
REPORT FOR THE DEVON CANADA ITIGINKPAK (F-29) SUMP ASSESSMENT



Prepared for:

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September 2005
IEG Project: 20212

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1.0 INTRODUCTION

Devon Canada (Devon) retained IEG Environmental (IEG) to investigate possible impacted soil associated with an oilfield waste storage component at the Itiginkpak F-29 in the Mackenzie Delta, Northwest Territories. As a requirement of Devon's water licence, IEG conducted soil and water analysis at the site. This report summarizes the site investigation results and future recommendations for the site.

1.1 Site Description

The F29 well site is located at 68°28'20.6" N, 134°36'58.4" W near Oniak Channel in the Mackenzie Delta, Northwest Territories. The site is located approximately 35 km northwest of Inuvik. No oilfield facilities were present on the lease except for a sign identifying the location of well centre. The sump is located in the southwest corner of the lease (Photograph 1). Three thermistors are present on the lease; they are located directly on the sump cap, east of the sump in the pooled water, and on the east edge of the lease (control).

1.2 Objective and Scope

The objective of the assessment was to both characterize the soil in the sump cap area and to determine the origin of the elevated terrain conductivities indicated by the Electromagnetic (EM) survey. In addition pooled water east to the sump was also characterized.

The scope of work consisted of the following tasks:

1. Conduct a sump assessment based on the 2004 Environmental Science Research Fund (ESRF) protocols developed by AMEC;
2. Characterize potential impacted soil based on an EM 38 survey;
3. Characterize pooled water located east of the sump;
4. Characterize background soil and water conditions;
5. Determine permafrost depths on the sump, lease, and background areas; and
6. Prepare a summary report of the analytical data.

2.0 SOIL ASSESSMENT

2.1 Electromagnetic Survey

In September 2004, Newpark Environmental conducted an EM 38 survey of the lease and surrounding area using an EM 38 (Figure 1). Values of relatively low conductivities are shaded cool colors (blue-green), intermediate values are shaded warm colors (yellow), and elevated conductivity values are shaded hot colors (orange-red).

2.2 Soil Sampling

Borehole locations were selected based upon the location of the sump and the EM 38 survey. A total of eight boreholes were advanced, seven in the area of elevated terrain apparent conductivities (BH05-001 to -007) and one background location northwest of well centre (BH05-008) (Figure 1).

Soil samples were collected using a clean hand auger and the depth to permafrost was measured using a permafrost probe. Soil sampling intervals were determined based on site-specific conditions. At each borehole soil samples were collected at the surface and at the depth of permafrost. If the depth to permafrost exceeded 0.65 m an additional sample was collected at the midpoint between the surface and the permafrost layer.

Soil samples were placed into sterile Ziploc plastic bags for laboratory analysis. Standard chain-of-custody protocol was followed for all samples collected. Soil samples were stored in an ice-filled cooler ($\sim 4^\circ \text{ C}$) prior to being submitted to Norwest Labs in Edmonton on July 29th, 2005.

2.3 Soil Analytical Schedule

The analytical schedule was based on the NWT Water License requirements. The schedule includes:

- pH;
- Electrical Conductivity;
- Sodium Adsorption Ratio;
- Soluble Ca, Mg, Na, K, Cl, SO₄;
- Routine Metals
- Microtox Assay.

2.4 Assessment Criteria

Analytical results for soil samples collected from the site were compared to the following quality assessment and remediation criteria:

- CCME (*Canadian Council of Ministers of the Environment*), 1999 (2003 update).
Canadian Environmental Quality Guidelines (and updates). Pub. No. 1299.

Non-regulated soil parameters such as soluble chloride, sulfate, etc. have been included in summary tables, as they are useful for confirming sump related impact on soils which may not otherwise satisfy contaminated site assessment criteria. Values in the data summary table (Table 1) that exceed any remediation criteria or guidelines have been highlighted.

3.0 WATER ASSESSMENT

3.1 Water Sampling

Water samples were collected from four locations at a depth of 5 cm using a grab method (WS05-001 to -004). Two water samples (WS05-001 and WS05-002) were collected from pooled water located along the east edge of the sump (Figure 1) (Photograph 2). The two background sampling points included a pond located approximately 400 m southwest of the sump (WS05-003) and pooled water (W05-004) located approximately 1 km southeast of the sump (not shown on figure 1).

3.2 Water Analytical Schedule

The analytical schedule was based on the NWT Water License requirements. The schedule includes:

- pH;
- Electrical Conductivity (EC);
- Soluble Ca, Mg, Na, K, Cl, SO₄;
- Routine Metals.

