010, 10436863013

METHOD BLANK: 1714466 Matrix: Solid
Associated Lab Samples: 10436863001, 10436863002, 10436863003, 10436863004, 10436863005, 10436863006, 10436863007, 10436863008, 10436863009, 10436863010, 10436863013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/kg	<14.4	50.0	06/28/18 15:01	
1,1,2,2-Tetrachloroethane	ug/kg	<17.5	50.0	06/28/18 15:01	
1,1,2-Trichloroethane	ug/kg	<20.2	50.0	06/28/18 15:01	
1,1-Dichloroethane	ug/kg	<17.6	50.0	06/28/18 15:01	
1,1-Dichloroethene	ug/kg	<17.6	50.0	06/28/18 15:01	
1,2-Dichloroethane	ug/kg	<15.0	50.0	06/28/18 15:01	
1,2-Dichloropropane	ug/kg	<16.8	50.0	06/28/18 15:01	
2-Butanone (MEK)	ug/kg	<124	250	06/28/18 15:01	
2-Hexanone	ug/kg	<52.0	250	06/28/18 15:01	
4-Methyl-2-pentanone (MIBK)	ug/kg	<41.1	250	06/28/18 15:01	
Acetone	ug/kg	<98.6	250	06/28/18 15:01	
Benzene	ug/kg	<9.2	20.0	06/28/18 15:01	
Bromodichloromethane	ug/kg	<9.8	50.0	06/28/18 15:01	
Bromoform	ug/kg	<19.8	50.0	06/28/18 15:01	
Bromomethane	ug/kg	<69.9	250	06/28/18 15:01	
Carbon disulfide	ug/kg	<11.1	50.0	06/28/18 15:01	
Carbon tetrachloride	ug/kg	<12.1	50.0	06/28/18 15:01	
Chlorobenzene	ug/kg	<14.8	50.0	06/28/18 15:01	
Chloroethane	ug/kg	<67.0	250	06/28/18 15:01	
Chloroform	ug/kg	<46.4	250	06/28/18 15:01	
Chloromethane	ug/kg	<20.4	50.0	06/28/18 15:01	
cis-1,2-Dichloroethene	ug/kg	<16.6	50.0	06/28/18 15:01	
cis-1,3-Dichloropropene	ug/kg	<16.6	50.0	06/28/18 15:01	
Dibromochloromethane	ug/kg	<17.9	50.0	06/28/18 15:01	
Ethylbenzene	ug/kg	<12.4	50.0	06/28/18 15:01	
m&p-Xylene	ug/kg	<34.4	100	06/28/18 15:01	
Methyl-tert-butyl ether	ug/kg	<12.7	50.0	06/28/18 15:01	
Methylene Chloride	ug/kg	<16.2	50.0	06/28/18 15:01	
o-Xylene	ug/kg	<14.0	50.0	06/28/18 15:01	
Styrene	ug/kg	<9.0	50.0	06/28/18 15:01	
Tetrachloroethene	ug/kg	<12.9	50.0	06/28/18 15:01	
Toluene	ug/kg	<11.2	50.0	06/28/18 15:01	
trans-1,2-Dichloroethene	ug/kg	<16.5	50.0	06/28/18 15:01	
trans-1,3-Dichloropropene	ug/kg	<14.4	50.0	06/28/18 15:01	
Trichloroethene	ug/kg	<23.6	50.0	06/28/18 15:01	
Vinyl chloride	ug/kg	<21.1	50.0	06/28/18 15:01	
4-Bromofluorobenzene (S)	%	93	48-130	06/28/18 15:01	
Dibromofluoromethane (S)	%	116	57-148	06/28/18 15:01	
Toluene-d8 (S)	%	107	58-142	06/28/18 15:01	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

LABORATORY CONTROL SAMPLE: 1714467

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/kg	2500	2590	104	70-130	
1,1,2,2-Tetrachloroethane	ug/kg	2500	2840	114	68-130	
1,1,2-Trichloroethane	ug/kg	2500	2610	104	70-130	
1,1-Dichloroethane	ug/kg	2500	2550	102	67-132	
1,1-Dichloroethene	ug/kg	2500	2740	110	67-128	
1,2-Dichloroethane	ug/kg	2500	2500	100	65-137	
1,2-Dichloropropane	ug/kg	2500	2820	113	75-126	
Benzene	ug/kg	2500	2470	99	70-130	
Bromodichloromethane	ug/kg	2500	2750	110	70-130	
Bromoform	ug/kg	2500	2310	92	57-117	
Bromomethane	ug/kg	2500	2360	94	48-135	
Carbon disulfide	ug/kg	2500	2580	103	66-143	
Carbon tetrachloride	ug/kg	2500	2650	106	65-133	
Chlorobenzene	ug/kg	2500	2590	103	70-130	
Chloroethane	ug/kg	2500	2500	100	37-165	
Chloroform	ug/kg	2500	2530	101	72-126	
Chloromethane	ug/kg	2500	1960	78	34-120	
cis-1,2-Dichloroethene	ug/kg	2500	2430	97	70-130	
cis-1,3-Dichloropropene	ug/kg	2500	2700	108	69-130	
Dibromochloromethane	ug/kg	2500	2610	104	68-130	
Ethylbenzene	ug/kg	2500	2630	105	79-121	
m&p-Xylene	ug/kg	5000	5260	105	70-130	
Methyl-tert-butyl ether	ug/kg	2500	2370	95	66-129	
Methylene Chloride	ug/kg	2500	2580	103	68-129	
o-Xylene	ug/kg	2500	2670	107	70-130	
Styrene	ug/kg	2500	2660	107	70-130	
Tetrachloroethene	ug/kg	2500	2630	105	70-130	
Toluene	ug/kg	2500	2660	106	80-123	
trans-1,2-Dichloroethene	ug/kg	2500	2540	102	70-130	
trans-1,3-Dichloropropene	ug/kg	2500	2290	91	67-130	
Trichloroethene	ug/kg	2500	2720	109	70-130	
Vinyl chloride	ug/kg	2500	2080	83	52-122	
4-Bromofluorobenzene (S)	%			98	48-130	
Dibromofluoromethane (S)	%			105	57-148	
Toluene-d8 (S)	%			101	58-142	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1714468 1714469

Parameter	Units	10436863004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1-Trichloroethane	ug/kg	<25.0	1660	1660	1500	1440	90	87	62-130	4	20	
1,1,2,2-Tetrachloroethane	ug/kg	<25.0	1660	1660	1670	1550	101	94	64-137	7	20	
1,1,2-Trichloroethane	ug/kg	<25.0	1660	1660	1650	1520	100	92	70-130	8	20	
1,1-Dichloroethane	ug/kg	<25.0	1660	1660	1590	1510	96	91	65-132	5	20	
1,1-Dichloroethene	ug/kg	<25.0	1660	1660	1460	1410	88	85	50-128	4	21	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1714468 1714469

