

# North Shore Environmental Consultants Inc.

July 15, 2008

**BY COURIER**

**Husky Oil Operations Ltd.  
707-8<sup>th</sup> Ave. S.W.  
Box 6525, Station "D"  
Calgary, AB  
T2P 3G7**

**Attention: Sonia Glubish, B.Sc., A.Ag.  
*Reclamation Coordinator***

**Re: Surface Soil Sampling  
01-18-017-18 W4M Lomond, Alberta**

Husky Oil Operations Ltd. (Husky) retained North Shore Environmental Consultants Inc. (North Shore) to complete surface soil sampling in response to landowner concerns regarding runoff water from the Husky 01-18-07-18 W4M Armada Gas Plant onto his field located directly east of the plant across range road 18-5.

The landowner raised concerns with pesticide application on the plant site and the possibility that the runoff water had carried the pesticides into his field causing discolouration and sparse growth.

## **Field Work and Findings:**

On June 13, 2008, North Shore met the Husky representative Allen Fefchack and the landowner Pat Honess on site. Mr. Honess pointed out the area of concern with sparse growth and discoloured vegetation along the edges of his wheat field. The area of concern is located in the far southwest corner of LSD 04-17-017-18 W4M adjacent to Range Road 18-5 and Secondary Highway 539. The Husky 1-18 gas plant is located approximately 30 m west across Range Road 18-5 from the area of concern.

North Shore observed standing water, stressed vegetation (yellowish brown discoloured wheat) and sparse growth in the area of concern. Standing water was also observed along the east boundary of the Husky plant in the west ditch of range road 18-5. Erosion rills were observed on range road 18-5 between the west and east ditches.

The area of concern measures approximately 155 m long and 15 m wide running north-south along the east side of 18-5 and approximately 160 m long and 15 m wide along the north side of highway 539. North Shore collected five discrete soil samples from within the area of concern and three control samples located outside of the area of concern. North Shore completed a site sketch and documented the area with photographs

GPS coordinates were collected using a hand held Garmin GPS with +/- 4.0 m accuracy using UTM coordinates in NAD 83. Please refer to Figure 1 for the scaled site diagram, and Appendix A for photographs.

#### Laboratory Analytical Results

Soil samples were submitted to ALS Laboratory Group (ALS) in Calgary on June 13, 2008. Point samples 2 and 5 were selected for herbicide, sterilant, salinity, nutrient, particle size and hydrocarbon analyses. Control sample 2 was selected for salinity, nutrient (NPKS) and particle size analyses.

Laboratory analyses reported that hydrocarbon concentrations met Tier 1 Guidelines. Two samples (Control 2 and Point 3) had electrical conductivity (EC) and sodium adsorption ratio (SAR) values rated as 'good' according to AENV 2001 Guidelines. One sample (Point 5) had EC and SAR values rated 'fair' according to AENV 2001 Guidelines. Particle size analysis classified the soils as being fine grained.

Laboratory analyses also reported that samples Point 3 and Point 5 had detectable concentrations of certain herbicides. Point 3 had detectable concentrations of AMPA, Diuron, 2,4-D, Treflan, Dicamba and MCPA. The MCPA concentration exceeds Tier 1 Guidelines.

Soil sample Point 5 had detectable concentrations of Glyphosate, AMPA, Diuron, DCPMU, 2,4-D, Treflan, Dicamba, MCPA. The Glyphosate concentration exceeds Tier 1 Guidelines.

North Shore has requested additional analyses on the control samples and will provide a summary of results upon the receipt of the laboratory data.

Please feel free to contact me at (403) 228-3095 with any questions or concerns.

Sincerely,

**North Shore Environmental Consultants Inc.**

Per:



Ryan Cox, C.Tech., A.T.T.  
Environmental Consultant

encl.

Attachments:

