

**Summary of Legal Sample Collection at the Central Treatment Area Excavation November 2017  
Former Domtar Wood Treating Facility**

*Mark Adams, Environmental Protection Officer*

*Document date January 26, 2018*

*This is a summary only. More specific details of events, observations and collection of samples can be found in my field notes and photo log.*

During the course of the ESA drilling work in September, 2017, I received information from Angela Brown regarding an anonymous public complaint. The complainant's allegations pointed to the possibility that visibly impacted material had either been used as backfill or left in place the Central Treatment Area excavation. We considered possible sampling options. Due to the limited workspace, steep excavation slopes and body of water at the base of the excavation, it was deemed unsafe or unfeasible to drive a tracked drill rig to the desired locations in the excavation to conduct borehole drilling.

On 30 Sep. 2017, I completed preliminary hand auger "test" holes to get preliminary field observations on the soil quality at five locations within the excavation and determine if these observations corroborated with the information provided by the anonymous complainant. Two of the hand auger test holes on the western side of the excavation recovered clay material with a strong odour at the maximum depth of advancement 80 cm. I was unable to auger to a depth greater than 80 cm due to having the wrong hand auger attachments to effectively advance within the dense, sticky clay. As a result of the strong odour observation, I set in motion arrangements to have laboratory sample collection work and borehole logging completed with the assistance of a Golder consultant.

On 1 and 2 Nov. 2017, I returned to the Central Treatment Area excavation with an assisting consultant from Golder Associates. He operated the hand auger and completed borehole logs, which are available on file. I handled all aspects of sample collection and chain of custody in accordance with generally accepted sampling methodology. Hand auger locations were selected based on locations where impacts were observed during my previous preliminary test hand augering. Each depth sampled included two methanol preservation vials, two – 125 ml jars and one bag.

On 1 Nov. 2017, after the first three hand auger boreholes were completed, the Golder consultant went down to the standing water in the base of the excavation to collect a surface water sample for the purpose of the Golder Phase 2 ESA contract. When he stepped in the mud next to the water, he noted black staining and a colourful sheen in his footprint. He immediately notified me and I went down to observe. There was a strong odour and the appearance of free product within his footprint. Some shallow digging in the area with the edge of my boot revealed further staining within 1-2 inches of the excavation surface. I decided to collect a sample from this area, entitled SS17-01. The sample was collected in two methanol preservation vials, two – 125 ml jars and one bag.

The lab analyses that exceeded Tier 2 Subsoil Guidelines are summarized below.

## Central Treatment Area Hand Auger Samples - Exceedances

Sample ID	Lab Analyses*	Exceedances of <u>Tier 2 Subsoil Guidelines</u> Noted
HAY17-01 at 2.5-3.0 m	BTEX, F1-F4, PAH	Naphthalene
HAY17-01 at 3.0-3.5 m	BTEX, F1-F4, PAH	Anthracene, fluoranthene, naphthalene, benzo(a)pyrene, B(a)P TPE
HAY17-01 at 3.5-4.0 m	CH, TCLP	--
HAY17-02 at 1.0-1.5 m	BTEX, F1-F4, PAH	Anthracene, Fluoranthene, Naphthalene, B(a)P TPE
HAY17-02 at 1.5-2.0 m	BTEX, F1-F4, PAH	--
HAY17-02 at 2.0-2.5 m	CH, TCLP	--
HAY17-02 at 2.5-3.0 m	BTEX, F1-F4, PAH	Anthracene, Naphthalene, B(a)P TPE
HAY17-03 at 1.5-2.0 m	BTEX, F1-F4	--
SS17-01	BTEX, F1-F4, PAH	F2, F3, Anthracene, Fluoranthene, Benzo(a)pyrene, B(a)P TPE
HAY17-04 at 0.5-1.0 m	BTEX, F1-F4, PAH	--
HAY17-04 at 1.0-1.5 m	CH	--
<i>HAY17-05</i>	<i>---</i>	<i>Samples collected but no analyses requested based on field observations</i>
HAY17-06 at 2.0-2.5 m	BTEX, F1-F4, PAH	F2, Anthracene
HAY17-06 at 2.5-3.0 m	CH, TCLP	--

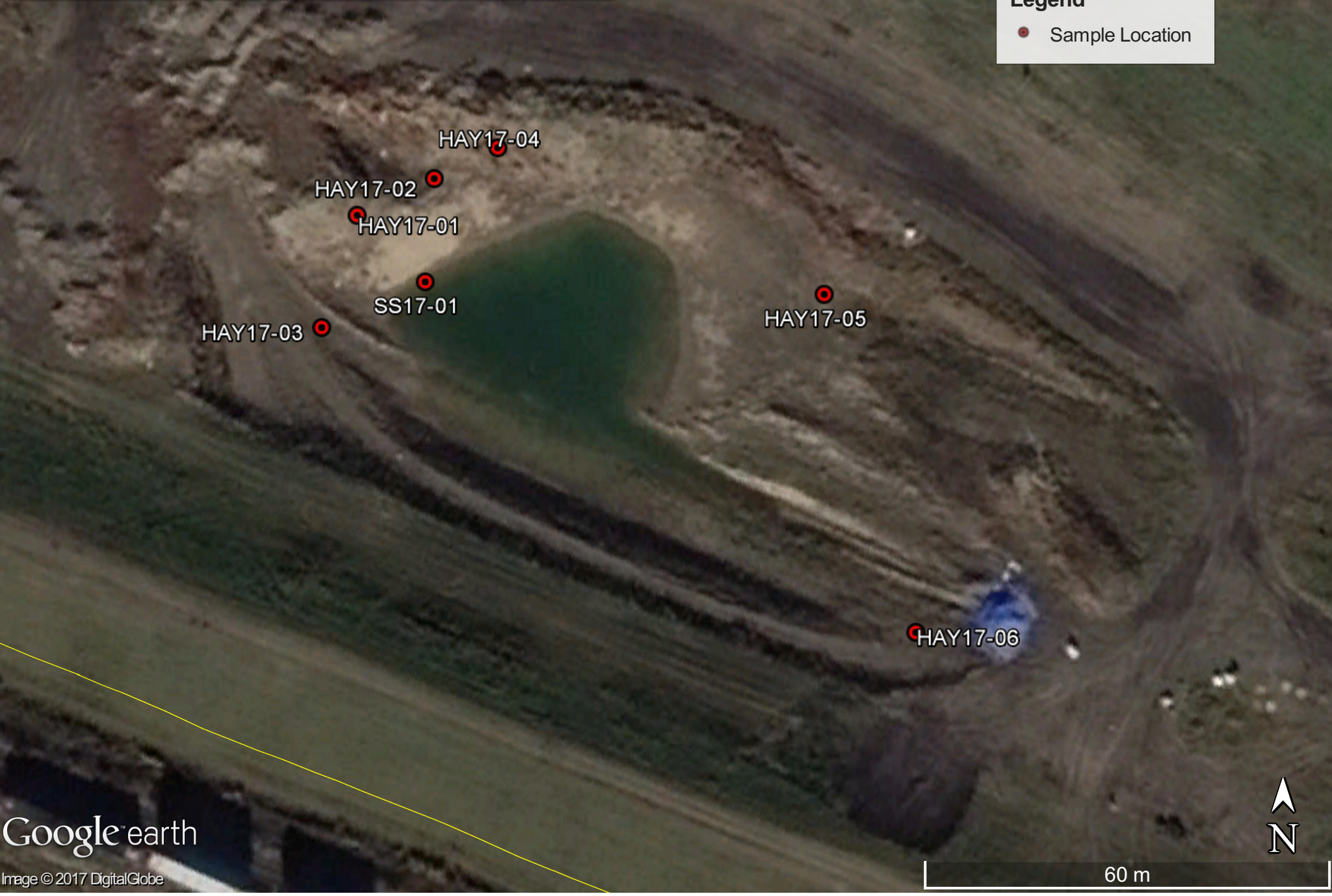
\* Lab analyses completed: BTEX – benzene, toluene, ethylbenzene and xylenes; F1-F4 – petroleum hydrocarbon fractions F1-F4; PAH – polycyclic aromatic hydrocarbons; CH – chlorinated hydrocarbons and phenolics; TCLP – toxicity characteristic leachate procedure for naphthalene.