Parameter	Units	10436863004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2-Dichloroethane	ug/kg	<25.0	1660	1660	1670	1570	101	95	65-139	6	20	
1,2-Dichloropropane	ug/kg	<25.0	1660	1660	1790	1660	108	100	74-128	8	20	
Benzene	ug/kg	<25.0	1660	1660	1550	1470	93	89	66-132	5	20	
Bromodichloromethane	ug/kg	<25.0	1660	1660	1710	1650	103	99	69-130	4	20	
Bromoform	ug/kg	<25.0	1660	1660	1600	1550	97	94	57-130	3	20	
Bromomethane	ug/kg	<69.9	1660	1660	1330	1250	80	75	34-145	6	20	
Carbon disulfide	ug/kg	<25.0	1660	1660	1320	1270	80	77	48-143	4	20	
Carbon tetrachloride	ug/kg	<25.0	1660	1660	1480	1460	90	88	54-133	2	20	
Chlorobenzene	ug/kg	<25.0	1660	1660	1670	1590	101	96	70-130	5	20	
Chloroethane	ug/kg	<67.0	1660	1660	1370	1360	83	82	33-165	1	20	
Chloroform	ug/kg	<46.4	1660	1660	1650	1570	99	95	72-128	5	20	
Chloromethane	ug/kg	<25.0	1660	1660	836	777	50	47	20-120	7	20	
cis-1,2-Dichloroethene	ug/kg	<25.0	1660	1660	1620	1480	98	90	69-130	9	20	
cis-1,3-Dichloropropene	ug/kg	<25.0	1660	1660	1620	1500	98	91	65-130	7	20	
Dibromochloromethane	ug/kg	<25.0	1660	1660	1620	1460	98	88	65-130	10	20	
Ethylbenzene	ug/kg	<25.0	1660	1660	1590	1480	96	90	63-127	7	20	
m&p-Xylene	ug/kg	<50.0	3310	3310	3250	3100	98	94	70-130	5	20	
Methyl-tert-butyl ether	ug/kg	<25.0	1660	1660	1480	1390	89	84	62-135	6	20	
Methylene Chloride	ug/kg	<25.0	1660	1660	1670	1560	101	94	68-129	7	20	
o-Xylene	ug/kg	<25.0	1660	1660	1620	1530	98	92	69-130	6	20	
Styrene	ug/kg	<25.0	1660	1660	1720	1580	104	96	70-130	8	20	
Tetrachloroethene	ug/kg	<25.0	1660	1660	1570	1540	95	93	70-130	2	20	
Toluene	ug/kg	<25.0	1660	1660	1680	1580	102	95	80-123	6	20	
trans-1,2-Dichloroethene	ug/kg	<25.0	1660	1660	1590	1420	96	86	70-130	11	20	
trans-1,3-Dichloropropene	ug/kg	<25.0	1660	1660	1460	1370	88	83	67-130	6	20	
Trichloroethene	ug/kg	<25.0	1660	1660	1640	1590	99	96	70-130	3	20	
Vinyl chloride	ug/kg	<25.0	1660	1660	928	899	56	54	39-122	3	20	
4-Bromofluorobenzene (S)	%						97	90	48-130			
Dibromofluoromethane (S)	%						106	100	57-148			
Toluene-d8 (S)	%						102	96	58-142			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

QC Batch: 547301 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10436863011, 10436863012

METHOD BLANK: 2975400 Matrix: Water
Associated Lab Samples: 10436863011, 10436863012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.20	0.65	06/27/18 12:47	
1,1,1-Trichloroethane	ug/L	<0.14	0.45	06/27/18 12:47	
1,1,2,2-Tetrachloroethane	ug/L	<0.17	0.57	06/27/18 12:47	
1,1,2-Trichloroethane	ug/L	<0.18	0.60	06/27/18 12:47	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.22	0.72	06/27/18 12:47	
1,1-Dichloroethane	ug/L	<0.17	0.57	06/27/18 12:47	
1,1-Dichloroethene	ug/L	<0.16	0.53	06/27/18 12:47	
1,1-Dichloropropene	ug/L	<0.20	0.66	06/27/18 12:47	
1,2,3-Trichlorobenzene	ug/L	<0.21	0.69	06/27/18 12:47	
1,2,3-Trichloropropane	ug/L	<0.26	0.86	06/27/18 12:47	
1,2,4-Trichlorobenzene	ug/L	<0.20	0.66	06/27/18 12:47	
1,2,4-Trimethylbenzene	ug/L	<0.20	0.65	06/27/18 12:47	
1,2-Dibromo-3-chloropropane	ug/L	<1.7	5.5	06/27/18 12:47	
1,2-Dibromoethane (EDB)	ug/L	<0.24	0.80	06/27/18 12:47	
1,2-Dichlorobenzene	ug/L	<0.14	0.46	06/27/18 12:47	
1,2-Dichloroethane	ug/L	<0.22	0.73	06/27/18 12:47	
1,2-Dichloropropane	ug/L	<0.16	0.55	06/27/18 12:47	
1,3,5-Trimethylbenzene	ug/L	<0.12	0.41	06/27/18 12:47	
1,3-Dichlorobenzene	ug/L	<0.16	0.54	06/27/18 12:47	
1,3-Dichloropropane	ug/L	<0.070	0.23	06/27/18 12:47	
1,4-Dichlorobenzene	ug/L	<0.17	0.56	06/27/18 12:47	
2,2-Dichloropropane	ug/L	<0.17	0.57	06/27/18 12:47	
2-Butanone (MEK)	ug/L	<0.99	3.3	06/27/18 12:47	
2-Chlorotoluene	ug/L	<0.16	0.54	06/27/18 12:47	
4-Chlorotoluene	ug/L	<0.13	0.45	06/27/18 12:47	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.42	1.4	06/27/18 12:47	
Acetone	ug/L	<9.2	30.8	06/27/18 12:47	
Allyl chloride	ug/L	<0.29	0.97	06/27/18 12:47	
Benzene	ug/L	<0.10	0.34	06/27/18 12:47	
Bromobenzene	ug/L	<0.21	0.69	06/27/18 12:47	
Bromochloromethane	ug/L	<0.27	0.91	06/27/18 12:47	
Bromodichloromethane	ug/L	<0.22	0.72	06/27/18 12:47	
Bromoform	ug/L	<0.80	2.7	06/27/18 12:47	
Bromomethane	ug/L	<1.8	6.1	06/27/18 12:47	
Carbon tetrachloride	ug/L	<0.19	0.63	06/27/18 12:47	
Chlorobenzene	ug/L	<0.17	0.57	06/27/18 12:47	
Chloroethane	ug/L	<0.49	1.6	06/27/18 12:47	
Chloroform	ug/L	<0.45	1.5	06/27/18 12:47	
Chloromethane	ug/L	<0.16	0.52	06/27/18 12:47	
cis-1,2-Dichloroethene	ug/L	<0.15	0.51	06/27/18 12:47	
cis-1,3-Dichloropropene	ug/L	<0.20	0.68	06/27/18 12:47	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