Table 1 – Laboratory Analytical Results

Figure 1 – Site Location Map

Figure 2 – Aerial Photo

Figure 3 – Site Diagram

Appendix A – Site Photographs

Appendix B – Laboratory Certificates of Analyses

**TABLE**

TABLE 1  
SUMMARY OF SOIL ANALYTICAL RESULTS  
01-18-017-18 W4M  
SURFACE SOIL SAMPLING  
HUSKY ENERGY

Parameters	Units	13-Jun-08			Guidelines <sup>1</sup>		
		Control 2	Point 3	Point 5			
		0-0.15m	0-0.15m	0-0.15m	Criteria	Year	Value
<b>Hydrocarbon Analyses</b>							
Benzene	mg/kg		<0.005	<0.005	AENV	2007	0.046
Toluene	mg/kg		<0.01	<0.01	AENV	2007	0.52
Ethylbenzene	mg/kg		<0.01	<0.01	AENV	2007	0.11
Total Xylenes (o, m & p)	mg/kg		<0.01	<0.01	AENV	2007	15
F1 (C <sub>6</sub> to C <sub>10</sub> )(-BTX) <sup>2</sup>	mg/kg		<5	<5	AENV	2007	210
F2 (C <sub>11</sub> to C <sub>16</sub> )	mg/kg		<5	<5	AENV	2007	150
F3 (C <sub>17</sub> to C <sub>34</sub> )	mg/kg		100	75	AENV	2007	1300
F4 (>C34) <sup>3</sup>	mg/kg		57	40	AENV	2007	5600
Soil Moisture	%		26	19	NC	NC	NC
<b>Chromatogram Interpretation<sup>4</sup></b>							
			Indistinguishable	Indistinguishable	NC	NC	NC
<b>Routine</b>							
pH	pH-unit	6.88	7.24	7.64	AENV	2007	6 - 8.5
Electrical Conductivity (EC)	dS/m	1.62	1.01	<u>6.71</u>	AENV	2001	<2
Sodium Adsorption Ratio (SAR)	Ratio	1.62	1.41	<u>8.19</u>	AENV	2001	<4
Saturation	%	50.7	44.7	58.0	NC	NC	NC
<b>Soil Nutrients</b>							
Available Nitrate-N	mg/kg	1.8	1.8	10.2	NC	NC	NC
Available Phosphate-P	mg/kg	28	57	31	NC	NC	NC
Available Potassium	mg/kg	535	462	408	NC	NC	NC
Available Sulfate-S	mg/kg	113	33	1150	NC	NC	NC
<b>Soluble Salts</b>							
Calcium (Ca)	mg/L	195	116	416	NC	NC	NC
Magnesium (Mg)	mg/L	48.6	24.0	350	NC	NC	NC
Sodium (Na)	mg/L	97.8	63.9	937	NC	NC	NC
Potassium (K)	mg/L	41.5	36.6	55.2	NC	NC	NC
Sulphate (SO <sub>4</sub> )	mg/L	804	297	4170	NC	NC	NC
Chloride (Cl)	mg/L	<20	<20	70	NC	NC	NC
<b>Pesticides</b>							
Glyphosate	mg/kg		<0.005	<u>0.52</u>	AENV	2007	0.054
AMPA	mg/kg		0.090	0.21	NC	NC	NC
<b>Sterilants</b>							
Atrazine	mg/kg		<0.0005	<0.0005	AENV	2007	0.0088
Bromacil	mg/kg		<0.0005	<0.0005	NC	NC	NC
Diuron	mg/kg		0.00735	0.0084	AENV	2007	1.9
DCPMU	mg/kg		<0.0005	0.016	NC	NC	NC
Simazine	mg/kg		<0.0005	<0.0005	AENV	2007	0.033
Tebuthiuron	mg/kg		<0.0005	<0.0005	AENV	2007	0.12
<b>Herbicides</b>							
2,4-D d5	mg/kg		93	119	NC	NC	NC
Treflan d14	mg/kg		98	121	NC	NC	NC
Clopyralid	mg/kg		<0.005	<0.005	NC	NC	NC
Dicamba	mg/kg		0.033	0.008	AENV	2007	0.12
Mecoprop	mg/kg		<0.005	<0.005	NC	NC	NC
MCPA	mg/kg		<u>0.021</u>	0.011	AENV	2007	0.02
2,4-D	mg/kg		<0.005	0.018	AENV	2007	0.1
Bromoxynil	mg/kg		<0.005	<0.005	AENV	2007	0.044
Trifluralin	mg/kg		<0.005	<0.005	AENV	2007	0.038
Triclopyr	mg/kg		<0.005	<0.005	NC	NC	NC
Triallate	mg/kg		<0.005	<0.005	AENV	2007	0.0077
2,4,5-T	mg/kg		<0.005	<0.005	NC	NC	NC
Picloram	mg/kg		<0.005	<0.005	AENV	2007	0.024
Fluazifop-p-butyl	mg/kg		<0.005	<0.005	NC	NC	NC
Diclofop-methyl	mg/kg		<0.005	<0.005	AENV	2007	0.059
<b>Particle Size Analysis</b>							
Fine <75µ	%	65	65	64	NC	NC	NC
Coarse >75µ	%	35	35	36	NC	NC	NC
Texture		Fine	Fine	Fine	NC	NC	NC

**Notes:**

<sup>1</sup> Alberta Environment. 2001. Salt Contamination Assessment and Remediation Guidelines. These guidelines are for topsoil (A horizons on the control area)

Alberta Environment. 2007. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. These standards are for fine textured surface soil under agricultural land use for all exposure pathways.

<sup>2</sup> Fraction 1 petroleum hydrocarbons (C6-C10) minus benzene, toluene, ethylbenzene and xylene concentrations.

<sup>3</sup> Fraction 4 petroleum hydrocarbons (C34-C50 or >C34) as determined by high temperature gas chromatography.

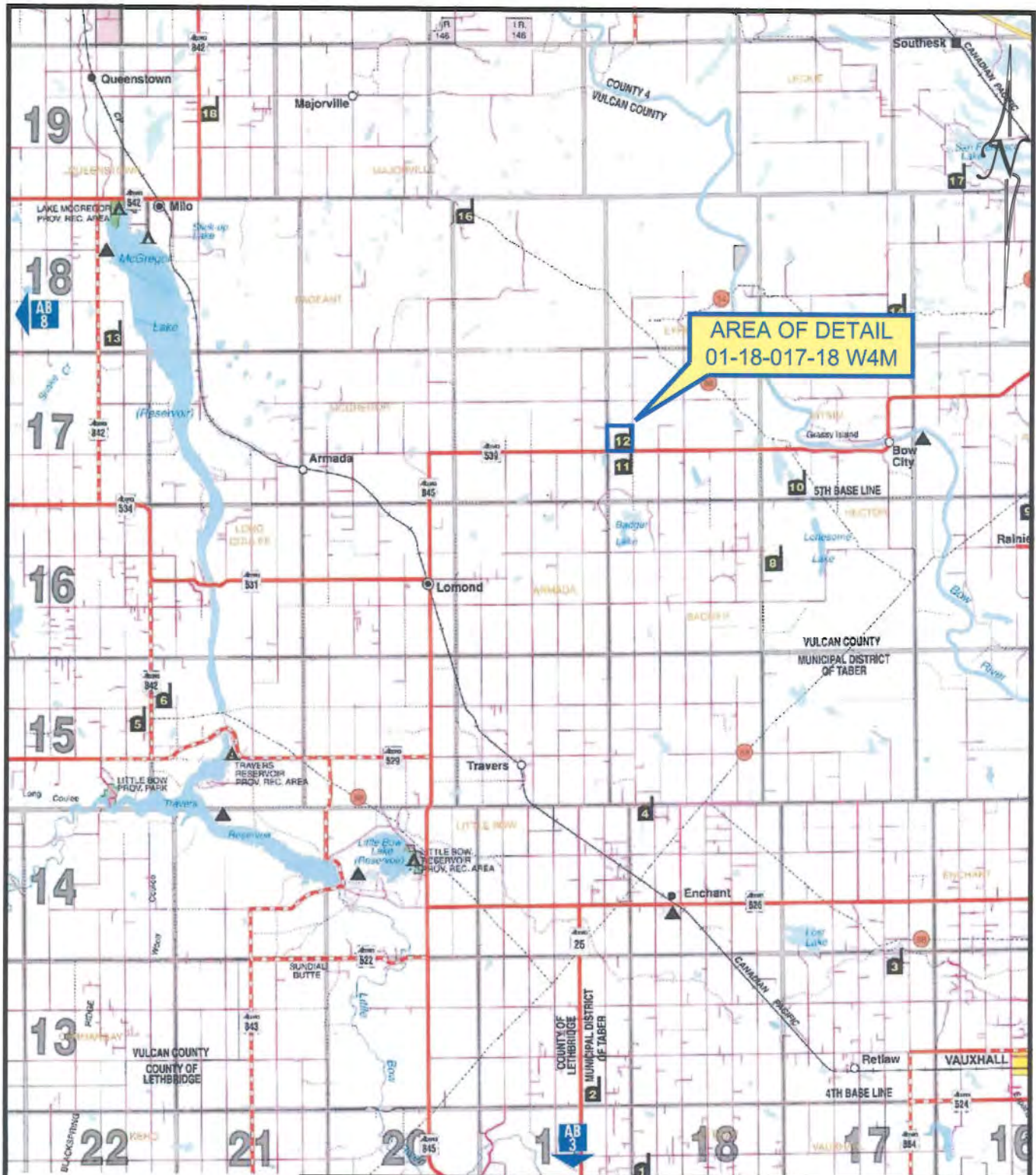
<sup>4</sup> Interpreted by North Shore unless otherwise indicated.