# Former Domtar Wood Treating Facility

Central Treatment Area Sample Locations 1-2 Nov. 2017  
(Image 3 Oct. 2017)

**Legend**

- Sample Location





ALBERTA ENVIRONMENT  
ATTN: Mark Adams  
111 TWIN ATRIA BUILDING  
4999 98 AVE  
EDMONTON AB T6B 2X3

Date Received: 02-NOV-17  
Report Date: 24-NOV-17 11:22 (MT)  
Version: FINAL REV. 2

Client Phone: 780-422-3051

## Certificate of Analysis

Lab Work Order #: L2017573  
Project P.O. #: NOT SUBMITTED  
Job Reference:  
C of C Numbers: 15-583275, 15-583277, 15-583278  
Legal Site Desc: confidential

Comments: ADDITIONAL 15-NOV-17 17:33  
Additional analysis added to samples on hold.

Nicole Thibault, B.Sc. (Hons)  
Account Manager

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## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-6 HAY17-01 AT 2.5-3.0							
Sampled By: Mark Adams on 01-NOV-17 @ 10:00							
Matrix: soil							
<b>BTEX, Styrene &amp; F1-F4</b>							
<b>BTEX and F1</b>							
Benzene	0.764		0.0050	mg/kg	01-NOV-17	16-NOV-17	R3885589
Toluene	0.393		0.050	mg/kg	01-NOV-17	16-NOV-17	R3885589
Ethylbenzene	0.374		0.010	mg/kg	01-NOV-17	16-NOV-17	R3885589
m+p-Xylene	0.900		0.050	mg/kg	01-NOV-17	16-NOV-17	R3885589
o-Xylene	0.451		0.050	mg/kg	01-NOV-17	16-NOV-17	R3885589
Styrene	<0.050		0.050	mg/kg	01-NOV-17	16-NOV-17	R3885589
Xylenes	1.35		0.10	mg/kg	01-NOV-17	16-NOV-17	R3885589
Surrogate: 1,4-Difluorobenzene (SS)	110.0		70-130	%	01-NOV-17	16-NOV-17	R3885589
Surrogate: 4-Bromofluorobenzene (SS)	116.0		70-130	%	01-NOV-17	16-NOV-17	R3885589
Surrogate: 3,4-Dichlorotoluene (SS)	120.0		70-130	%	01-NOV-17	16-NOV-17	R3885589
<b>CCME Total Extractable Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	86.7		70-130	%	16-NOV-17	16-NOV-17	R3892910
Chrom. to baseline at nC50	YES				16-NOV-17	16-NOV-17	R3892910
Prep/Analysis Dates					16-NOV-17	16-NOV-17	R3892910
<b>CCME Total Hydrocarbons</b>							
F1 (C6-C10)	<10		10	mg/kg		24-NOV-17	
F1-BTEX	<10		10	mg/kg		24-NOV-17	
F2 (C10-C16)	93		20	mg/kg		24-NOV-17	
F2-Naphth	22		20	mg/kg		24-NOV-17	
F3 (C16-C34)	71		20	mg/kg		24-NOV-17	
F3-PAH	27		20	mg/kg		24-NOV-17	
F4 (C34-C50)	<20		20	mg/kg		24-NOV-17	
Total Hydrocarbons (C6-C50)	164		20	mg/kg		24-NOV-17	
<b>Miscellaneous Parameters</b>							
Moisture	17.4		0.25	%		17-NOV-17	R3891408
<b>PAH &amp; Carcinogenic PAH list</b>							
Acenaphthene	12.9	DLHC	0.50	mg/kg	17-NOV-17	23-NOV-17	R3894100
Acenaphthylene	0.152	DLHC	0.050	mg/kg	17-NOV-17	23-NOV-17	R3894100
Anthracene	1.91	DLHC	0.040	mg/kg	17-NOV-17	23-NOV-17	R3894100
Fluoranthene	10.0	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Fluorene	7.31	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Naphthalene	71.2	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Phenanthrene	26.4	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Pyrene	5.91	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benz(a)anthracene	1.00	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(b&j)fluoranthene	0.83	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(k)fluoranthene	0.36	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(g,h,i)perylene	0.20	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(a)pyrene	0.36	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Chrysene	1.26	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Dibenz(a,h)anthracene	0.059	DLHC	0.050	mg/kg	17-NOV-17	23-NOV-17	R3894100
Indeno(1,2,3-c,d)pyrene	0.18	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
IACR:Coarse	2.29		0.25	mg/kg	17-NOV-17	23-NOV-17	R3894100
IACR:Fine	4.42		0.47	mg/kg	17-NOV-17	23-NOV-17	R3894100
B(A)P Total Potency Equivalent	0.668		0.096	mg/kg	17-NOV-17	23-NOV-17	R3894100
Surrogate: d10-Acenaphthene	120.9		60-130	%	17-NOV-17	23-NOV-17	R3894100
Surrogate: d10-Phenanthrene	88.0		60-130	%	17-NOV-17	23-NOV-17	R3894100
Surrogate: d12-Chrysene	84.9		60-130	%	17-NOV-17	23-NOV-17	R3894100

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-7 HAY17-01 AT 3.0-3.5							
Sampled By: Mark Adams on 01-NOV-17 @ 10:00							
Matrix: soil							
<b>BTEX, Styrene &amp; F1-F4</b>							
<b>BTEX and F1</b>							
Benzene	1.17		0.0050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Toluene	2.91		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Ethylbenzene	3.15		0.010	mg/kg	01-NOV-17	09-NOV-17	R3880405
m+p-Xylene	8.12		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
o-Xylene	3.75		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Styrene	<0.050		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Xylenes	11.9		0.10	mg/kg	01-NOV-17	09-NOV-17	R3880405
Surrogate: 1,4-Difluorobenzene (SS)	97.7		70-130	%	01-NOV-17	09-NOV-17	R3880405
Surrogate: 4-Bromofluorobenzene (SS)	100.5		70-130	%	01-NOV-17	09-NOV-17	R3880405
Surrogate: 3,4-Dichlorotoluene (SS)	N/A	SOL:MI	-	%	01-NOV-17	09-NOV-17	R3880405
<b>CCME Total Extractable Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	86.8		70-130	%	07-NOV-17	07-NOV-17	R3881029
Chrom. to baseline at nC50	YES				07-NOV-17	07-NOV-17	R3881029
Prep/Analysis Dates					07-NOV-17	07-NOV-17	R3881029
<b>CCME Total Hydrocarbons</b>							
F1 (C6-C10)	32		10	mg/kg		14-NOV-17	
F1-BTEX	13		10	mg/kg		14-NOV-17	
F2 (C10-C16)	968		20	mg/kg		14-NOV-17	
F2-Naphth	<20		20	mg/kg		14-NOV-17	
F3 (C16-C34)	1250		20	mg/kg		14-NOV-17	
F3-PAH	<20		20	mg/kg		14-NOV-17	
F4 (C34-C50)	78		20	mg/kg		14-NOV-17	
Total Hydrocarbons (C6-C50)	2330		20	mg/kg		14-NOV-17	
<b>Miscellaneous Parameters</b>							
Moisture	18.0		0.25	%		08-NOV-17	R3880033
<b>PAH &amp; Carcinogenic PAH list</b>							
Acenaphthene	256	DLHC	5.0	mg/kg	08-NOV-17	10-NOV-17	R3884768
Acenaphthylene	<5.0	DLHC	5.0	mg/kg	08-NOV-17	10-NOV-17	R3884768
Anthracene	72.2	DLHC	4.0	mg/kg	08-NOV-17	10-NOV-17	R3884768
Fluoranthene	376	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Fluorene	201	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Naphthalene	1090	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Phenanthrene	702	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Pyrene	250	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benz(a)anthracene	79	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benzo(b&j)fluoranthene	73	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benzo(k)fluoranthene	27	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benzo(g,h,i)perylene	16	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benzo(a)pyrene	44	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Chrysene	51	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Dibenz(a,h)anthracene	<5.0	DLHC	5.0	mg/kg	08-NOV-17	10-NOV-17	R3884768
Indeno(1,2,3-c,d)pyrene	15	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
IACR:Coarse	183		25	mg/kg	08-NOV-17	10-NOV-17	R3884768
IACR:Fine	353		47	mg/kg	08-NOV-17	10-NOV-17	R3884768
B(A)P Total Potency Equivalent	66.8		9.6	mg/kg	08-NOV-17	10-NOV-17	R3884768
Surrogate: d10-Acenaphthene	N/A	SDO:RNA	-	%	08-NOV-17	10-NOV-17	R3884768
Surrogate: d10-Phenanthrene	N/A	SDO:RNA	-	%	08-NOV-17	10-NOV-17	R3884768
Surrogate: d12-Chrysene	N/A	SDO:RNA	-	%	08-NOV-17	10-NOV-17	R3884768