METHOD BLANK: 2975400 Matrix: Water
Associated Lab Samples: 10436863011, 10436863012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromochloromethane	ug/L	<0.12	0.41	06/27/18 12:47	
Dibromomethane	ug/L	<0.16	0.54	06/27/18 12:47	
Dichlorodifluoromethane	ug/L	<0.23	0.78	06/27/18 12:47	
Dichlorofluoromethane	ug/L	<0.14	0.47	06/27/18 12:47	N2
Diethyl ether (Ethyl ether)	ug/L	<0.095	0.32	06/27/18 12:47	
Ethylbenzene	ug/L	<0.14	0.46	06/27/18 12:47	
Hexachloro-1,3-butadiene	ug/L	<0.31	1.0	06/27/18 12:47	
Isopropylbenzene (Cumene)	ug/L	<0.18	0.62	06/27/18 12:47	
Methyl-tert-butyl ether	ug/L	<0.16	0.54	06/27/18 12:47	
Methylene Chloride	ug/L	<0.98	3.3	06/27/18 12:47	
n-Butylbenzene	ug/L	<0.24	0.80	06/27/18 12:47	
n-Propylbenzene	ug/L	<0.10	0.34	06/27/18 12:47	
Naphthalene	ug/L	<0.48	1.6	06/27/18 12:47	
p-Isopropyltoluene	ug/L	<0.15	0.51	06/27/18 12:47	
sec-Butylbenzene	ug/L	<0.15	0.50	06/27/18 12:47	
Styrene	ug/L	<0.19	0.62	06/27/18 12:47	
tert-Butylbenzene	ug/L	<0.15	0.49	06/27/18 12:47	
Tetrachloroethene	ug/L	<0.17	0.57	06/27/18 12:47	
Tetrahydrofuran	ug/L	<2.2	7.4	06/27/18 12:47	
Toluene	ug/L	<0.083	0.28	06/27/18 12:47	
trans-1,2-Dichloroethene	ug/L	<0.12	0.39	06/27/18 12:47	
trans-1,3-Dichloropropene	ug/L	<0.18	0.61	06/27/18 12:47	
Trichloroethene	ug/L	<0.15	0.50	06/27/18 12:47	
Trichlorofluoromethane	ug/L	<0.23	0.77	06/27/18 12:47	
Vinyl chloride	ug/L	<0.092	0.31	06/27/18 12:47	
Xylene (Total)	ug/L	<0.31	1.0	06/27/18 12:47	
1,2-Dichloroethane-d4 (S)	%.	99	75-125	06/27/18 12:47	
4-Bromofluorobenzene (S)	%.	96	75-125	06/27/18 12:47	
Toluene-d8 (S)	%.	98	75-125	06/27/18 12:47	

LABORATORY CONTROL SAMPLE: 2975401

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	17.7	89	75-125	
1,1,1-Trichloroethane	ug/L	20	21.1	106	75-125	
1,1,2,2-Tetrachloroethane	ug/L	20	18.5	92	75-129	
1,1,2-Trichloroethane	ug/L	20	19.5	97	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	20	18.7	94	74-125	
1,1-Dichloroethane	ug/L	20	20.7	103	75-127	
1,1-Dichloroethene	ug/L	20	18.4	92	73-125	
1,1-Dichloropropene	ug/L	20	20.5	102	75-125	
1,2,3-Trichlorobenzene	ug/L	20	17.4	87	74-126	
1,2,3-Trichloropropane	ug/L	20	19.7	98	75-125	
1,2,4-Trichlorobenzene	ug/L	20	16.9	84	75-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

LABORATORY CONTROL SAMPLE: 2975401

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	18.4	92	75-125	
1,2-Dibromo-3-chloropropane	ug/L	50	44.2	88	64-129	
1,2-Dibromoethane (EDB)	ug/L	20	18.3	92	75-125	
1,2-Dichlorobenzene	ug/L	20	18.8	94	75-125	
1,2-Dichloroethane	ug/L	20	19.8	99	74-125	
1,2-Dichloropropane	ug/L	20	20.6	103	75-125	
1,3,5-Trimethylbenzene	ug/L	20	18.7	93	75-125	
1,3-Dichlorobenzene	ug/L	20	18.6	93	75-125	
1,3-Dichloropropane	ug/L	20	19.5	98	75-125	
1,4-Dichlorobenzene	ug/L	20	18.1	91	75-125	
2,2-Dichloropropane	ug/L	20	21.0	105	70-125	
2-Butanone (MEK)	ug/L	100	106	106	57-130	
2-Chlorotoluene	ug/L	20	18.0	90	75-125	
4-Chlorotoluene	ug/L	20	18.3	92	75-125	
4-Methyl-2-pentanone (MIBK)	ug/L	100	103	103	69-137	
Acetone	ug/L	100	98.0	98	32-150	
Allyl chloride	ug/L	20	18.5	93	64-135	
Benzene	ug/L	20	19.6	98	75-126	
Bromobenzene	ug/L	20	20.0	100	75-125	
Bromochloromethane	ug/L	20	21.9	109	75-126	
Bromodichloromethane	ug/L	20	19.3	96	75-125	
Bromoform	ug/L	20	17.0	85	67-125	
Bromomethane	ug/L	20	14.1	71	30-150	
Carbon tetrachloride	ug/L	20	18.0	90	75-125	
Chlorobenzene	ug/L	20	19.8	99	75-125	
Chloroethane	ug/L	20	16.1	81	64-142	
Chloroform	ug/L	20	19.7	99	75-125	
Chloromethane	ug/L	20	15.9	80	40-150	
cis-1,2-Dichloroethene	ug/L	20	21.3	107	75-125	
cis-1,3-Dichloropropene	ug/L	20	17.5	87	75-125	
Dibromochloromethane	ug/L	20	17.6	88	75-125	
Dibromomethane	ug/L	20	19.5	97	75-125	
Dichlorodifluoromethane	ug/L	20	14.4	72	61-132	
Dichlorofluoromethane	ug/L	20	18.3	92	75-129	N2
Diethyl ether (Ethyl ether)	ug/L	20	20.1	101	74-125	
Ethylbenzene	ug/L	20	19.5	98	75-125	
Hexachloro-1,3-butadiene	ug/L	20	18.9	95	75-125	
Isopropylbenzene (Cumene)	ug/L	20	19.6	98	75-125	
Methyl-tert-butyl ether	ug/L	20	20.8	104	73-129	
Methylene Chloride	ug/L	20	19.9	99	72-125	
n-Butylbenzene	ug/L	20	16.8	84	75-125	
n-Propylbenzene	ug/L	20	18.4	92	75-125	
Naphthalene	ug/L	20	16.9	85	65-126	
p-Isopropyltoluene	ug/L	20	16.9	85	75-125	
sec-Butylbenzene	ug/L	20	17.9	89	75-125	
Styrene	ug/L	20	19.6	98	75-125	
tert-Butylbenzene	ug/L	20	18.3	92	75-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

LABORATORY CONTROL SAMPLE: 2975401

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/L	20	18.9	94	75-125	
Tetrahydrofuran	ug/L	200	206	103	30-150	
Toluene	ug/L	20	19.1	96	74-125	
trans-1,2-Dichloroethene	ug/L	20	19.9	99	70-126	
trans-1,3-Dichloropropene	ug/L	20	19.7	99	75-125	
Trichloroethene	ug/L	20	18.8	94	75-125	
Trichlorofluoromethane	ug/L	20	17.5	87	71-131	
Vinyl chloride	ug/L	20	18.1	90	65-137	
Xylene (Total)	ug/L	60	59.2	99	75-125	
1,2-Dichloroethane-d4 (S)	%.			101	75-125	
4-Bromofluorobenzene (S)	%.			96	75-125	
Toluene-d8 (S)	%.			100	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2975423 2975424