NC - No Criteria Established

**Underlined** - Greater than applicable guidelines.

blank - not analysed

## FIGURES



**AREA OF DETAIL**  
01-18-017-18 W4M

0 5 10 15  
SCALE IN KILOMETERS



**NORTH SHORE**  
Environmental Consultants  
#143, 201 Kaska Road  
Sherwood Park, AB  
T8A 2J6

**HUSKY ENERGY**  
01-18-017-18 W4M  
KEY MAP

Date: JULY 2008	Drawn By: JV	Checked by: RC	Figure: 1 OF 2
North Shore File #: E0003355	Scale: 1:350 000	Revision #: 00	

\*\*BASE MAP DERIVED FROM CANADIAN OIL ATLAS\*\*





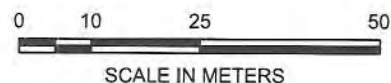
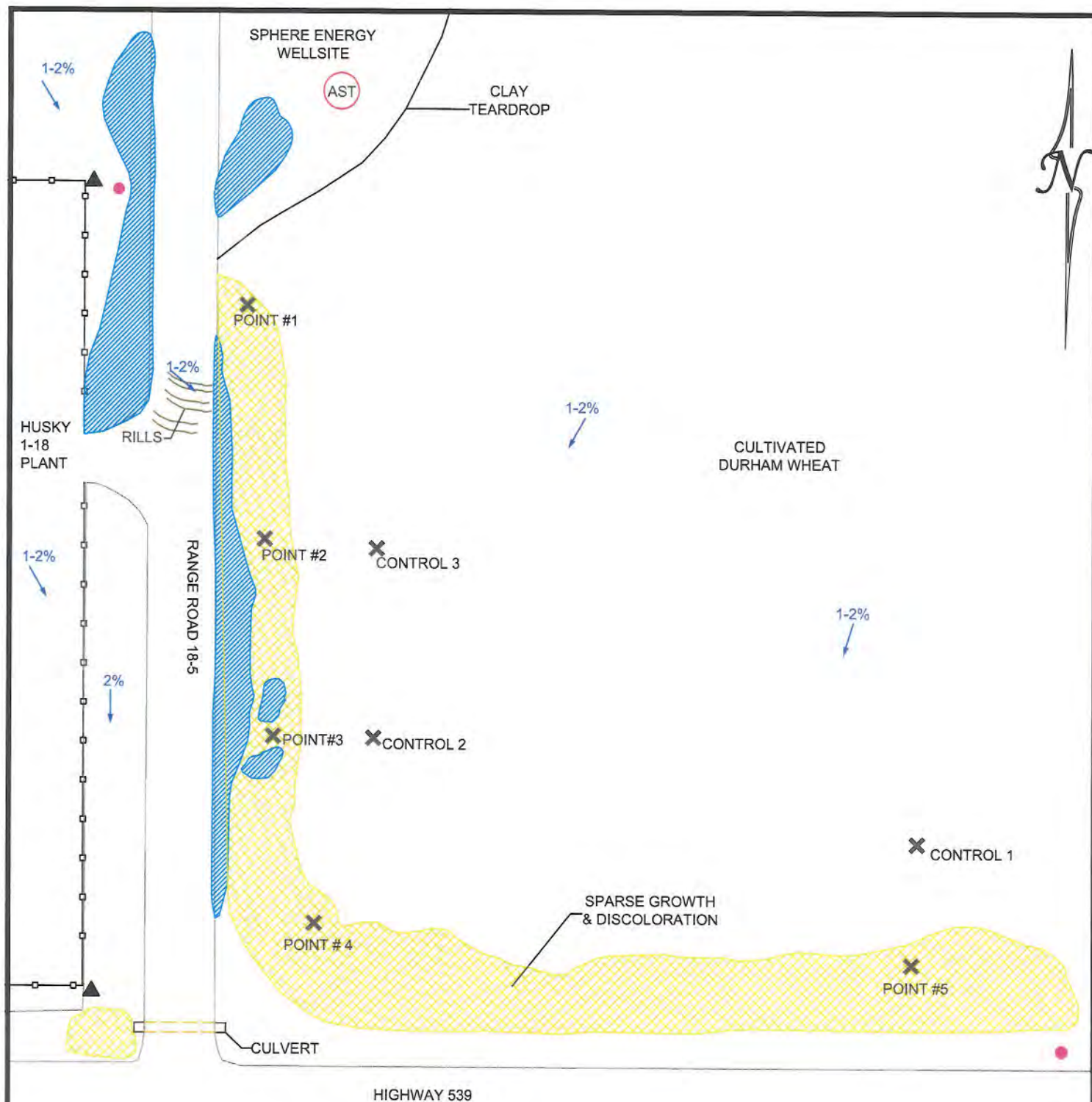
0 50 100 200  
 SCALE IN METERS

  
**NORTH SHORE**  
 Environmental Consultants  
 #143, 201 Kaska Road  
 Sherwood Park, AB  
 T8A 2J6

**HUSKY ENERGY**  
 01-18-017-18 W4M  
 AERIAL PHOTO AS#5008- 1999

Date: JULY 2008	Drawn By: JV	Checked by: RC	Figure: 2 OF 3
North Shore Job #: E0003355	Scale: 1:5000	File Name: 01-18-17-18 W4-Fg2	





#### LEGEND

- SURVEY MARKER
- POWER POLE
- FENCE LINE
- SAMPLE POINTS
- SLOPE DIRECTION
- STANDING WATER

**NORTH SHORE**  
 Environmental Consultants  
 #143, 201 Kaska Road  
 Sherwood Park, AB  
 T8A 2J6

#### HUSKY ENERGY 01-18-017-18 W4M SITE SHOWING SAMPLE LOCATIONS

Date:	Drawn By:	Checked by:	Figure:
JULY 2008	JV	RC	3 OF 3
North Shore File #: E0003355	Scale: 1:1000	Revision #: 00	

**APPENDIX A**  
**SITE PHOTOGRAPHS**



Photo 1: View of sign at entrance to gas plant, note standing water at entrance.