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-8 HAY17-01 AT 3.5-4.0 Sampled By: Mark Adams on 01-NOV-17 @ 10:00 Matrix: soil							
<b>Miscellaneous Parameters</b>							
Moisture	17.3		0.25	%		10-NOV-17	R3881369
Naphthalene	13.8	DLHC	0.050	mg/L	09-NOV-17	12-NOV-17	R3884999
<b>Chlorinated Hydrocarbons in Soil by GCMS</b>							
1,2-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,3-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,4-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorobutadiene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachloroethane	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorocyclohexane (Total)	<9.0	DLCI	9.0	mg/kg	10-NOV-17	14-NOV-17	R3885008
Pentachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3,4-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3,5-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,4,5-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
2,4,5-Trichlorotoluene	<0.030	DLCI	0.030	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,4-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,3,5-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
<b>Chlorinated Phenols by Tumbler/GCMS</b>							
2,3,4,5-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,4,6-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,4-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,5,6-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,6-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4,6-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,4,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
Pentachlorophenol	0.030		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
<b>Phenolics by Tumbler/GC-MS</b>							
4-Chloro-3-methylphenol	<0.20	DLCI	0.20	mg/kg	10-NOV-17	14-NOV-17	R3880943
2-Chlorophenol	<0.20	DLQ	0.20	mg/kg	10-NOV-17	14-NOV-17	R3880943
3-Chlorophenol	<0.10	DLCI	0.10	mg/kg	10-NOV-17	14-NOV-17	R3880943
4-Chlorophenol	<0.030	DLCI	0.030	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4 & 2,5-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,6-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,4-Dichlorophenol	<0.30	DLQ	0.30	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,5-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4-Dimethylphenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
o-Cresol	0.054		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
m-Cresol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
p-Cresol	<0.030	DLCI	0.030	mg/kg	10-NOV-17	14-NOV-17	R3880943
Phenol	0.040		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
L2017573-11 HAY17-02 AT 1.0-1.5 Sampled By: Mark Adams on 01-NOV-17 @ 00:30 Matrix: soil							
<b>BTEX, Styrene &amp; F1-F4</b>							
<b>BTEX and F1</b>							
Benzene	0.349		0.0050	mg/kg	01-NOV-17	16-NOV-17	R3885589
Toluene	0.173		0.050	mg/kg	01-NOV-17	16-NOV-17	R3885589

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-11 HAY17-02 AT 1.0-1.5							
Sampled By: Mark Adams on 01-NOV-17 @ 00:30							
Matrix: soil							
<b>BTEX and F1</b>							
Ethylbenzene	0.666		0.010	mg/kg	01-NOV-17	16-NOV-17	R3885589
m+p-Xylene	1.21		0.050	mg/kg	01-NOV-17	16-NOV-17	R3885589
o-Xylene	0.827		0.050	mg/kg	01-NOV-17	16-NOV-17	R3885589
Styrene	<0.050		0.050	mg/kg	01-NOV-17	16-NOV-17	R3885589
Xylenes	2.03		0.10	mg/kg	01-NOV-17	16-NOV-17	R3885589
Surrogate: 1,4-Difluorobenzene (SS)	121.0		70-130	%	01-NOV-17	16-NOV-17	R3885589
Surrogate: 4-Bromofluorobenzene (SS)	125.0		70-130	%	01-NOV-17	16-NOV-17	R3885589
Surrogate: 3,4-Dichlorotoluene (SS)	97.0		70-130	%	01-NOV-17	16-NOV-17	R3885589
<b>CCME Total Extractable Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	89.2		70-130	%	16-NOV-17	16-NOV-17	R3892910
Chrom. to baseline at nC50	YES				16-NOV-17	16-NOV-17	R3892910
Prep/Analysis Dates					16-NOV-17	16-NOV-17	R3892910
<b>CCME Total Hydrocarbons</b>							
F1 (C6-C10)	13		10	mg/kg		24-NOV-17	
F1-BTEX	<10		10	mg/kg		24-NOV-17	
F2 (C10-C16)	205		20	mg/kg		24-NOV-17	
F2-Naphth	98		20	mg/kg		24-NOV-17	
F3 (C16-C34)	248		20	mg/kg		24-NOV-17	
F3-PAH	23		20	mg/kg		24-NOV-17	
F4 (C34-C50)	21		20	mg/kg		24-NOV-17	
Total Hydrocarbons (C6-C50)	487		20	mg/kg		24-NOV-17	
<b>Miscellaneous Parameters</b>							
Moisture	15.4		0.25	%		17-NOV-17	R3891408
<b>PAH &amp; Carcinogenic PAH list</b>							
Acenaphthene	37.3	DLHC	0.50	mg/kg	17-NOV-17	23-NOV-17	R3894100
Acenaphthylene	0.60	DLHC	0.50	mg/kg	17-NOV-17	23-NOV-17	R3894100
Anthracene	13.8	DLHC	0.40	mg/kg	17-NOV-17	23-NOV-17	R3894100
Fluoranthene	59.1	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Fluorene	27.1	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Naphthalene	107	DLHC	10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Phenanthrene	101	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Pyrene	41.8	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benz(a)anthracene	10.4	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(b&j)fluoranthene	9.7	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(k)fluoranthene	3.9	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(g,h,i)perylene	3.4	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(a)pyrene	5.5	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Chrysene	9.7	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Dibenz(a,h)anthracene	0.88	DLHC	0.50	mg/kg	17-NOV-17	23-NOV-17	R3894100
Indeno(1,2,3-c,d)pyrene	2.7	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
IACR:Coarse	25.7		2.5	mg/kg	17-NOV-17	23-NOV-17	R3894100
IACR:Fine	49.5		4.7	mg/kg	17-NOV-17	23-NOV-17	R3894100
B(A)P Total Potency Equivalent	9.16		0.96	mg/kg	17-NOV-17	23-NOV-17	R3894100
Surrogate: d10-Acenaphthene	N/A	SDO:RNA	-	%	17-NOV-17	23-NOV-17	R3894100
Surrogate: d10-Phenanthrene	N/A	SDO:RNA	-	%	17-NOV-17	23-NOV-17	R3894100
Surrogate: d12-Chrysene	N/A	SDO:RNA	-	%	17-NOV-17	23-NOV-17	R3894100
L2017573-12 HAY17-02 AT 1.5-2.0							
Sampled By: Mark Adams on 01-NOV-17 @ 00:30							
Matrix: soil							
<b>BTEX, Styrene &amp; F1-F4</b>							
<b>BTEX and F1</b>							