Parameter	Units	10436832003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/L	<1.0	20	20	8.5	5.7	43	28	69-130	41	30	M1,R1
1,1,1-Trichloroethane	ug/L	<1.0	20	20	10.4	6.8	52	34	72-133	42	30	M1,R1
1,1,2,2-Tetrachloroethane	ug/L	<1.0	20	20	8.4	5.8	42	29	60-137	37	30	M1,R1
1,1,2-Trichloroethane	ug/L	<1.0	20	20	9.3	6.4	46	32	70-128	36	30	M1,R1
1,1,2-Trichlorotrifluoroethane	ug/L	<1.0	20	20	7.6	4.9	38	24	64-147	43	30	M1,R1
1,1-Dichloroethane	ug/L	<1.0	20	20	10.3	7.0	52	35	64-136	38	30	M1,R1
1,1-Dichloroethene	ug/L	<1.0	20	20	9.5	6.4	47	32	67-139	39	30	M1,R1
1,1-Dichloropropene	ug/L	<1.0	20	20	9.7	6.0	48	30	69-131	47	30	M1,R1
1,2,3-Trichlorobenzene	ug/L	<1.0	20	20	6.5	3.9	32	20	60-138	49	30	M1,R1
1,2,3-Trichloropropane	ug/L	<4.0	20	20	9.3	6.1	46	31	67-129	41	30	M1,R1
1,2,4-Trichlorobenzene	ug/L	<1.0	20	20	6.3	4.0	32	20	71-125	45	30	M1,R1
1,2,4-Trimethylbenzene	ug/L	<1.0	20	20	8.1	4.9	40	24	67-130	49	30	M1,R1
1,2-Dibromo-3-chloropropane	ug/L	<4.0	50	50	19.6	13.2	39	26	52-141	39	30	M1,R1
1,2-Dibromoethane (EDB)	ug/L	<1.0	20	20	8.7	6.1	43	31	66-130	34	30	M1,R1
1,2-Dichlorobenzene	ug/L	<1.0	20	20	8.2	5.2	41	26	72-126	44	30	M1,R1
1,2-Dichloroethane	ug/L	<1.0	20	20	9.5	6.9	47	35	64-125	32	30	M1,R1
1,2-Dichloropropane	ug/L	<4.0	20	20	9.9	6.9	50	34	65-128	37	30	M1,R1
1,3,5-Trimethylbenzene	ug/L	<1.0	20	20	8.0	4.8	40	24	63-139	51	30	M1,R1
1,3-Dichlorobenzene	ug/L	<1.0	20	20	7.9	4.9	39	24	70-128	47	30	M1,R1
1,3-Dichloropropane	ug/L	<1.0	20	20	9.2	6.3	46	31	70-131	38	30	M1,R1
1,4-Dichlorobenzene	ug/L	<1.0	20	20	7.6	5.0	38	25	74-125	42	30	M1,R1
2,2-Dichloropropane	ug/L	<4.0	20	20	10.9	7.5	55	37	58-137	38	30	M1,R1
2-Butanone (MEK)	ug/L	<5.0	100	100	50.6	35.1	51	35	45-132	36	30	M1,R1
2-Chlorotoluene	ug/L	<1.0	20	20	8.2	5.0	41	25	66-134	48	30	M1,R1
4-Chlorotoluene	ug/L	<1.0	20	20	7.9	4.9	40	25	70-132	46	30	M1,R1
4-Methyl-2-pentanone (MIBK)	ug/L	<5.0	100	100	49.1	33.6	49	34	54-143	38	30	M1,R1
Acetone	ug/L	<20.0	100	100	45.6	36.4	46	36	51-150	23	30	M1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2975423 2975424

Parameter	Units	10436832003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Allyl chloride	ug/L	<4.0	20	20	8.9	6.7	45	34	52-150	28	30	M1
Benzene	ug/L	<1.0	20	20	9.7	6.6	48	32	62-140	38	30	M1,R1
Bromobenzene	ug/L	<1.0	20	20	9.3	5.9	47	29	70-128	45	30	M1,R1
Bromochloromethane	ug/L	<1.0	20	20	10.6	7.2	53	36	65-131	38	30	M1,R1
Bromodichloromethane	ug/L	<1.0	20	20	9.0	6.2	45	31	74-127	37	30	M1,R1
Bromoform	ug/L	<4.0	20	20	7.6	5.4	38	27	59-125	34	30	M1,R1
Bromomethane	ug/L	<4.0	20	20	9.8	5.8J	49	29	30-149	52	30	M1,R1
Carbon tetrachloride	ug/L	<1.0	20	20	8.7	5.6	44	28	67-134	43	30	M1,R1
Chlorobenzene	ug/L	<1.0	20	20	9.2	5.9	46	29	72-131	44	30	M1,R1
Chloroethane	ug/L	<1.0	20	20	13.5	7.0	67	35	55-150	63	30	M1,R1
Chloroform	ug/L	<1.0	20	20	9.3	6.4	47	32	67-125	38	30	M1,R1
Chloromethane	ug/L	<4.0	20	20	13.3	7.3	67	37	43-148	58	30	M1,R1
cis-1,2-Dichloroethene	ug/L	<1.0	20	20	10.3	7.0	51	35	62-132	38	30	M1,R1
cis-1,3-Dichloropropene	ug/L	<4.0	20	20	8.1	5.6	41	28	63-129	37	30	M1,R1
Dibromochloromethane	ug/L	<1.0	20	20	8.2	5.8	41	29	67-127	35	30	M1,R1
Dibromomethane	ug/L	<4.0	20	20	9.2	6.4	46	32	68-132	36	30	M1,R1
Dichlorodifluoromethane	ug/L	<1.0	20	20	12.6	5.6	63	28	59-144	76	30	M1,R1
Dichlorofluoromethane	ug/L	<1.0	20	20	15.1	7.9	76	40	63-144	62	30	M1,N2, R1
Diethyl ether (Ethyl ether)	ug/L	<4.0	20	20	9.8	6.8	49	34	52-139	36	30	M1,R1
Ethylbenzene	ug/L	<1.0	20	20	9.5	5.9	45	28	75-131	46	30	M1,R1
Hexachloro-1,3-butadiene	ug/L	<1.0	20	20	6.1	3.6	30	18	58-146	50	30	M1,R1
Isopropylbenzene (Cumene)	ug/L	<1.0	20	20	8.9	5.2	45	26	71-132	52	30	M1,R1
Methyl-tert-butyl ether	ug/L	<1.0	20	20	9.9	7.1	49	35	65-130	32	30	M1,R1
Methylene Chloride	ug/L	<4.0	20	20	9.5	6.8	47	34	66-125	33	30	M1,R1
n-Butylbenzene	ug/L	<1.0	20	20	6.1	3.7	30	18	57-141	49	30	M1,R1
n-Propylbenzene	ug/L	<1.0	20	20	7.9	4.7	39	23	70-131	51	30	M1,R1
Naphthalene	ug/L	<4.0	20	20	7.1	4.7	36	23	48-134	42	30	M1,R1
p-Isopropyltoluene	ug/L	<1.0	20	20	6.9	4.0	34	20	66-136	52	30	M1,R1
sec-Butylbenzene	ug/L	<1.0	20	20	7.5	4.1	37	20	69-134	58	30	M1,R1
Styrene	ug/L	<1.0	20	20	8.9	5.5	44	28	65-134	46	30	M1,R1
tert-Butylbenzene	ug/L	<1.0	20	20	8.3	4.7	41	23	71-130	56	30	M1,R1
Tetrachloroethene	ug/L	<1.0	20	20	8.4	5.1	42	26	69-135	48	30	M1,R1
Tetrahydrofuran	ug/L	<10.0	200	200	93.1	68.4	47	34	48-150	31	30	M1,R1
Toluene	ug/L	<1.0	20	20	9.5	6.1	45	28	68-132	43	30	M1,R1
trans-1,2-Dichloroethene	ug/L	<1.0	20	20	9.6	6.4	48	32	61-134	40	30	M1,R1
trans-1,3-Dichloropropene	ug/L	<4.0	20	20	9.1	6.1	46	31	66-125	39	30	M1,R1
Trichloroethene	ug/L	<0.40	20	20	9.1	6.0	45	30	64-136	41	30	M1,R1
Trichlorofluoromethane	ug/L	<1.0	20	20	15.0	7.2	75	36	65-146	70	30	M1,R1
Vinyl chloride	ug/L	<0.20	20	20	15.4	8.0	77	40	51-150	64	30	M1,R1
Xylene (Total)	ug/L	<3.0	60	60	27.8	17.3	46	29	69-135	47	30	MS,RS
1,2-Dichloroethane-d4 (S)	%.						101	101	75-125			
4-Bromofluorobenzene (S)	%.						95	96	75-125			
Toluene-d8 (S)	%.						99	97	75-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