Photo 2: Looking north along range road 18-5, note the Sphere Energy wellsite in the upper right portion of the photo.





Photo 3: View of discoloured crop looking north along the east side of range road 18-5.



Photo 4: View of discoloured crop looking south along east edge of range road 18-5.





Photo 5: Close up view of discoloured wheat.



Photo 6: View of sparse growth at the SW corner of the field, looking east along highway 539.



**APPENDIX B**  
**LABORATORY CERTIFICATES OF ANALYSES**



**Environmental Division**

**Certificate of Analysis**

NORTH SHORE ENVIRONMENTAL

ATTN: RYAN COX

# 127, 11929-40TH STREET S.E.

CALGARY AB T2Z 4M8

**Report Date:** 10-MAR-10 14:19 (MT)

**Version:** FINAL REV. 2

**Lab Work Order #:** L642291

**Date Received:** 13-JUN-08

**Project P.O. #:** NOT SUBMITTED

**Job Reference:** HUSKY

**Legal Site Desc:** 01-18-017-18 W4M

**CofC Numbers:** 00654, L642291

**Other Information:**

**Comments:** ADDITIONAL 15-JUL-08 10:16

10-MAR-10: Final Report

Victoria Blaire Robicheau  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L642291-3	POINT 3 (0-0.15M)							
Sampled By:	R.C. on 13-JUN-08 @ 14:00							
Matrix:	SOIL							
CCME BTEX, TVHs and TEHs								
CCME BTEX								
Benzene		<0.005		0.005	mg/kg	14-JUN-08	16-JUN-08	R680754
Toluene		<0.01		0.01	mg/kg	14-JUN-08	16-JUN-08	R680754
Ethylbenzene		<0.01		0.01	mg/kg	14-JUN-08	16-JUN-08	R680754
Xylenes		<0.01		0.01	mg/kg	14-JUN-08	16-JUN-08	R680754
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates						14-JUN-08	16-JUN-08	R680368
CCME Total Hydrocarbons								
F1 (C6-C10)		<5		5	mg/kg		17-JUN-08	
F1-BTEX		<5		5	mg/kg		17-JUN-08	
F2 (C10-C16)		<5		5	mg/kg		17-JUN-08	
F3 (C16-C34)		100		5	mg/kg		17-JUN-08	
F4 (C34-C50)		57		5	mg/kg		17-JUN-08	
Total Hydrocarbons (C6-C50)		160		5	mg/kg		17-JUN-08	
Chromatogram to baseline at nC50		NO					17-JUN-08	
Miscellaneous Parameters								
% Moisture		26		0.1	%	14-JUN-08	15-JUN-08	R680200
MUST PSA % > 75um		35		1	%		16-JUN-08	R680676
Glyphosate/AMPA								
Glyphosate		<0.005		0.005	mg/kg		02-JUL-08	R688888
AMPA		0.090		0.005	mg/kg		02-JUL-08	R688888
Herbicides & Pesticides in Soil								
Surrogate: 2,4-D d5		93		25-175	%		23-JUN-08	R684722
Surrogate: Treflan d14		98		25-175	%		23-JUN-08	R684722
Clopyralid		<0.005		0.005	mg/kg		23-JUN-08	R684722
Dicamba		0.033		0.005	mg/kg		23-JUN-08	R684722
Mecoprop		<0.005		0.005	mg/kg		23-JUN-08	R684722
MCPA		0.021		0.005	mg/kg		23-JUN-08	R684722
2,4-D		<0.005		0.005	mg/kg		23-JUN-08	R684722
Bromoxynil		<0.005		0.005	mg/kg		23-JUN-08	R684722
Trifluralin		<0.005		0.005	mg/kg		23-JUN-08	R684722
Triclopyr		<0.005		0.005	mg/kg		23-JUN-08	R684722
Triallate		<0.005		0.005	mg/kg		23-JUN-08	R684722
2,4,5-T		<0.005		0.005	mg/kg		23-JUN-08	R684722
Picloram		<0.005		0.005	mg/kg		23-JUN-08	R684722
Fluazifop-p-butyl		<0.005		0.005	mg/kg		23-JUN-08	R684722
Diclofop-methyl		<0.005		0.005	mg/kg		23-JUN-08	R684722
Soil Sterilant Screen								
Tebuthiuron		<0.0005		0.0005	mg/kg		26-JUN-08	R686064
Bromacil		<0.0005		0.0005	mg/kg		26-JUN-08	R686064
Simazine		<0.0005		0.0005	mg/kg		26-JUN-08	R686064
DCPMU		0.0141		0.0005	mg/kg		26-JUN-08	R686064
Atrazine		<0.0005		0.0005	mg/kg		26-JUN-08	R686064
Diuron		0.00735		0.0005	mg/kg		26-JUN-08	R686064
Available N, P, K and S								
Available Nitrate-N								
Available Nitrate-N		1.8		0.4	mg/kg	19-JUN-08	19-JUN-08	R682463
Available Phosphate & Potassium								
Available Phosphate-P		57		1	mg/kg	19-JUN-08	19-JUN-08	R682276
Available Potassium		462		2	mg/kg	19-JUN-08	19-JUN-08	R682276
Available Sulfate-S								
Available Sulfate-S		33		2	mg/kg	19-JUN-08	19-JUN-08	R682328