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-12 HAY17-02 AT 1.5-2.0							
Sampled By: Mark Adams on 01-NOV-17 @ 00:30							
Matrix: soil							
<b>BTEX and F1</b>							
Benzene	0.101		0.0050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Toluene	0.073		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Ethylbenzene	0.329		0.010	mg/kg	01-NOV-17	09-NOV-17	R3880405
m+p-Xylene	0.443		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
o-Xylene	0.281		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Styrene	<0.050		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Xylenes	0.72		0.10	mg/kg	01-NOV-17	09-NOV-17	R3880405
Surrogate: 1,4-Difluorobenzene (SS)	110.9		70-130	%	01-NOV-17	09-NOV-17	R3880405
Surrogate: 4-Bromofluorobenzene (SS)	110.6		70-130	%	01-NOV-17	09-NOV-17	R3880405
Surrogate: 3,4-Dichlorotoluene (SS)	101.9		70-130	%	01-NOV-17	09-NOV-17	R3880405
<b>CCME Total Extractable Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	84.1		70-130	%	07-NOV-17	07-NOV-17	R3881029
Chrom. to baseline at nC50	YES				07-NOV-17	07-NOV-17	R3881029
Prep/Analysis Dates					07-NOV-17	07-NOV-17	R3881029
<b>CCME Total Hydrocarbons</b>							
F1 (C6-C10)	<10		10	mg/kg		14-NOV-17	
F1-BTEX	<10		10	mg/kg		14-NOV-17	
F2 (C10-C16)	700		20	mg/kg		14-NOV-17	
F2-Naphth	678		20	mg/kg		14-NOV-17	
F3 (C16-C34)	1150		20	mg/kg		14-NOV-17	
F3-PAH	1140		20	mg/kg		14-NOV-17	
F4 (C34-C50)	87		20	mg/kg		14-NOV-17	
Total Hydrocarbons (C6-C50)	1940		20	mg/kg		14-NOV-17	
<b>Miscellaneous Parameters</b>							
Moisture	17.7		0.25	%		08-NOV-17	R3880033
<b>PAH &amp; Carcinogenic PAH list</b>							
Acenaphthene	3.58		0.0050	mg/kg	08-NOV-17	09-NOV-17	R3884768
Acenaphthylene	0.0359		0.0050	mg/kg	08-NOV-17	09-NOV-17	R3884768
Anthracene	0.279		0.0040	mg/kg	08-NOV-17	09-NOV-17	R3884768
Fluoranthene	1.36		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Fluorene	2.00		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Naphthalene	22.2	DLHC	1.0	mg/kg	08-NOV-17	09-NOV-17	R3884768
Phenanthrene	2.84		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Pyrene	0.964		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benz(a)anthracene	0.314		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(b&j)fluoranthene	0.297		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(k)fluoranthene	0.106		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(g,h,i)perylene	0.093		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(a)pyrene	0.188		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Chrysene	0.187		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Dibenz(a,h)anthracene	0.0246		0.0050	mg/kg	08-NOV-17	09-NOV-17	R3884768
Indeno(1,2,3-c,d)pyrene	0.075		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
IACR:Coarse	0.737		0.050	mg/kg	08-NOV-17	09-NOV-17	R3884768
IACR:Fine	1.42		0.050	mg/kg	08-NOV-17	09-NOV-17	R3884768
B(A)P Total Potency Equivalent	0.295		0.020	mg/kg	08-NOV-17	09-NOV-17	R3884768
Surrogate: d10-Acenaphthene	90.5		60-130	%	08-NOV-17	09-NOV-17	R3884768
Surrogate: d10-Phenanthrene	100.9		60-130	%	08-NOV-17	09-NOV-17	R3884768
Surrogate: d12-Chrysene	104.8		60-130	%	08-NOV-17	09-NOV-17	R3884768
L2017573-13 HAY17-02 AT 2.0-2.5							
Sampled By: Mark Adams on 01-NOV-17 @ 00:30							
Matrix: soil							

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-13 HAY17-02 AT 2.0-2.5 Sampled By: Mark Adams on 01-NOV-17 @ 00:30 Matrix: soil							
<b>Miscellaneous Parameters</b>							
Moisture	16.1		0.25	%		10-NOV-17	R3881369
Naphthalene	10.3	DLHC	0.050	mg/L	09-NOV-17	12-NOV-17	R3884999
<b>Chlorinated Hydrocarbons in Soil by GCMS</b>							
1,2-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,3-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,4-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorobutadiene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachloroethane	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorocyclohexane (Total)	<25	DLCI	25	mg/kg	10-NOV-17	14-NOV-17	R3885008
Pentachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3,4-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3,5-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,4,5-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
2,4,5-Trichlorotoluene	<0.060	DLCI	0.060	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,4-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,3,5-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
<b>Chlorinated Phenols by Tumbler/GCMS</b>							
2,3,4,5-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,4,6-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,4-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,5,6-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,6-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4,6-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,4,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
Pentachlorophenol	0.023		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
<b>Phenolics by Tumbler/GC-MS</b>							
4-Chloro-3-methylphenol	<0.40	DLCI	0.40	mg/kg	10-NOV-17	14-NOV-17	R3880943
2-Chlorophenol	<0.20	DLQ	0.20	mg/kg	10-NOV-17	14-NOV-17	R3880943
3-Chlorophenol	<0.090	DLCI	0.090	mg/kg	10-NOV-17	14-NOV-17	R3880943
4-Chlorophenol	<0.050	DLCI	0.050	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4 & 2,5-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,6-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,4-Dichlorophenol	<0.40	DLQ	0.40	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,5-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4-Dimethylphenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
o-Cresol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
m-Cresol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
p-Cresol	<0.030	DLCI	0.030	mg/kg	10-NOV-17	14-NOV-17	R3880943
Phenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
L2017573-14 HAY17-02 AT 2.5-3.0 Sampled By: Mark Adams on 01-NOV-17 @ 00:30 Matrix: soil							
<b>BTEX, Styrene &amp; F1-F4</b>							
<b>BTEX and F1</b>							
Benzene	0.0863		0.0050	mg/kg	01-NOV-17	17-NOV-17	R3885589
Toluene	0.324		0.050	mg/kg	01-NOV-17	17-NOV-17	R3885589

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-14 HAY17-02 AT 2.5-3.0							
Sampled By: Mark Adams on 01-NOV-17 @ 00:30							
Matrix: soil							
<b>BTEX and F1</b>							
Ethylbenzene	0.658		0.010	mg/kg	01-NOV-17	17-NOV-17	R3885589
m+p-Xylene	1.64		0.050	mg/kg	01-NOV-17	17-NOV-17	R3885589
o-Xylene	1.17		0.050	mg/kg	01-NOV-17	17-NOV-17	R3885589
Styrene	<0.050		0.050	mg/kg	01-NOV-17	17-NOV-17	R3885589
Xylenes	2.81		0.10	mg/kg	01-NOV-17	17-NOV-17	R3885589
Surrogate: 1,4-Difluorobenzene (SS)	93.1		70-130	%	01-NOV-17	17-NOV-17	R3885589
Surrogate: 4-Bromofluorobenzene (SS)	121.5		70-130	%	01-NOV-17	17-NOV-17	R3885589
Surrogate: 3,4-Dichlorotoluene (SS)	93.6		70-130	%	01-NOV-17	17-NOV-17	R3885589
<b>CCME Total Extractable Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	90.0		70-130	%	16-NOV-17	16-NOV-17	R3892910
Chrom. to baseline at nC50	YES				16-NOV-17	16-NOV-17	R3892910
Prep/Analysis Dates					16-NOV-17	16-NOV-17	R3892910
<b>CCME Total Hydrocarbons</b>							
F1 (C6-C10)	17		10	mg/kg		24-NOV-17	
F1-BTEX	13		10	mg/kg		24-NOV-17	
F2 (C10-C16)	356		20	mg/kg		24-NOV-17	
F2-Naphth	295		20	mg/kg		24-NOV-17	
F3 (C16-C34)	598		20	mg/kg		24-NOV-17	
F3-PAH	517		20	mg/kg		24-NOV-17	
F4 (C34-C50)	46		20	mg/kg		24-NOV-17	
Total Hydrocarbons (C6-C50)	1020		20	mg/kg		24-NOV-17	
<b>Miscellaneous Parameters</b>							
% Moisture	16.4		0.50	%		16-NOV-17	R3886967
<b>PAH &amp; Carcinogenic PAH list</b>							
Acenaphthene	15.4	DLHC	0.50	mg/kg	17-NOV-17	23-NOV-17	R3894100
Acenaphthylene	0.192	DLHC	0.050	mg/kg	17-NOV-17	23-NOV-17	R3894100
Anthracene	3.44	DLHC	0.040	mg/kg	17-NOV-17	23-NOV-17	R3894100
Fluoranthene	21.4	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Fluorene	10.5	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Naphthalene	61.1	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Phenanthrene	35.3	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Pyrene	14.8	DLHC	1.0	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benz(a)anthracene	4.37	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(b&j)fluoranthene	3.86	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(k)fluoranthene	1.47	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(g,h,i)perylene	1.46	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Benzo(a)pyrene	2.52	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Chrysene	2.66	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
Dibenz(a,h)anthracene	0.355	DLHC	0.050	mg/kg	17-NOV-17	23-NOV-17	R3894100
Indeno(1,2,3-c,d)pyrene	1.03	DLHC	0.10	mg/kg	17-NOV-17	23-NOV-17	R3894100
IACR:Coarse	10.0		0.25	mg/kg	17-NOV-17	23-NOV-17	R3894100
IACR:Fine	19.3		0.47	mg/kg	17-NOV-17	23-NOV-17	R3894100
B(A)P Total Potency Equivalent	3.99		0.096	mg/kg	17-NOV-17	23-NOV-17	R3894100
Surrogate: d10-Acenaphthene	109.9		60-130	%	17-NOV-17	23-NOV-17	R3894100
Surrogate: d10-Phenanthrene	96.2		60-130	%	17-NOV-17	23-NOV-17	R3894100
Surrogate: d12-Chrysene	94.1		60-130	%	17-NOV-17	23-NOV-17	R3894100
L2017573-18 HAY17-03 AT 1.5-2.0							
Sampled By: Mark Adams on 01-NOV-17 @ 15:00							
Matrix: soil							
<b>BTEX, Styrene &amp; F1-F4</b>							
<b>BTEX and F1</b>							