QC Batch: 546641 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3550 Analysis Description: 8270D Solid PAH by SIM MSSV
Associated Lab Samples: 10436863001, 10436863002, 10436863003, 10436863004, 10436863005, 10436863006, 10436863007, 10436863008, 10436863009, 10436863010

METHOD BLANK: 2972761 Matrix: Solid
Associated Lab Samples: 10436863001, 10436863002, 10436863003, 10436863004, 10436863005, 10436863006, 10436863007, 10436863008, 10436863009, 10436863010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acenaphthene	ug/kg	<0.41	1.4	06/26/18 11:44	
Acenaphthylene	ug/kg	<0.50	1.6	06/26/18 11:44	
Anthracene	ug/kg	<0.47	1.6	06/26/18 11:44	
Benzo(a)anthracene	ug/kg	<1.1	3.6	06/26/18 11:44	
Benzo(a)pyrene	ug/kg	<0.69	2.3	06/26/18 11:44	
Benzo(b)fluoranthene	ug/kg	<0.37	1.2	06/26/18 11:44	
Benzo(g,h,i)perylene	ug/kg	<0.63	2.1	06/26/18 11:44	
Benzo(k)fluoranthene	ug/kg	<0.84	2.8	06/26/18 11:44	
Chrysene	ug/kg	<1.4	4.5	06/26/18 11:44	
Dibenz(a,h)anthracene	ug/kg	<0.46	1.5	06/26/18 11:44	
Fluoranthene	ug/kg	<0.43	1.4	06/26/18 11:44	
Fluorene	ug/kg	<0.31	1.0	06/26/18 11:44	
Indeno(1,2,3-cd)pyrene	ug/kg	<0.67	2.2	06/26/18 11:44	
Naphthalene	ug/kg	<0.77	2.6	06/26/18 11:44	
Phenanthrene	ug/kg	<1.9	6.4	06/26/18 11:44	
Pyrene	ug/kg	<1.5	5.1	06/26/18 11:44	
2-Fluorobiphenyl (S)	%.	60	42-125	06/26/18 11:44	
p-Terphenyl-d14 (S)	%.	78	57-125	06/26/18 11:44	

LABORATORY CONTROL SAMPLE: 2972762

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	ug/kg	33.3	21.4	64	52-125	
Acenaphthylene	ug/kg	33.3	21.9	66	50-125	
Anthracene	ug/kg	33.3	31.2	94	65-125	
Benzo(a)anthracene	ug/kg	33.3	36.2	109	60-125	
Benzo(a)pyrene	ug/kg	33.3	33.4	100	69-125	
Benzo(b)fluoranthene	ug/kg	33.3	39.3	118	61-125	
Benzo(g,h,i)perylene	ug/kg	33.3	34.6	104	60-125	
Benzo(k)fluoranthene	ug/kg	33.3	31.2	94	67-125	
Chrysene	ug/kg	33.3	37.4	112	67-125	
Dibenz(a,h)anthracene	ug/kg	33.3	31.2	94	63-125	
Fluoranthene	ug/kg	33.3	37.6	113	75-125	
Fluorene	ug/kg	33.3	24.5	74	54-125	
Indeno(1,2,3-cd)pyrene	ug/kg	33.3	33.6	101	63-125	
Naphthalene	ug/kg	33.3	22.6	68	49-125	
Phenanthrene	ug/kg	33.3	28.6	86	65-125	
Pyrene	ug/kg	33.3	32.2	97	64-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

LABORATORY CONTROL SAMPLE: 2972762

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Fluorobiphenyl (S)	%.			67	42-125	
p-Terphenyl-d14 (S)	%.			80	57-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2972763 2972764

Parameter	Units	10436821003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Acenaphthene	ug/kg	ND	39.3	39.3	45.3	38.3	115	98	30-125		30	
Acenaphthylene	ug/kg	ND	39.3	39.3	36.1	28.8	92	73	30-133		30	
Anthracene	ug/kg	ND	39.3	39.3	<5.5	<5.5	0	0	30-150		30	M6
Benzo(a)anthracene	ug/kg	ND	39.3	39.3	34.2J	33.1J	87	84	30-150		30	
Benzo(a)pyrene	ug/kg	ND	39.3	39.3	33.9	33.6	86	86	30-150		30	
Benzo(b)fluoranthene	ug/kg	ND	39.3	39.3	30.6	28.9	78	74	30-150		30	
Benzo(g,h,i)perylene	ug/kg	ND	39.3	39.3	32.5	32.0	82	81	30-150		30	
Benzo(k)fluoranthene	ug/kg	ND	39.3	39.3	37.3	31.1J	95	79	30-150		30	
Chrysene	ug/kg	ND	39.3	39.3	35.4J	37.2J	90	95	30-150		30	
Dibenz(a,h)anthracene	ug/kg	ND	39.3	39.3	31.4	29.4	80	75	30-131		30	
Fluoranthene	ug/kg	ND	39.3	39.3	36.6	35.1	93	89	30-150		30	
Fluorene	ug/kg	ND	39.3	39.3	32.3	28.1	82	72	30-147		30	
Indeno(1,2,3-cd)pyrene	ug/kg	ND	39.3	39.3	32.4	31.0	82	79	30-150		30	
Naphthalene	ug/kg	ND	39.3	39.3	28.8J	24.2J	73	62	30-131		30	
Phenanthrene	ug/kg	ND	39.3	39.3	51.6J	44.7J	131	114	30-150		30	
Pyrene	ug/kg	ND	39.3	39.3	60.3	53.6J	153	136	30-150		30	M6
2-Fluorobiphenyl (S)	%.						0	0	42-125			D3,S4
p-Terphenyl-d14 (S)	%.						0	0	57-125			S4

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

QC Batch: 547072
QC Batch Method: EPA Mod. 3510C
Analysis Method: EPA 8270D by SIM
Analysis Description: 8270D PAH by SIM MSSV
Associated Lab Samples: 10436863011