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

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L642291-3	POINT 3 (0-0.15M)							
Sampled By:	R.C. on 13-JUN-08 @ 14:00							
Matrix:	SOIL							
<b>Detailed Salinity</b>								
<b>Chloride (Cl) (Saturated Paste)</b>								
Chloride (Cl)	<20			20	mg/L		16-JUN-08	R680824
<b>SAR</b>								
Calcium (Ca)	116			5.0	mg/L		19-JUN-08	R681861
Potassium (K)	36.6			2.0	mg/L		19-JUN-08	R681861
Magnesium (Mg)	24.0			3.0	mg/L		19-JUN-08	R681861
Sodium (Na)	63.9			2.0	mg/L		19-JUN-08	R681861
SAR	1.41			0.10	SAR		19-JUN-08	R681861
<b>Sulphate (SO4)</b>								
Sulfur (as SO4)	297			6	mg/L		19-JUN-08	R681861
<b>pH and EC (Saturated Paste)</b>								
% Saturation	44.7			0.1	%		16-JUN-08	R680785
pH in Saturated Paste	7.24			0.01	pH		16-JUN-08	R680785
Conductivity Sat. Paste	1.01			0.03	dS m-1		16-JUN-08	R680785
L642291-5	POINT 5 (0-0.15M)							
Sampled By:	R.C. on 13-JUN-08 @ 14:00							
Matrix:	SOIL							
<b>CCME BTEX, TVHs and TEHs</b>								
<b>CCME BTEX</b>								
Benzene	<0.005			0.005	mg/kg	14-JUN-08	16-JUN-08	R680754
Toluene	<0.01			0.01	mg/kg	14-JUN-08	16-JUN-08	R680754
Ethylbenzene	<0.01			0.01	mg/kg	14-JUN-08	16-JUN-08	R680754
Xylenes	<0.01			0.01	mg/kg	14-JUN-08	16-JUN-08	R680754
<b>CCME Total Extractable Hydrocarbons</b>								
Prep/Analysis Dates						14-JUN-08	16-JUN-08	R680368
<b>CCME Total Hydrocarbons</b>								
F1 (C6-C10)	<5			5	mg/kg		17-JUN-08	
F1-BTEX	<5			5	mg/kg		17-JUN-08	
F2 (C10-C16)	<5			5	mg/kg		17-JUN-08	
F3 (C16-C34)	75			5	mg/kg		17-JUN-08	
F4 (C34-C50)	40			5	mg/kg		17-JUN-08	
Total Hydrocarbons (C6-C50)	120			5	mg/kg		17-JUN-08	
Chromatogram to baseline at nC50	NO						17-JUN-08	
<b>Miscellaneous Parameters</b>								
% Moisture	19			0.1	%	14-JUN-08	15-JUN-08	R680200
MUST PSA % > 75um	36			1	%		16-JUN-08	R680676
<b>Glyphosate/AMPA</b>								
Glyphosate	0.52			0.005	mg/kg		02-JUL-08	R688888
AMPA	0.21			0.005	mg/kg		02-JUL-08	R688888
<b>Herbicides &amp; Pesticides in Soil</b>								
Surrogate: 2,4-D d5	119			25-175	%		23-JUN-08	R684722
Surrogate: Treflan d14	121			25-175	%		23-JUN-08	R684722
Clopyralid	<0.005			0.005	mg/kg		23-JUN-08	R684722
Dicamba	0.008			0.005	mg/kg		23-JUN-08	R684722
Mecoprop	<0.005			0.005	mg/kg		23-JUN-08	R684722
MCPA	0.011			0.005	mg/kg		23-JUN-08	R684722
2,4-D	0.018			0.005	mg/kg		23-JUN-08	R684722
Bromoxynil	<0.005			0.005	mg/kg		23-JUN-08	R684722
Trifluralin	<0.005			0.005	mg/kg		23-JUN-08	R684722
Triclopyr	<0.005			0.005	mg/kg		23-JUN-08	R684722
Triallate	<0.005			0.005	mg/kg		23-JUN-08	R684722

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

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



ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L642291-6     CONTROL 1 (0-0.15M) Sampled By:    R.C. on 13-JUN-08 @ 14:00 Matrix:        SOIL <b>pH and EC (Saturated Paste)</b> Conductivity Sat. Paste	3.04		0.03	dS m-1		18-JUL-08	R696177
L642291-7     CONTROL 2 (0-0.15M) Sampled By:    R.C. on 13-JUN-08 @ 14:00 Matrix:        SOIL <b>Miscellaneous Parameters</b> MUST PSA % > 75um	35		1	%		16-JUN-08	R680676
<b>Glyphosate/AMPA</b> Glyphosate	0.11		0.005	mg/kg		22-JUL-08	R698550
AMPA	0.22		0.005	mg/kg		22-JUL-08	R698550
<b>Herbicides &amp; Pesticides in Soil</b> Surrogate: 2,4-D d5	129		25-175	%		25-JUL-08	R700488
Surrogate: Treflan d14	95		25-175	%		25-JUL-08	R700488
Clopyralid	<0.005		0.005	mg/kg		25-JUL-08	R700488
Dicamba	<0.005		0.005	mg/kg		25-JUL-08	R700488
Mecoprop	<0.005		0.005	mg/kg		25-JUL-08	R700488
MCPA	<0.005		0.005	mg/kg		25-JUL-08	R700488
2,4-D	<0.005		0.005	mg/kg		25-JUL-08	R700488
Bromoxynil	<0.005		0.005	mg/kg		25-JUL-08	R700488
Trifluralin	<0.005		0.005	mg/kg		25-JUL-08	R700488
Triclopyr	<0.005		0.005	mg/kg		25-JUL-08	R700488
Triallate	<0.005		0.005	mg/kg		25-JUL-08	R700488
2,4,5-T	<0.005		0.005	mg/kg		25-JUL-08	R700488
Picloram	<0.005		0.005	mg/kg		25-JUL-08	R700488
Fluazifop-p-butyl	<0.005		0.005	mg/kg		25-JUL-08	R700488
Diclofop-methyl	<0.005		0.005	mg/kg		25-JUL-08	R700488
<b>Soil Sterilant Screen</b> Tebuthiuron	<0.0005		0.0005	mg/kg		22-JUL-08	R698385
Bromacil	<0.0005		0.0005	mg/kg		22-JUL-08	R698385
Simazine	<0.0005		0.0005	mg/kg		22-JUL-08	R698385
DCPMU	<0.0005		0.0005	mg/kg		22-JUL-08	R698385
Atrazine	<0.0005		0.0005	mg/kg		22-JUL-08	R698385
Diuron	0.0026		0.0005	mg/kg		22-JUL-08	R698385
<b>Available N, P, K and S</b> <b>Available Nitrate-N</b> Available Nitrate-N	1.8		0.4	mg/kg	19-JUN-08	19-JUN-08	R682463
<b>Available Phosphate &amp; Potassium</b> Available Phosphate-P	28		1	mg/kg	19-JUN-08	19-JUN-08	R682276
Available Potassium	535		2	mg/kg	19-JUN-08	19-JUN-08	R682276
<b>Available Sulfate-S</b> Available Sulfate-S	113		2	mg/kg	19-JUN-08	19-JUN-08	R682328
<b>Detailed Salinity</b> <b>Chloride (Cl) (Saturated Paste)</b> Chloride (Cl)	<20		20	mg/L		16-JUN-08	R680824
<b>SAR</b> Calcium (Ca)	195		5.0	mg/L		17-JUN-08	R680763
Potassium (K)	41.5		2.0	mg/L		17-JUN-08	R680763
Magnesium (Mg)	48.6		3.0	mg/L		17-JUN-08	R680763
Sodium (Na)	97.8		2.0	mg/L		17-JUN-08	R680763
SAR	1.62		0.10	SAR		17-JUN-08	R680763
<b>Sulphate (SO4)</b> Sulfur (as SO4)	804		6	mg/L		17-JUN-08	R680763