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-18 HAY17-03 AT 1.5-2.0							
Sampled By: Mark Adams on 01-NOV-17 @ 15:00							
Matrix: soil							
<b>BTEX and F1</b>							
Benzene	<0.0050		0.0050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Toluene	<0.050		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Ethylbenzene	<0.010		0.010	mg/kg	01-NOV-17	09-NOV-17	R3880405
m+p-Xylene	<0.050		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
o-Xylene	<0.050		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Styrene	<0.050		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Xylenes	<0.10		0.10	mg/kg	01-NOV-17	09-NOV-17	R3880405
Surrogate: 1,4-Difluorobenzene (SS)	106.2		70-130	%	01-NOV-17	09-NOV-17	R3880405
Surrogate: 4-Bromofluorobenzene (SS)	78.7		70-130	%	01-NOV-17	09-NOV-17	R3880405
Surrogate: 3,4-Dichlorotoluene (SS)	102.7		70-130	%	01-NOV-17	09-NOV-17	R3880405
<b>CCME Total Extractable Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	88.2		70-130	%	07-NOV-17	07-NOV-17	R3881029
Chrom. to baseline at nC50	YES				07-NOV-17	07-NOV-17	R3881029
Prep/Analysis Dates					07-NOV-17	07-NOV-17	R3881029
<b>CCME Total Hydrocarbons</b>							
F1 (C6-C10)	<10		10	mg/kg		10-NOV-17	
F1-BTEX	<10		10	mg/kg		10-NOV-17	
F2 (C10-C16)	<20		20	mg/kg		10-NOV-17	
F3 (C16-C34)	36		20	mg/kg		10-NOV-17	
F4 (C34-C50)	21		20	mg/kg		10-NOV-17	
Total Hydrocarbons (C6-C50)	57		20	mg/kg		10-NOV-17	
<b>Miscellaneous Parameters</b>							
% Moisture	18.1		0.50	%		10-NOV-17	R3880858
L2017573-19 SS17-01							
Sampled By: Mark Adams on 01-NOV-17 @ 16:00							
Matrix: soil							
<b>BTEX, Styrene &amp; F1-F4</b>							
<b>BTEX and F1</b>							
Benzene	0.0097		0.0050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Toluene	<0.050		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Ethylbenzene	0.014		0.010	mg/kg	01-NOV-17	09-NOV-17	R3880405
m+p-Xylene	<0.050		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
o-Xylene	0.083		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Styrene	0.061		0.050	mg/kg	01-NOV-17	09-NOV-17	R3880405
Xylenes	<0.10		0.10	mg/kg	01-NOV-17	09-NOV-17	R3880405
Surrogate: 1,4-Difluorobenzene (SS)	116.8		70-130	%	01-NOV-17	09-NOV-17	R3880405
Surrogate: 4-Bromofluorobenzene (SS)	98.2		70-130	%	01-NOV-17	09-NOV-17	R3880405
Surrogate: 3,4-Dichlorotoluene (SS)	N/A	SOL:MI	-	%	01-NOV-17	09-NOV-17	R3880405
<b>CCME Total Extractable Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	102.3		70-130	%	07-NOV-17	07-NOV-17	R3881029
Chrom. to baseline at nC50	YES				07-NOV-17	07-NOV-17	R3881029
Prep/Analysis Dates					07-NOV-17	07-NOV-17	R3881029
<b>CCME Total Hydrocarbons</b>							
F1 (C6-C10)	<10		10	mg/kg		14-NOV-17	
F1-BTEX	<10		10	mg/kg		14-NOV-17	
F2 (C10-C16)	3370	DLHC	150	mg/kg		14-NOV-17	
F2-Naphth	3320		150	mg/kg		14-NOV-17	
F3 (C16-C34)	13000	DLHC	150	mg/kg		14-NOV-17	
F3-PAH	5890		150	mg/kg		14-NOV-17	
F4 (C34-C50)	1160	DLHC	150	mg/kg		14-NOV-17	
Total Hydrocarbons (C6-C50)	17500		150	mg/kg		14-NOV-17	

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-19 SS17-01 Sampled By: Mark Adams on 01-NOV-17 @ 16:00 Matrix: soil							
<b>Miscellaneous Parameters</b>							
Moisture	20.4		0.25	%		08-NOV-17	R3880033
<b>PAH &amp; Carcinogenic PAH list</b>							
Acenaphthene	936	DLHC	5.0	mg/kg	08-NOV-17	10-NOV-17	R3884768
Acenaphthylene	13.1	DLHC	5.0	mg/kg	08-NOV-17	10-NOV-17	R3884768
Anthracene	340	DLHC	4.0	mg/kg	08-NOV-17	10-NOV-17	R3884768
Fluoranthene	1870	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Fluorene	739	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Naphthalene	46	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Phenanthrene	3090	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Pyrene	1290	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benz(a)anthracene	389	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benzo(b&j)fluoranthene	370	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benzo(k)fluoranthene	140	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benzo(g,h,i)perylene	87	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Benzo(a)pyrene	228	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Chrysene	269	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
Dibenz(a,h)anthracene	24.0	DLHC	5.0	mg/kg	08-NOV-17	10-NOV-17	R3884768
Indeno(1,2,3-c,d)pyrene	75	DLHC	10	mg/kg	08-NOV-17	10-NOV-17	R3884768
IACR:Coarse	939		25	mg/kg	08-NOV-17	10-NOV-17	R3884768
IACR:Fine	1810		47	mg/kg	08-NOV-17	10-NOV-17	R3884768
B(A)P Total Potency Equivalent	353		9.6	mg/kg	08-NOV-17	10-NOV-17	R3884768
Surrogate: d10-Acenaphthene	N/A	SDO:RNA	-	%	08-NOV-17	10-NOV-17	R3884768
Surrogate: d10-Phenanthrene	N/A	SDO:RNA	-	%	08-NOV-17	10-NOV-17	R3884768
Surrogate: d12-Chrysene	N/A	SDO:RNA	-	%	08-NOV-17	10-NOV-17	R3884768
L2017573-20 HAY17-04 AT 0.5-1.0 Sampled By: Mark Adams on 02-NOV-17 @ 09:00 Matrix: soil							
<b>BTEX, Styrene &amp; F1-F4</b>							
<b>BTEX and F1</b>							
Benzene	<0.0050		0.0050	mg/kg	02-NOV-17	09-NOV-17	R3880405
Toluene	<0.050		0.050	mg/kg	02-NOV-17	09-NOV-17	R3880405
Ethylbenzene	<0.010		0.010	mg/kg	02-NOV-17	09-NOV-17	R3880405
m+p-Xylene	<0.050		0.050	mg/kg	02-NOV-17	09-NOV-17	R3880405
o-Xylene	<0.050		0.050	mg/kg	02-NOV-17	09-NOV-17	R3880405
Styrene	<0.050		0.050	mg/kg	02-NOV-17	09-NOV-17	R3880405
Xylenes	<0.10		0.10	mg/kg	02-NOV-17	09-NOV-17	R3880405
Surrogate: 1,4-Difluorobenzene (SS)	106.5		70-130	%	02-NOV-17	09-NOV-17	R3880405
Surrogate: 4-Bromofluorobenzene (SS)	83.2		70-130	%	02-NOV-17	09-NOV-17	R3880405
Surrogate: 3,4-Dichlorotoluene (SS)	99.5		70-130	%	02-NOV-17	09-NOV-17	R3880405
<b>CCME Total Extractable Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	84.9		70-130	%	07-NOV-17	07-NOV-17	R3881029
Chrom. to baseline at nC50	YES				07-NOV-17	07-NOV-17	R3881029
Prep/Analysis Dates					07-NOV-17	07-NOV-17	R3881029
<b>CCME Total Hydrocarbons</b>							
F1 (C6-C10)	<10		10	mg/kg		14-NOV-17	
F1-BTEX	<10		10	mg/kg		14-NOV-17	
F2 (C10-C16)	<20		20	mg/kg		14-NOV-17	
F2-Naphth	<20		20	mg/kg		14-NOV-17	
F3 (C16-C34)	<20		20	mg/kg		14-NOV-17	
F3-PAH	<20		20	mg/kg		14-NOV-17	
F4 (C34-C50)	<20		20	mg/kg		14-NOV-17	