METHOD BLANK: 2974269
Matrix: Water
Associated Lab Samples: 10436863011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acenaphthene	ug/L	<0.0032	0.011	06/27/18 09:55	
Acenaphthylene	ug/L	<0.0046	0.015	06/27/18 09:55	
Anthracene	ug/L	<0.0062	0.021	06/27/18 09:55	
Benzo(a)anthracene	ug/L	<0.0039	0.013	06/27/18 09:55	
Benzo(a)pyrene	ug/L	<0.0040	0.013	06/27/18 09:55	
Benzo(b)fluoranthene	ug/L	<0.013	0.042	06/27/18 09:55	
Benzo(g,h,i)perylene	ug/L	<0.0098	0.033	06/27/18 09:55	
Benzo(k)fluoranthene	ug/L	<0.010	0.035	06/27/18 09:55	
Chrysene	ug/L	<0.0092	0.031	06/27/18 09:55	
Dibenz(a,h)anthracene	ug/L	<0.0092	0.031	06/27/18 09:55	
Fluoranthene	ug/L	<0.018	0.061	06/27/18 09:55	
Fluorene	ug/L	<0.0059	0.020	06/27/18 09:55	
Indeno(1,2,3-cd)pyrene	ug/L	<0.013	0.044	06/27/18 09:55	
Naphthalene	ug/L	<0.0068	0.023	06/27/18 09:55	
Phenanthrene	ug/L	<0.010	0.035	06/27/18 09:55	
Pyrene	ug/L	<0.015	0.049	06/27/18 09:55	
2-Fluorobiphenyl (S)	%.	76	30-145	06/27/18 09:55	
p-Terphenyl-d14 (S)	%.	91	30-149	06/27/18 09:55	

LABORATORY CONTROL SAMPLE: 2974270

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	ug/L	1	0.70	70	50-125	
Acenaphthylene	ug/L	1	0.72	72	47-125	
Anthracene	ug/L	1	0.93	93	65-125	
Benzo(a)anthracene	ug/L	1	0.91	91	60-125	
Benzo(a)pyrene	ug/L	1	0.92	92	67-125	
Benzo(b)fluoranthene	ug/L	1	0.88	88	64-125	
Benzo(g,h,i)perylene	ug/L	1	0.83	83	53-125	
Benzo(k)fluoranthene	ug/L	1	0.88	88	61-125	
Chrysene	ug/L	1	0.91	91	68-125	
Dibenz(a,h)anthracene	ug/L	1	0.75	75	45-125	
Fluoranthene	ug/L	1	0.91	91	73-125	
Fluorene	ug/L	1	0.72	72	53-125	
Indeno(1,2,3-cd)pyrene	ug/L	1	0.83	83	62-125	
Naphthalene	ug/L	1	0.74	74	46-125	
Phenanthrene	ug/L	1	0.81	81	66-125	
Pyrene	ug/L	1	0.89	89	65-125	
2-Fluorobiphenyl (S)	%.			75	30-145	
p-Terphenyl-d14 (S)	%.			94	30-149	

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REPORT OF LABORATORY ANALYSIS

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(612)607-1700

QUALITY CONTROL DATA

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2974271 2974272

Parameter	Units	10436884010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Acenaphthene	ug/L	ND	.95	.95	0.65	0.63	69	67	53-125	3	30	
Acenaphthylene	ug/L	ND	.95	.95	0.67	0.66	70	70	48-125	1	30	
Anthracene	ug/L	ND	.95	.95	0.88	0.89	92	94	66-125	2	30	
Benzo(a)anthracene	ug/L	ND	.95	.95	0.86	0.82	90	86	57-125	5	30	
Benzo(a)pyrene	ug/L	ND	.95	.95	0.84	0.87	89	91	62-125	2	30	
Benzo(b)fluoranthene	ug/L	ND	.95	.95	0.78	0.91	82	96	50-125	16	30	
Benzo(g,h,i)perylene	ug/L	ND	.95	.95	0.73	0.76	76	81	34-125	5	30	
Benzo(k)fluoranthene	ug/L	ND	.95	.95	0.80	0.77	84	81	50-125	4	30	
Chrysene	ug/L	ND	.95	.95	0.90	0.87	95	92	65-125	4	30	
Dibenz(a,h)anthracene	ug/L	ND	.95	.95	0.71	0.74	75	78	31-127	4	30	
Fluoranthene	ug/L	ND	.95	.95	0.88	0.90	92	95	70-125	2	30	
Fluorene	ug/L	ND	.95	.95	0.69	0.68	73	72	53-125	1	30	
Indeno(1,2,3-cd)pyrene	ug/L	ND	.95	.95	0.74	0.77	78	81	45-125	4	30	
Naphthalene	ug/L	ND	.95	.95	0.57	0.65	60	69	34-125	13	30	
Phenanthrene	ug/L	ND	.95	.95	0.78	0.79	82	84	61-125	1	30	
Pyrene	ug/L	ND	.95	.95	0.88	0.84	92	89	60-125	4	30	
2-Fluorobiphenyl (S)	%.						69	69	30-145			
p-Terphenyl-d14 (S)	%.						98	96	30-149			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G	Pace Analytical Services - Green Bay
PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

A5	Greater than 5% sediment in sample determined by visual observation. Aqueous portion decanted from the sediment and extracted. The sample container could not be rinsed with solvent per the method requirement.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
MS	Analyte recovery in the matrix spike was outside QC limits for one or more of the constituent analytes used in the calculated result.
N2	The lab does not hold NELAC/TNI accreditation for this parameter.
R1	RPD value was outside control limits.
RS	The RPD value in one of the constituent analytes was outside the control limits.
S4	Surrogate recovery not evaluated against control limits due to sample dilution.
W	Non-detect results are reported on a wet weight basis.

Pace Analytical Services, LLC
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(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10436863001	**SB-1_2-3**	EPA 3050	546886	EPA 6010D	547086
10436863002	**SB-1_12-13**	EPA 3050	546886	EPA 6010D	547086
10436863003	**SB-2_0-1**	EPA 3050	546886	EPA 6010D	547086
10436863004	**SB-2_6-7**	EPA 3050	546886	EPA 6010D	547086
10436863005	**SB-3_0-2**	EPA 3050	546886	EPA 6010D	547086
10436863006	**SB-3_8-9**	EPA 3050	546886	EPA 6010D	547086
10436863007	**SB-4_0-2**	EPA 3050	546886	EPA 6010D	547086
10436863008	**SB-4_6-7**	EPA 3050	546886	EPA 6010D	547086
10436863009	**SB-5_0-1**	EPA 3050	546886	EPA 6010D	547086
10436863010	**SB-5_8-9**	EPA 3050	546886	EPA 6010D	547086
10436863001	**SB-1_2-3**	EPA 7471B	546627	EPA 7471B	546772
10436863002	**SB-1_12-13**	EPA 7471B	546627	EPA 7471B	546772
10436863003	**SB-2_0-1**	EPA 7471B	546627	EPA 7471B	546772
10436863004	**SB-2_6-7**	EPA 7471B	546627	EPA 7471B	546772
10436863005	**SB-3_0-2**	EPA 7471B	546627	EPA 7471B	546772
10436863006	**SB-3_8-9**	EPA 7471B	546627	EPA 7471B	546772
10436863007	**SB-4_0-2**	EPA 7471B	546627	EPA 7471B	546772
10436863008	**SB-4_6-7**	EPA 7471B	546627	EPA 7471B	546772
10436863009	**SB-5_0-1**	EPA 7471B	546627	EPA 7471B	546772
10436863010	**SB-5_8-9**	EPA 7471B	546627	EPA 7471B	546772
10436863001	**SB-1_2-3**	ASTM D2974	547426		
10436863002	**SB-1_12-13**	ASTM D2974	547426		
10436863003	**SB-2_0-1**	ASTM D2974	547426		
10436863004	**SB-2_6-7**	ASTM D2974	547426		
10436863005	**SB-3_0-2**	ASTM D2974	547426		
10436863006	**SB-3_8-9**	ASTM D2974	547426		
10436863007	**SB-4_0-2**	ASTM D2974	547426		
10436863008	**SB-4_6-7**	ASTM D2974	547426		
10436863009	**SB-5_0-1**	ASTM D2974	547426		
10436863010	**SB-5_8-9**	ASTM D2974	547426		
10436863001	**SB-1_2-3**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863002	**SB-1_12-13**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863003	**SB-2_0-1**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863004	**SB-2_6-7**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863005	**SB-3_0-2**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863006	**SB-3_8-9**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863007	**SB-4_0-2**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863008	**SB-4_6-7**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863009	**SB-5_0-1**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863010	**SB-5_8-9**	EPA 3550	546641	EPA 8270D by SIM	546989
10436863011	**SB-3_14.5-19.5**	EPA Mod. 3510C	547072	EPA 8270D by SIM	547275
10436863001	**SB-1_2-3**	EPA 5035/5030B	293184	EPA 8260	293187
10436863002	**SB-1_12-13**	EPA 5035/5030B	293184	EPA 8260	293187
10436863003	**SB-2_0-1**	EPA 5035/5030B	293184	EPA 8260	293187
10436863004	**SB-2_6-7**	EPA 5035/5030B	293184	EPA 8260	293187
10436863005	**SB-3_0-2**	EPA 5035/5030B	293184	EPA 8260	293187