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

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L642291-7      CONTROL 2 (0-0.15M) Sampled By:    R.C. on 13-JUN-08 @ 14:00 Matrix:        SOIL <b>pH and EC (Saturated Paste)</b> % Saturation pH in Saturated Paste Conductivity Sat. Paste	   50.7 6.88 1.62		   0.1 0.01 0.03	   % pH dS m-1		   16-JUN-08 16-JUN-08 16-JUN-08	   R680785 R680785 R680785
L642291-8      CONTROL 3 (0-0.15M) Sampled By:    R.C. on 13-JUN-08 @ 14:00 Matrix:        SOIL  <b>Detailed Salinity</b> <b>Chloride (Cl) (Saturated Paste)</b> Chloride (Cl) <b>SAR</b> Calcium (Ca) Potassium (K) Magnesium (Mg) Sodium (Na) SAR <b>Sulphate (SO4)</b> Sulfur (as SO4) <b>pH and EC (Saturated Paste)</b> % Saturation pH in Saturated Paste Conductivity Sat. Paste	             50  53.3 7.35 0.63		             6 0.1 0.01 0.03	             mg/L mg/L mg/L mg/L SAR mg/L  %		             18-JUL-08 21-JUL-08 21-JUL-08 21-JUL-08 21-JUL-08 21-JUL-08 21-JUL-08 18-JUL-08 18-JUL-08 18-JUL-08	             R696318 R696851 R696851 R696851 R696851 R696851 R696851 R696177 R696177 R696177

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

## Reference Information

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Tebuthiuron	E	L642291-3, -5
Matrix Spike	AMPA	E	L642291-3, -5
Matrix Spike	Glyphosate	E	L642291-3, -5

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-SAR-CL	Soil	Chloride (Cl) (Saturated Paste)	CSSS CH15/EPA300.1
ETL-BTX,TVH-CCME-CL	Soil	CCME BTEX	CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TEH-CCME-CL	Soil	CCME Total Extractable Hydrocarbons	CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TVH,TEH-CCME-CL	Soil	CCME Total Hydrocarbons	CCME CWS-PHC Dec-2000 - Pub# 1310

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.

GLYPH/AMPA-ED	Soil	Glyphosate/AMPA	EPA 8318-HPLC/Fluorescence
GLYPH/AMPA-ED	Soil	Glyphosate/AMPA	JAFC, 1994, VOL. 42, NO. 12, 2751-2759
HERBSCR-ED	Soil	Herbicides & Pesticides in Soil	MODIFIED JAOAC, VOL. 74, NO. 3, 1991.
NO3-AVAIL-SK	Soil	Available Nitrate-N	CSSS (1993) 4.3

Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution.

Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.

Reference:

Carter, Martin. Soil Sampling and Methods of Analysis. Can. Soc. Soil Sci.(1993) method 4.3

PO4/K-AVAIL-SK	Soil	Available Phosphate & Potassium	Comm. Soil Sci. Plant Anal, 25 (5&6)
PREP-MOISTURE-CL	Soil	% Moisture	Oven dry 105C-Gravimetric
PSA-MUST-CL	Soil	MUST PSA D50 > 75um	ASTM D422-63
SALINITY-INTCHECK-CL	Soil		CSSS 18.4-Calculation
SAR-CALC-CL	Soil	SAR	CSSS 18.4-Calculation
SAT/PH/EC-CL	Soil	pH and EC (Saturated Paste)	CSSS, Chp. 18 - Saturation Extract
SO4-AVAIL-SK	Soil	Available Sulfate-S	NCR-13 (1998) p. 35-39

The soil is extracted with a weak calcium chloride solution. The calcium chloride serves to reduce the extraction of organic materials and increases flocculation of the soil in the extract. Total S in the extract is then determined by ICP-AES, which is considered to be equivalent to the plant available S for mineral soils from the prairies.

## Reference Information

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Reference: Recommended Methods of Soil Analysis for Canadian Prairie Agricultural Soils. Alberta Agriculture(1988), p. 28			
SO4-PASTE-ICP-CL	Soil	Sulphate (SO4)	CSSS CH15/EPA6010
SOIL STER-ED	Soil	Soil Sterilant Screen	EPA 8318-LC/UV

\*\* 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
CL	ALS LABORATORY GROUP - CALGARY, ALBERTA, CANADA
ED	ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA
SK	ALS LABORATORY GROUP - SASKATOON, SASKATCHEWAN, CANADA