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-20 HAY17-04 AT 0.5-1.0 Sampled By: Mark Adams on 02-NOV-17 @ 09:00 Matrix: soil							
<b>CCME Total Hydrocarbons</b>							
Total Hydrocarbons (C6-C50)	<20		20	mg/kg		14-NOV-17	
<b>Miscellaneous Parameters</b>							
Moisture	16.6		0.25	%		08-NOV-17	R3880033
<b>PAH &amp; Carcinogenic PAH list</b>							
Acenaphthene	0.968		0.0050	mg/kg	08-NOV-17	09-NOV-17	R3884768
Acenaphthylene	0.0313		0.0050	mg/kg	08-NOV-17	09-NOV-17	R3884768
Anthracene	0.648		0.0040	mg/kg	08-NOV-17	09-NOV-17	R3884768
Fluoranthene	2.87		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Fluorene	0.900		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Naphthalene	1.34		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Phenanthrene	3.86		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Pyrene	2.04		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benz(a)anthracene	0.580		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(b&j)fluoranthene	0.531		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(k)fluoranthene	0.205		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(g,h,i)perylene	0.179		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(a)pyrene	0.364		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Chrysene	0.545		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Dibenz(a,h)anthracene	0.0433		0.0050	mg/kg	08-NOV-17	09-NOV-17	R3884768
Indeno(1,2,3-c,d)pyrene	0.128		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
IACR:Coarse	1.39		0.050	mg/kg	08-NOV-17	09-NOV-17	R3884768
IACR:Fine	2.68		0.050	mg/kg	08-NOV-17	09-NOV-17	R3884768
B(A)P Total Potency Equivalent	0.559		0.020	mg/kg	08-NOV-17	09-NOV-17	R3884768
Surrogate: d10-Acenaphthene	94.1		60-130	%	08-NOV-17	09-NOV-17	R3884768
Surrogate: d10-Phenanthrene	103.5		60-130	%	08-NOV-17	09-NOV-17	R3884768
Surrogate: d12-Chrysene	104.5		60-130	%	08-NOV-17	09-NOV-17	R3884768
L2017573-21 HAY17-04 AT 1.0-1.5 Sampled By: Mark Adams on 02-NOV-17 @ 09:00 Matrix: soil							
<b>Miscellaneous Parameters</b>							
Moisture	16.4		0.25	%		10-NOV-17	R3881369
<b>Chlorinated Hydrocarbons in Soil by GCMS</b>							
1,2-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,3-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,4-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorobutadiene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachloroethane	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorocyclohexane (Total)	<0.080	DLCI	0.080	mg/kg	10-NOV-17	14-NOV-17	R3885008
Pentachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3,4-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3,5-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,4,5-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
2,4,5-Trichlorotoluene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,4-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,3,5-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
<b>Chlorinated Phenols by Tumbler/GCMS</b>							
2,3,4,5-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,4,6-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,4-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-21 HAY17-04 AT 1.0-1.5 Sampled By: Mark Adams on 02-NOV-17 @ 09:00 Matrix: soil							
<b>Chlorinated Phenols by Tumbler/GCMS</b>							
2,3,5,6-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,6-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4,6-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,4,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
Pentachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
<b>Phenolics by Tumbler/GC-MS</b>							
4-Chloro-3-methylphenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2-Chlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3-Chlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
4-Chlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4 & 2,5-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,6-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,4-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,5-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4-Dimethylphenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
o-Cresol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
m-Cresol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
p-Cresol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
Phenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
L2017573-27 HAY17-06 AT 2.0-2.5 Sampled By: Mark Adams on 02-NOV-17 @ 11:00 Matrix: soil							
<b>BTEX, Styrene &amp; F1-F4</b>							
<b>BTEX and F1</b>							
Benzene	0.113		0.0050	mg/kg	02-NOV-17	09-NOV-17	R3880405
Toluene	0.109		0.050	mg/kg	02-NOV-17	09-NOV-17	R3880405
Ethylbenzene	0.520		0.010	mg/kg	02-NOV-17	09-NOV-17	R3880405
m+p-Xylene	0.909		0.050	mg/kg	02-NOV-17	09-NOV-17	R3880405
o-Xylene	0.777		0.050	mg/kg	02-NOV-17	09-NOV-17	R3880405
Styrene	<0.050		0.050	mg/kg	02-NOV-17	09-NOV-17	R3880405
Xylenes	1.69		0.10	mg/kg	02-NOV-17	09-NOV-17	R3880405
Surrogate: 1,4-Difluorobenzene (SS)	92.7		70-130	%	02-NOV-17	09-NOV-17	R3880405
Surrogate: 4-Bromofluorobenzene (SS)	75.5		70-130	%	02-NOV-17	09-NOV-17	R3880405
Surrogate: 3,4-Dichlorotoluene (SS)	74.3		70-130	%	02-NOV-17	09-NOV-17	R3880405
<b>CCME Total Extractable Hydrocarbons</b>							
Surrogate: 2-Bromobenzotrifluoride	100.2		70-130	%	07-NOV-17	07-NOV-17	R3881029
Chrom. to baseline at nC50	YES				07-NOV-17	07-NOV-17	R3881029
Prep/Analysis Dates					07-NOV-17	07-NOV-17	R3881029
<b>CCME Total Hydrocarbons</b>							
F1 (C6-C10)	<10		10	mg/kg		14-NOV-17	
F1-BTEX	<10		10	mg/kg		14-NOV-17	
F2 (C10-C16)	1330	DLHC	70	mg/kg		14-NOV-17	
F2-Naphth	1280		70	mg/kg		14-NOV-17	
F3 (C16-C34)	2230	DLHC	70	mg/kg		14-NOV-17	
F3-PAH	2170		70	mg/kg		14-NOV-17	
F4 (C34-C50)	274	DLHC	70	mg/kg		14-NOV-17	
Total Hydrocarbons (C6-C50)	3830		70	mg/kg		14-NOV-17	
<b>Miscellaneous Parameters</b>							