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 49161423.00 Husky Phase II
Pace Project No.: 10436863

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10436863006	**SB-3_8-9**	EPA 5035/5030B	293184	EPA 8260	293187
10436863007	**SB-4_0-2**	EPA 5035/5030B	293184	EPA 8260	293187
10436863008	**SB-4_6-7**	EPA 5035/5030B	293184	EPA 8260	293187
10436863009	**SB-5_0-1**	EPA 5035/5030B	293184	EPA 8260	293187
10436863010	**SB-5_8-9**	EPA 5035/5030B	293184	EPA 8260	293187
10436863013	**MeOH Trip Blank**	EPA 5035/5030B	293184	EPA 8260	293187
10436863011	**SB-3_14.5-19.5**	EPA 8260B	547301		
10436863012	**Trip Blank**	EPA 8260B	547301		

Barr Engineering Co. Chain of Custody

Sample Origination State: ☐ KS ☐ MO ☐ UT ☐ MI ☐ ND ☒ WI ☐ MN ☐ SD Other: ____

BARR ☐ Ann Arbor ☒ Duluth ☐ Hibbing ☐ Minneapolis ☐ Bismarck ☐ Grand Rapids ☐ Jefferson City ☐ Salt Lake City

COC Number: 58003

COC 1 of 2

WO#: 10436863

10436863

REPORT TO		INVOICE TO	
Company:	Barr Engineering	Company:	Barr
Address:	325 S. Lake Ave. Duluth	Address:	
Name:	Lynette Carney	Name:	
email:	LMC@barr.com	email:	
Copy to:	datamgt@barr.com	P.O.	
Project Name:	Husky phase II	Barr Project No:	49161423.00

Matrix Code: GW = Groundwater; SW = Surface Water; WW = Waste Water; DW = Drinking Water; S = Soil/Solid; SD = Sediment; O = Other

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; I = Ascorbic Acid; J = NH_4Cl; K = Zn Acetate; O = Other

	Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MS	Total Number of Containers	Analysis Requested: Water / Soil — VOCs	RCRA metals, PAHs	% Solids	Preservative Code	Field Filtered Y/N	
										F	A	A			
										N	N	N			
1.	SB-1	2	3	ft	6/21/18	1405	S	N	4		2	1	1		001
2.	SB-1	12	13			1430									002
3.	SB-2	0	1			1515									003
4.	SB-2	6	7			1530									004
5.	SB-3	0	2			1620									005
6.	SB-3	8	9			1635									006
7.	SB-4	0	2		6/22/18	0840									007
8.	SB-4	6	7			0855									008
9.	SB-5	0	1			0935									009
10.	SB-5	8	9			0950									010

BARR USE ONLY

Sampled by: MAB

Barr Proj. Manager: LMC

Barr DQ Manager: JET

Lab Name: Pace

Lab Location: MPLS

Relinquished by: _____ On Ice? (Y) N Date 6/22/18 Time 1435 Received by: _____ Date 6/22/18 Time 14:35

Relinquished by: _____ On Ice? (Y) N Date 6/22/18 Time 1700 Received by: _____ Date 6-22-18 Time 17 00

Samples Shipped VIA: ☐ Courier ☐ Federal Express ☒ Sampler ☐ Other: _____

Air Bill Number:

Lab WO: Temperature on Receipt (°C): 2.5 Custody Seal Intact? ☐ Y ☐ N ☒ None

Requested Due Date: ☒ Standard Turn Around Time ☐ Rush _____ (mm/dd/yyyy)

Distribution - **White-Original:** Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

R C L 6-22-18 20:00 Pace 6/22/18 2000 T=2.8

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 01/02/18

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☒ Duluth ☐ Jefferson City
☐ Bismarck ☐ Hibbing ☐ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☒ WI ☐ MI ☐ ND Other: ☐ MN ☐ SD

COC Number: № 47625
COC 2 of 2

REPORT TO	INVOICE TO
Company: Barr Engineering	Company: Barr
Address: 325 S. Lake Ave. Duluth	Address:
Name: Lynette Carney	Name:
email: LMC@barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name: Husky Phase II	Barr Project No: 49161423.00

Matrix Code: GW = Groundwater; SW = Surface Water; WW = Waste Water; DW = Drinking Water; S = Soil/Solid; SD = Sediment; O = Other

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; I = Ascorbic Acid; J = NH_4Cl; K = Zn Acetate; O = Other

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water VOC	Water PAH	Soil VOC	% Solids	Preservative Code	Field Filtered Y/N	
									B	A	F				
									N	N	N				
1. SB-3	14.5	19.5	ft	6/22/18	1120	GW	N	4	3	1					011
2. Trip Blank	–	–	–	–	–	–	N	3	2		1				012
3. MeOH Trip Blank 6/22/18															013
4.															
5.															
6.															
7.															
8.															
9.															
10.															

BARR USE ONLY

Sampled by: MAB
Barr Proj. Manager: LMC
Barr DQ Manager: JET
Lab Name: Pace
Lab Location: MPLS

Relinquished by: [signature] On Ice? N Date 6/22/18 Time 1435 Received by: [signature] Date 6/23/18 Time 14:35

Relinquished by: [signature] On Ice? N Date 6/22/18 Time 1700 Received by: [signature] Date 6-22-18 Time 1700

Samples Shipped VIA: ☐ Courier ☐ Federal Express ☒ Sampler ☐ Other: _____

Air Bill Number:

Lab WO: Temperature on Receipt (°C): 2.5 Custody Seal Intact? ☐ Y ☐ N ☒ None

Requested Due Date: ☒ Standard Turn Around Time ☐ Rush _____ (mm/dd/yyyy)

Distribution - White-Original: Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

[signature] 6-22-18 20:00 [signature] 6/22/18 2000 To 2.8

H:RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02May2018 Page 1 of 2
	Document No.: **F-MN-L-213-rev.23**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Barr