### Chain of Custody Numbers:

00654 L642291

### 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*

*mk/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.*

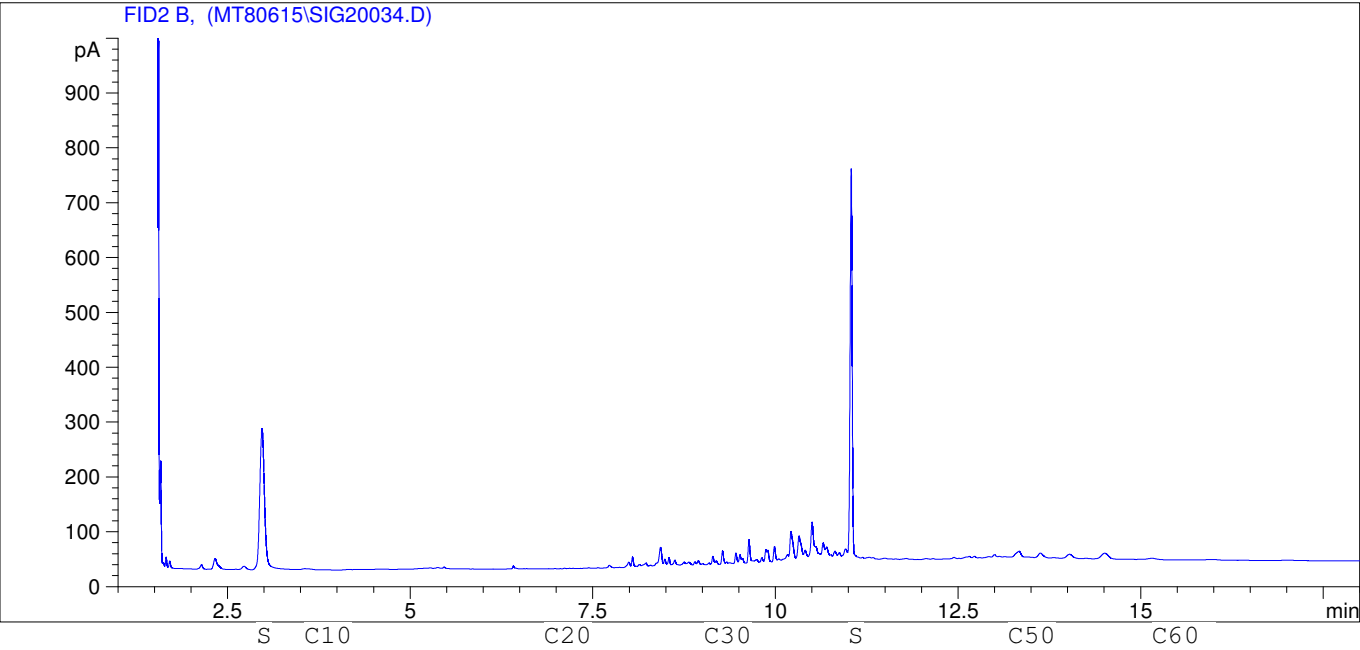
*Test results reported relate only to the samples as received by the laboratory.*

*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.*

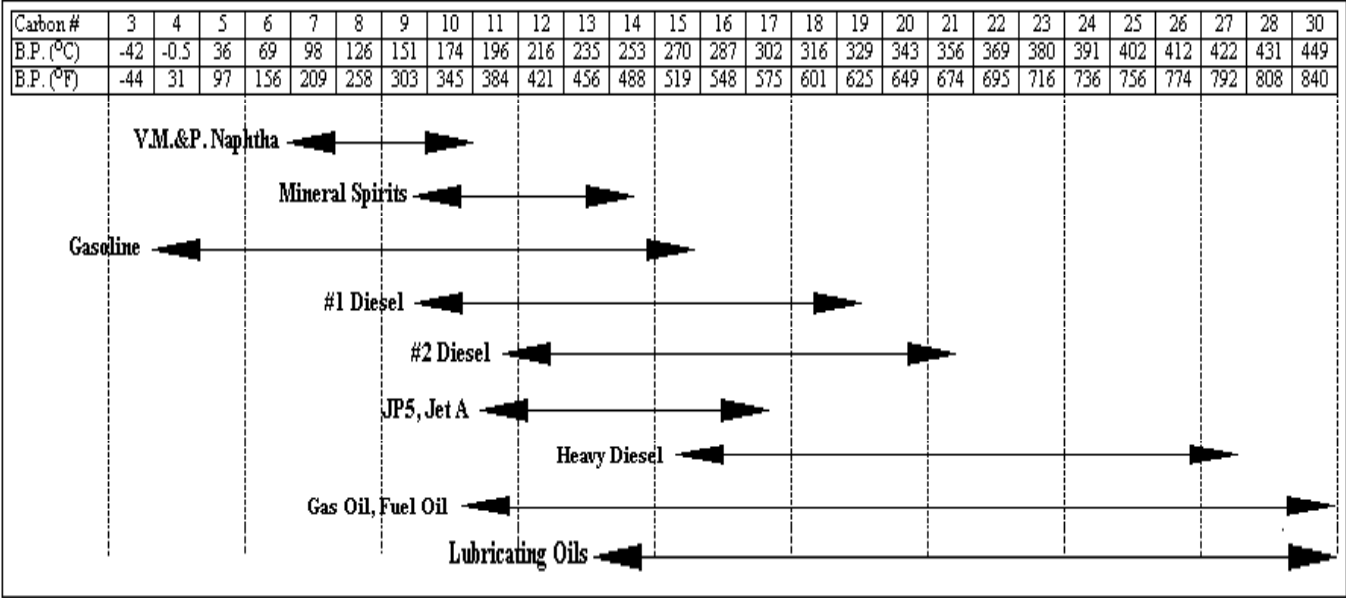


Sample ID: L642291-3 V20  
Injection Date: 6/16/2008 5:55:20 AM  
Injection Time: 6/16/2008 5:55:20 AM  
Instrument ID: 6890HP6  
Operator: organics