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-27 HAY17-06 AT 2.0-2.5 Sampled By: Mark Adams on 02-NOV-17 @ 11:00 Matrix: soil							
Moisture	16.7		0.25	%		08-NOV-17	R3880033
<b>PAH &amp; Carcinogenic PAH list</b>							
Acenaphthene	12.4	DLHC	0.50	mg/kg	08-NOV-17	09-NOV-17	R3884768
Acenaphthylene	0.143		0.0050	mg/kg	08-NOV-17	09-NOV-17	R3884768
Anthracene	3.99		0.0040	mg/kg	08-NOV-17	09-NOV-17	R3884768
Fluoranthene	11.9	DLHC	1.0	mg/kg	08-NOV-17	09-NOV-17	R3884768
Fluorene	10.2	DLHC	1.0	mg/kg	08-NOV-17	09-NOV-17	R3884768
Naphthalene	46.0	DLHC	1.0	mg/kg	08-NOV-17	09-NOV-17	R3884768
Phenanthrene	33.1	DLHC	1.0	mg/kg	08-NOV-17	09-NOV-17	R3884768
Pyrene	8.7	DLHC	1.0	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benz(a)anthracene	1.94		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(b&j)fluoranthene	1.55		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(k)fluoranthene	0.648		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(g,h,i)perylene	0.567		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Benzo(a)pyrene	1.12		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Chrysene	2.07		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
Dibenz(a,h)anthracene	0.143		0.0050	mg/kg	08-NOV-17	09-NOV-17	R3884768
Indeno(1,2,3-c,d)pyrene	0.330		0.010	mg/kg	08-NOV-17	09-NOV-17	R3884768
IACR:Coarse	4.35		0.050	mg/kg	08-NOV-17	09-NOV-17	R3884768
IACR:Fine	8.39		0.050	mg/kg	08-NOV-17	09-NOV-17	R3884768
B(A)P Total Potency Equivalent	1.74		0.020	mg/kg	08-NOV-17	09-NOV-17	R3884768
Surrogate: d10-Acenaphthene	102.1		60-130	%	08-NOV-17	09-NOV-17	R3884768
Surrogate: d10-Phenanthrene	111.0		60-130	%	08-NOV-17	09-NOV-17	R3884768
Surrogate: d12-Chrysene	98.3		60-130	%	08-NOV-17	09-NOV-17	R3884768
L2017573-28 HAY17-06 AT 2.5-3.0 Sampled By: Mark Adams on 02-NOV-17 @ 11:00 Matrix: soil							
<b>Miscellaneous Parameters</b>							
Moisture	15.7		0.25	%		10-NOV-17	R3881369
Naphthalene	2.42	DLHC	0.050	mg/L	09-NOV-17	12-NOV-17	R3884999
<b>Chlorinated Hydrocarbons in Soil by GCMS</b>							
1,2-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,3-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,4-Dichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorobutadiene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachloroethane	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
Hexachlorocyclohexane (Total)	<3.0	DLCI	3.0	mg/kg	10-NOV-17	14-NOV-17	R3885008
Pentachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3,4-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3,5-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,4,5-Tetrachlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
2,4,5-Trichlorotoluene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,3-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,2,4-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
1,3,5-Trichlorobenzene	<0.010		0.010	mg/kg	10-NOV-17	14-NOV-17	R3885008
<b>Chlorinated Phenols by Tumbler/GCMS</b>							
2,3,4,5-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,4,6-Tetrachlorophenol	0.029		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,4-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,5,6-Tetrachlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2017573-28 HAY17-06 AT 2.5-3.0							
Sampled By: Mark Adams on 02-NOV-17 @ 11:00							
Matrix: soil							
<b>Chlorinated Phenols by Tumbler/GCMS</b>							
2,3,6-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4,6-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,4,5-Trichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
Pentachlorophenol	0.162		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
<b>Phenolics by Tumbler/GC-MS</b>							
4-Chloro-3-methylphenol	<0.060	DLCI	0.060	mg/kg	10-NOV-17	14-NOV-17	R3880943
2-Chlorophenol	<0.030	DLQ	0.030	mg/kg	10-NOV-17	14-NOV-17	R3880943
3-Chlorophenol	<0.040	DLCI	0.040	mg/kg	10-NOV-17	14-NOV-17	R3880943
4-Chlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,3-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4 & 2,5-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,6-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,4-Dichlorophenol	<0.060	DLQ	0.060	mg/kg	10-NOV-17	14-NOV-17	R3880943
3,5-Dichlorophenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
2,4-Dimethylphenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
o-Cresol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
m-Cresol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
p-Cresol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943
Phenol	<0.020		0.020	mg/kg	10-NOV-17	14-NOV-17	R3880943

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## Reference Information

### Sample Parameter Qualifier Key:

Qualifier	Description
DLCI	Detection Limit Raised: Chromatographic Interference due to co-elution.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
DUP-H,J	Duplicate results outside ALS DQO, due to sample heterogeneity. Duplicate results and limits are expressed in terms of absolute difference.
SDO:RNA	Surrogate diluted out:% recovery not available
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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BTXS,F1-MEOH-ED	Soil	BTEX and F1	EPA 8260C/5021A and CWS PHC Tier 1
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This analysis involves the extraction of a subsample of the sediment/soil with methanol added in the field at the time of subsampling. The soil methanol extract is added to water and reagents, then heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. BTX Target compound concentrations are measured using mass spectrometry detection. The instrumental portion of F1 analysis is carried out in accordance with the Canada Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method (2001).

CLH-SOX-MS-VA	Soil	Chlorinated Hydrocarbons in Soil by GCMS	EPA METHODS 3540, 8121, 8270
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This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3610, 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a Soxhlet system to extract a subsample of the sediment/soil with dichloromethane. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Hexachlorocyclohexanes includes the alpha, beta, gamma, and delta isomers

CLPHEN-TMB-MS-VA	Soil	Chlorinated Phenols by Tumbler/GCMS	EPA 3570, 8270D, Knapp(1979)
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A subsample of the soil/sediment is rotary extracted by solvent, derivitized, and analysed by GC/MS.

ETL-TVH,TEH-CCME-ED	Soil	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001
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Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F2-4-TMB-ED	Soil	CCME Total Extractable Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001
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This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment" For C10 to C50 hydrocarbons (F2, F3, F4) and gravimetric heavy hydrocarbons (F4G-sg), a subsample of the sediment/soil is extracted with 1:1 hexane:acetone using a rotary extractor. The extract undergoes a silica-gel clean-up to remove polar compounds. F2, F3 & F4 are analyzed by on-column GC/FID, and F4G-sg is analyzed gravimetrically.

#### Notes:

1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where F4 (C34-C50) and F4G-sg results are reported for a sample, the larger of the reported values is used for comparison against the relevant CCME standard for F4.

## Reference Information

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
		7. The gravimetric heavy hydrocarbon results (F4G-sg), cannot be added to the C6 to C50 hydrocarbon results. 8. This method is validated for use. 9. Data from analysis of quality control samples is available upon request. 10. Reported results are expressed as milligrams per dry kilogram.	
MOISTURE-CL	Soil	% Moisture	CWS for PHC in Soil - Tier 1
		This analysis is carried out gravimetrically by drying the sample at 105 C	
MOISTURE-VA	Soil	Moisture content	CWS for PHC in Soil - Tier 1
		This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.	
PAH-ABT1-CL	Soil	PAH & Carcinogenic PAH list	EPA 3570/8270-GC/MS
		This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of DCM and acetone. The extract is then solvent exchanged to toluene. The final extract is analyzed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.	
PAH-TCLP-CL	Waste	PAH TCLP List	EPA 1311 AND EPA 3510/8270-GC/MS
		Samples are leached according to TCLP protocol (EPA 1311), and then the aqueous leachate is extracted as per EPA 3510. The extracts are analyzed on GC/MSD.	
PHEN-TMB-MS-VA	Soil	Phenolics by Tumbler/GC-MS	EPA 3570, 8270D, Knapp(1979)
		A subsample of the soil/sediment is rotary extracted by solvent, derivitized, and analysed by GC/MS.	
PREP-MOISTURE-ED	Soil	% Moisture	Oven dry 105C-Gravimetric
		The weighed portion of soil is placed in a 105°C oven to dry to a constant weight; the drying time will vary based on the moisture content of the soil. The dried soil weight is then used to calculate % moisture.	
		Reference: ASTM D2974-00.	