Project #: **WO#: 10436863**

PM: AA1 **Due Date: 07/02/18**

CLIENT: BARR

Courier: ☐Fed Ex ☐UPS ☐USPS ☐Client ☐Commercial ☒Pace ☐SpeeDee ☐Other:_____

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☒Yes ☐No **Seals Intact?** ☒Yes ☐No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐Bubble Wrap ☒Bubble Bags ☐None ☐Other:_____ **Temp Blank?** ☒Yes ☐No

Thermometer Used: ☐G87A9170600254 ☒G87A9155100842 **Type of Ice:** ☒Wet ☐Blue ☐None ☐Dry ☐Melted

Cooler Temp Read (°C): 2.7 **Cooler Temp Corrected (°C):** 2.8 **Biological Tissue Frozen?** ☐Yes ☐No ☒N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** BV 6/22/18

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐Yes ☒No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐Yes ☒No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☒Yes	☐No		1.
Chain of Custody Filled Out?	☒Yes	☐No		2.
Chain of Custody Relinquished?	☒Yes	☐No		3.
Sampler Name and/or Signature on COC?	☒Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time?	☒Yes	☐No		5.
Short Hold Time Analysis (<72 hr)?	☐Yes	☒No		6.
Rush Turn Around Time Requested?	☐Yes	☒No		7.
Sufficient Volume?	☒Yes	☐No		8.
Correct Containers Used?	☒Yes	☐No		9.
-Pace Containers Used?	☒Yes	☐No		
Containers Intact?	☒Yes	☐No		10.
Filtered Volume Received for Dissolved Tests?	☐Yes	☐No	☒N/A	11. Note if sediment is visible in the dissolved container
Is sufficient information available to reconcile the samples to the COC? Matrix: WT SL	☒Yes	☐No		12.
All containers needing acid/base preservation have been checked?	☐Yes	☐No	☒N/A	13. ☐HNO_3 ☐H_2SO_4 ☐NaOH Positive for Res. Chlorine? Y N
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐Yes	☐No	☒N/A	Sample #
	☒Yes	☐No	☐N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☒Yes	☐No	☐N/A	14. Trip Blank 2/2 headspace 5-6mm
Trip Blank Present?	☒Yes	☐No	☐N/A	15.
Trip Blank Custody Seals Present?	☒Yes	☐No	☐N/A	
Pace Trip Blank Lot # (if purchased): HCl: 159185, MeOH: 040518-3				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐Yes ☐No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Amanda J Albrecht **Date:** 6/25/18

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

55h

40171636

Chain of Custody

Pace Analytical®
www.pacelabs.com

☐ Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: WI

Workorder: 10436863 **Workorder Name:** 49161423.00 Husky Phase II **Owner Received Date:** 6/22/2018 **Results Requested By:** 7/3/2018

Report To	Subcontract To
Amanda Albrecht Pace Analytical Minnesota 1700 Elm Street Suite 200 Minneapolis, MN 55414 Phone (612)607-6382	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: MeOH	VOC by 8260 (Pace-Green Bay)	LAB USE ONLY
1	SB-1_2-3	PS	6/21/2018 14:05	10436863001	Solid	2	X	001
2	SB-1_12-13	PS	6/21/2018 14:30	10436863002	Solid	2	X	002
3	SB-2_0-1	PS	6/21/2018 15:15	10436863003	Solid	2	X	003
4	SB-2_6-7	PS	6/21/2018 15:30	10436863004	Solid	2	X	004
5	SB-3_0-2	PS	6/21/2018 16:20	10436863005	Solid	2	X	005
6	SB-3_8-9	PS	6/21/2018 16:35	10436863006	Solid	2	X	006
7	SB-4_0-2	PS	6/22/2018 08:40	10436863007	Solid	2	X	007
8	SB-4_6-7	PS	6/22/2018 08:55	10436863008	Solid	2	X	008
9	SB-5_0-1	PS	6/22/2018 09:35	10436863009	Solid	2	X	009
10	SB-5_8-9	PS	6/22/2018 09:50	10436863010	Solid	2	X	010
11	MeOH Trip Blank	PS	6/21/2018 00:00	10436863013	Solid	1	X	011

Comments

Transfers	Released By	Date/Time	Received By	Date/Time
1	Wadro	6/21/18 1717		
2	Wadro	6/20/18 0855	Susan K Wyles Paul	6/20/18 0855
3				

Cooler Temperature on Receipt 5.5 °C | Custody Seal (Y) or N | Received on Ice (Y) or N | Samples Intact (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.*

This chain of custody is considered complete as is since this information is available in the owner laboratory.

Pace Analytical Services, LLC
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Sample Preservation Receipt Form

Client Name: Pace, MN Project # 40171636

All containers needing preservation have been checked and noted below: □Yes □No ☑N/A Initial when completed: Date/ Time:

Lab Lot# of pH paper: Lab Std #ID of preservation (if pH adjusted):

Pace Lab #	Glass							Plastic							Vials						Jars			General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN							
001																			2														2.5 / 5 / 10
002																			2														2.5 / 5 / 10
003																			2														2.5 / 5 / 10
004																			2														2.5 / 5 / 10
005																			2														2.5 / 5 / 10
006																			2														2.5 / 5 / 10
007																			2														2.5 / 5 / 10
008																			2														2.5 / 5 / 10
009																			2														2.5 / 5 / 10
010																			2														2.5 / 5 / 10
011																			1														2.5 / 5 / 10
012																																	2.5 / 5 / 10
013																																	2.5 / 5 / 10
014																																	2.5 / 5 / 10
015																																	2.5 / 5 / 10
016																																	2.5 / 5 / 10
017																																	2.5 / 5 / 10
018																																	2.5 / 5 / 10
019																																	2.5 / 5 / 10
020																																	2.5 / 5 / 10

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: _____ Headspace in VOA Vials (>6mm) : □Yes □No ☑N/A ***If yes look in headspace column**

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	

Pace Analytical™ 1241 Bellevue Street, Green Bay, WI 54302	Document Name: Sample Condition Upon Receipt (SCUR)	Document Revised: 25Apr2018
	Document No.: F-GB-C-031-Rev.07	Issuing Authority: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Client Name: Pace MN

Project #: WO#: 40171636

Courier: ☐ CS Logistics ☐ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco ☐ Client ☐ Pace Other:

Tracking #: 1760825

Custody Seal on Cooler/Box Present: ☒ yes ☐ no Seals intact: ☒ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Packing Material: ☒ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other

Thermometer Used SR - 9 **Type of Ice:** (Wet) Blue Dry None ☒ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 5 /Corr: 5.5

Temp Blank Present: ☒ yes ☐ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Person examining contents: Date: 6/28/18 Initials:

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C.

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☑N/A	4. IRWO
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No	6.
Rush Turn Around Time Requested:	☑Yes ☐No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD: ☐Yes ☑No ☐N/A		8.
Correct Containers Used:	☑Yes ☐No	9. 007 - 2 vials, 008 - 1 vial, 004 - 2 vials
-Pace Containers Used: 6/28/18	☑Yes ☐No ☑N/A	Incorrect tare weight
-Pace IR Containers Used:	☒Yes ☐No ☐N/A	SSM 6/29/18
Containers Intact:	☐Yes ☑No	10.
Filtered volume received for Dissolved tests	☐Yes ☑No ☐N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: W	☑Yes ☐No ☐N/A	12.
Trip Blank Present:	☑Yes ☐No ☐N/A	13. MEOH
Trip Blank Custody Seals Present	☑Yes ☐No ☐N/A	
Pace Trip Blank Lot # (if purchased):		6/28/18

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Date: 6/28/18