S=Surrogate

Boiling Point Distribution Range for Petroleum Based Fuel Products

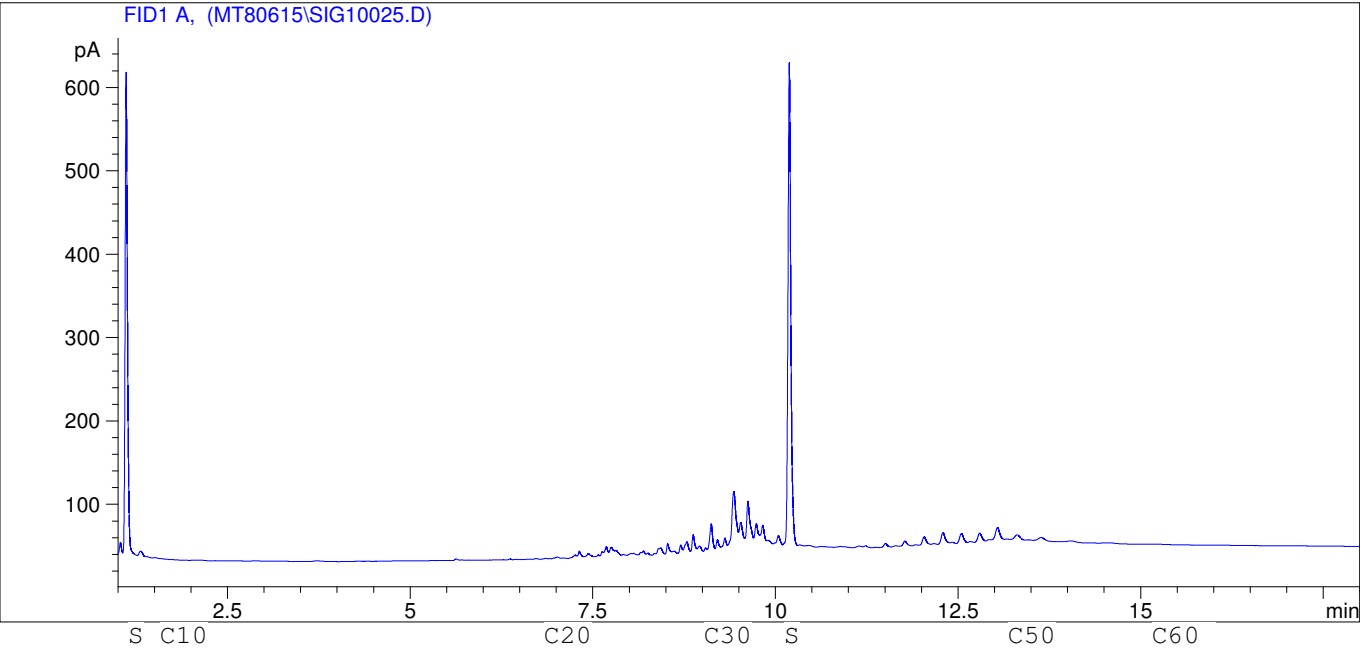


Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.



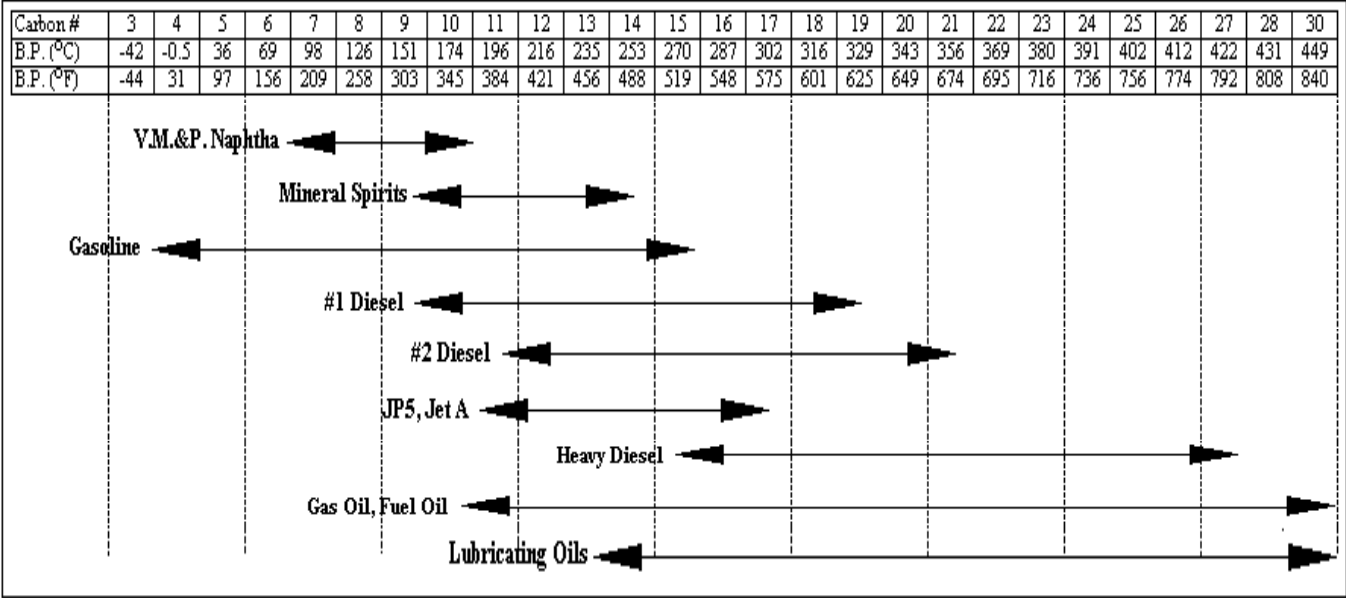


Sample ID: L642291-5 V20  
Injection Date: 6/16/2008 1:08:42 AM  
Injection Time: 6/16/2008 1:08:42 AM  
Instrument ID: 6890HP6  
Operator: organics



S=Surrogate

Boiling Point Distribution Range for Petroleum Based Fuel Products



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.



## CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

**CANADA TOLL FREE 1-800-668-9878**

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

COC # 00654

Page 1 of 1

L64 229

REPORT TO:		REPORT FORMAT / DISTRIBUTION		SERVICE REQUESTED	
COMPANY: North Shore Environmental		STANDARD OTHER		REGULAR SERVICE (DEFAULT) <input checked="" type="checkbox"/>	
CONTACT: Ryan Cox		PDF EXCEL CUSTOM FAX		RUSH SERVICE (2-3 DAYS)	
ADDRESS: #127, 11929-40th Street SE		EMAIL 1: rcox@northshoreenv.com		PRIORITY SERVICE (1 DAY or ASAP)	
Calgary, AB T2Z 4M8		EMAIL 2:		EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS	
PHONE: 228-3095 FAX: 723-3095				ANALYSIS REQUEST	
INVOICE TO: SAME AS REPORT? (YES/NO)		INDICATE BOTTLES: FILTERED / PRESERVED (F/P) →			
COMPANY:		CLIENT / PROJECT INFORMATION:			
CONTACT:		JOB #: Husky			
ADDRESS:		PO/A/E:			
		Legal Site Description: 01-18-017-18 W4M			
PHONE: FAX:		QUOTE #:			
Lab Work Order # (lab use only)		SAMPLER (Initials): R.C.			
Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	
	Point 1 (0-0.15m)	June 13/08	1400hrs	Soil	
	Point 2 (0-0.10m)				
	Point 3 (0-0.10m)				
	Point 4 (0-0.10m)				
	Point 5 (0-0.10m)				
	Control 1 (0-0.10m)				
	Control 2 (0-0.10m)				
	Control 3 (0-0.10m)				
GUIDELINES / REGULATIONS					
AENV Tier 1 (2007)					
Failure to complete all portions of this form may delay analysis. Please fill in this from LEGIBLY.					
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy.					
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION? YES / NO (If no provide details)
Robert Felby	June 13 1640	[Signature]	June 13/08	21°	
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:		
			16:35 PM		