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

### Chain of Custody Numbers:

15-583275	15-583277	15-583278
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### GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample  
 mg/kg wwt - milligrams per kilogram based on wet weight of sample  
 mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight  
 mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Chain of Custody (COC) / Analytical Request Form



COC Number: 15 - 583275

Page 1 of 3

www.alsglobal.com

Canada Toll Free: 1-800-688-8878

L2017573-COFC

Report To		Report Format / Distribution			Select Service Level Below - Please confirm all EBP TATs with your AM - surcharges will apply											
Contact and company name below will appear on the final report		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply											
Company:	Alberta Environment and Parks (AEP)	Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4] <input type="checkbox"/>				1 Business day [E1] <input type="checkbox"/>							
Contact:	Mark Adams	<input checked="" type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3] <input type="checkbox"/>				Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>							
Phone:	587-784-6034	Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2] <input type="checkbox"/>											
Company address below will appear on the final report		Email 1 or Fax: mark.adams@gov.ab.ca			Date and Time Required for all EBP TATs:											
Street:	4994 - 78 Ave. NW Suite 111	Email 2: angela.L.brown@gov.ab.ca			For tests that can not be performed according to the service level selected, you will be contacted.											
City/Province:	Edmonton, AB	Email 3:			Analysis Request											
Postal Code:	T6B 2K3	Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											
Invoice To:	Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX														
	Copy of Invoice with Report <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Email 1 or Fax:														
Company:		Email 2:														
Contact:		Email 3:														
Project Information		Oil and Gas Required/Fluids (client use):														
ALS Account # / Quote #:		AFE/Cost Center:			PO#											
Job #:		Major/Minor Code:			Routing Code:											
PO / AFE:		Requisitioner:														
LSD:	Confidential	Location:														
ALS Lab Work Order # (lab use only):	L2017573	ALS Contact: Nicole Thibault			Sampler: Mark Adams											
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	BYEX FI	F2 - F4	PAHs	PCP & products	TCLP naphthalene				Number of Containers			
	HAY17-01 at 0.0-0.5	01-Nov-17	10:00	SDI									5			
	" 0.5-1.0	"	"	"									4			
	" 1.0-1.5	"	"	"									4			
	" 1.5-2.0	"	"	"									4			
	" 2.0-2.5	"	"	"									4			
	" 2.5-3.0	"	"	"									4			
	" 3.0-3.5	"	"	"	X	X	X						4			
	" 3.5-4.0	"	"	"				X	X				4			
	HAY17-02 at 0.0-0.5	"	12:30	"									4			
	" 0.5-1.0	"	"	"									4			
	" 1.0-1.5	"	"	"									4			
	" 1.5-2.0	"	"	"	X	X	X						4			
Drinking Water (DW) Samples (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)											
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		Legal Samples Compare to AB Tier 1 guidelines. Bottom half time up. For PCP (penta-chlorophenol), include degradation products per email to Nicole Thibault, Sept. 1, 2017.			Frozen <input type="checkbox"/>				SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>							
Are samples for human drinking water use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input type="checkbox"/>				Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>							
					Cooling Initiated <input type="checkbox"/>											
					INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C							
					2.6, 3.3, 1.1											
SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (lab use only)				FINAL SHIPMENT RECEPTION (lab use only)								
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:					
Mark Adams	2 Nov 2017	17:20	A. Reicher	2-Nov-2017	5:20pm											



<b>Report To</b> - Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Please confirm all EAP TATs with your AM - surcharges will apply</b>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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<b>Invoice To</b>		<b>Invoice Distribution</b>			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="10" style="text-align: center;">Oil and Gas Required Fields (client use)</td> <td rowspan="10" style="writing-mode: vertical-rl; text-orientation: mixed;">Number of Containers</td> </tr> <tr> <td colspan="2">Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO</td> <td colspan="3">Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX</td> <td rowspan="10" style="writing-mode: vertical-rl; text-orientation: mixed;">BTEX FI</td> <td rowspan="10" style="writing-mode: vertical-rl; text-orientation: mixed;">F2 - F4</td> <td rowspan="10" style="writing-mode: vertical-rl; text-orientation: mixed;">PAHs</td> <td rowspan="10" style="writing-mode: vertical-rl; text-orientation: mixed;">PCP &amp; products</td> <td rowspan="10" style="writing-mode: vertical-rl; text-orientation: mixed;">TCLP naphthalene</td> <td colspan="10"></td> </tr> <tr> <td colspan="2">Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO</td> <td colspan="3">Email 1 or Fax _____</td> <td colspan="10"></td> </tr> <tr> <td colspan="2">Company: _____</td> <td colspan="3">Email 2 _____</td> <td colspan="10"></td> </tr> <tr> <td colspan="2">Contact: _____</td> <td colspan="3">Email 3 _____</td> <td colspan="10"></td> </tr> <tr> <td colspan="2"><b>Project Information</b></td> <td colspan="3">AFE/Cost Center: _____ PO# _____</td> <td colspan="10"></td> </tr> <tr> <td colspan="2">Job #: _____</td> <td colspan="3">Major/Minor Code: _____ Routing Code: _____</td> <td colspan="10"></td> </tr> <tr> <td colspan="2">PO / AFE: _____</td> <td colspan="3">Requisitioner: _____</td> <td colspan="10"></td> </tr> <tr> <td colspan="2">LSD: _____</td> <td colspan="3">Location: _____</td> <td colspan="10"></td> </tr> <tr> <td colspan="2">ALS Lab Work Order # (lab use only) <u>L2017573</u></td> <td colspan="3">ALS Contact: <u>N. Beaudin</u> Sampler: <u>M. 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Adams</u> Date: <u>2 Nov 2017</u> Time: <u>17:20</u></td> <td colspan="3">Received by: <u>N. 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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Please confirm all ESP TATs with your AM - surcharges will apply</b>						
Company: <u>Same as 15-583275</u>		Select Report Format: <input type="checkbox"/> PDF <input type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply						
Contact: <u>[Redacted]</u>		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4] <input type="checkbox"/>		1 Business day [E1] <input type="checkbox"/>				
Phone: <u>[Redacted]</u>		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E0] <input type="checkbox"/>				
Company address below will appear on the final report		Select Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			2 day [P2] <input type="checkbox"/>						
Street: <u>[Redacted]</u>		Email 1 or Fax			Date and Time Required for all ESP TATs: _____						
City/Province: <u>[Redacted]</u>		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.						
Postal Code: <u>[Redacted]</u>		Email 3			<b>Analysis Request</b>						
Invoice To: Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below						
Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX									
Company: <u>[Redacted]</u>		Email 1 or Fax									
Contact: <u>[Redacted]</u>		Email 2									
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ALS Account # / Quote #:		AFE/Cost Center:	PO#								
Job #:		Major/Minor Code:	Routing Code:								
PO / AFE:		Requisitioner:									
LSD:		Location:									
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	<u>HAY17-06 at 1.0 - 1.5</u>			<u>2-Nov-17</u>	<u>11:00</u>	<u>SO<sub>2</sub> 1</u>					
	<u>1.5 - 2.0</u>			<u>"</u>	<u>"</u>	<u>"</u>					
	<u>2.0 - 2.5</u>			<u>"</u>	<u>"</u>	<u>"</u>	<u>XXXXXX</u>				
	<u>2.5 - 3.0</u>			<u>"</u>	<u>"</u>	<u>"</u>	<u>XXXXXX</u>				
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					Cooling Initiated <input type="checkbox"/>						
					INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C				
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>						
Released by: <u>Mark Adams</u>	Date: <u>2 Nov 2017</u>	Time: <u>17:20</u>	Received by: <u>A. Bourbonnais</u>		Date: <u>2-Nov-2017</u>	Time: <u>5:29pm</u>	Received by:		Date:	Time:	