3.3 Assessment Criteria

Analytical results for water samples collected from the site were compared to the following quality assessment and remediation criteria:

- CCME (*Canadian Council of Ministers of the Environment*), 1999 (2003 update). *Canadian Environmental Quality Guidelines (and updates)*. Pub. No. 1299.

Values in the data summary table (Table 2) that exceed the applicable guidelines have been highlighted.

4.0 SOIL QUALITY

4.1 Background

Lab results reported that salinity and metals were below CCME guidelines for all samples collected at borehole BH05-008.

4.2 Sump Area

Vegetation stress and salt efflorescence was observed in the southwest corner of the lease (Photograph 3 and 4). These observations are consistent with the elevated terrain apparent conductivities on the EM 38 survey (Figure 1).

Laboratory analyses from soil samples collected from borehole BH05-001 reported EC values (up to 12.10 dS/m) that exceeded the applicable criteria throughout the entire profile of the sump cap. At borehole BH05-002 lab results reported EC values that exceeded the applicable criteria on the surface (4.29 dS/m) and at 1.05 cm belowground level (bgl) (2.22 dS/m). The elevated EC values correspond to the areas of elevated terrain conductivities, which are a result of the elevated concentrations of chloride (up to 1930 mg/kg) (Figure 1). SAR values reported at all depths on the sump cap were below the applicable salinity parameters (Table 1).

Laboratory results for all soil samples collected in the sump cap (BH05-001 and -002) reported values that passed the required guidelines for the Microtox assay (AEUB G-50).

4.3 Off-Lease Area

Vegetation stress and salt efflorescence were also observed in a riparian area southwest of the lease area (Photograph 4 and 5). Laboratory analyses reported that all soil samples collected at boreholes in this area (BH05-003 to -007) exceeded the CCME guideline for EC (up to 25.60 ds/m). SAR values exceeding the CCME guideline were also reported (8.00 and 8.10) at borehole BH05-005 at depths of 0.50 cm and 0.78 cm bgl. The elevated EC and SAR values correspond to the areas of elevated terrain conductivities (Figure 1). The elevated terrain conductivities are a result of elevated concentrations of chloride, potassium and sodium (up to 6020, 4070 and 650 mg/kg, respectively) (Table 1). Background concentrations (BH05-008) of chloride, potassium and sodium on the surface were reported at 40, 20 and 10 mg/kg. At depths of 0.47 and 0.65 m bgl, background concentrations of chloride, potassium and sodium were reported as 6, 2 and 4 mg/kg.

Laboratory results for all soil samples collected in the spill area (BH05-001 and -002) reported values that passed the required guidelines for the Microtox assay (AEUB G-50).

5.0 WATER QUALITY

Analytical results reported total iron concentrations (2.3 and 1.6 mg/L) at WS05-001 and WS05-002 sampling points exceeded the applicable criteria. The concentration of cadmium (0.00002 mg/L) at sampling point WS05-001 also exceeded the CCME guidelines (Table 2). However, laboratory analyses reported that cadmium concentrations at background sampling point WS05-003 and iron concentrations at both WS05-003 and -004 (locations not shown on figure 1) also exceeded the CCME guidelines (Table 2).

Reported total dissolved chloride concentrations from WS05-001 and -002 were greater than background (WS05-003 and -004) chloride concentrations. Elevated concentrations of chloride resulted in EC values that were approximately four times greater than the background (Table 2).

6.0 PERMAFROST LAYERS

Active layer measurements were taken at five points on top of the sump cap, 20 points around the perimeter of the sump, 15 points around the lease area and 15 points in the background terrain (Appendix C). The average depth of the active layer on top of the sump was more than twice the depth of the average background active layer depth and the average active layer depth of the lease (Table 3 below). Average active layer depths around the perimeter of the sump were not as deep as the active layer on top of the sump (Table 3).

Table 3. Average active layer depths at the F-29 lease.

Location	Average Active Layer Depth (m)	
Sump cap	0.922	
Cap perimeter north	0.666	Average Perimeter 0.700
Cap perimeter south	0.712	
Cap perimeter east	0.742	
Cap perimeter west	0.682	
Lease area	0.405	
Background	0.413	

7.0 CONCLUSIONS

The EM 38 survey and elevated EC values reported in the laboratory analyses indicate that the southwest corner of the lease area has been impacted by elevated concentrations of sodium, chloride and potassium resulting in EC values that exceed CCME guidelines.

The chloride concentration of the pooled water located on the east edge of the sump is elevated above background chloride concentration.

8.0 CLOSURE

If you should have any concerns or questions, please do not hesitate to contact David Wells at (867) 777-8521.

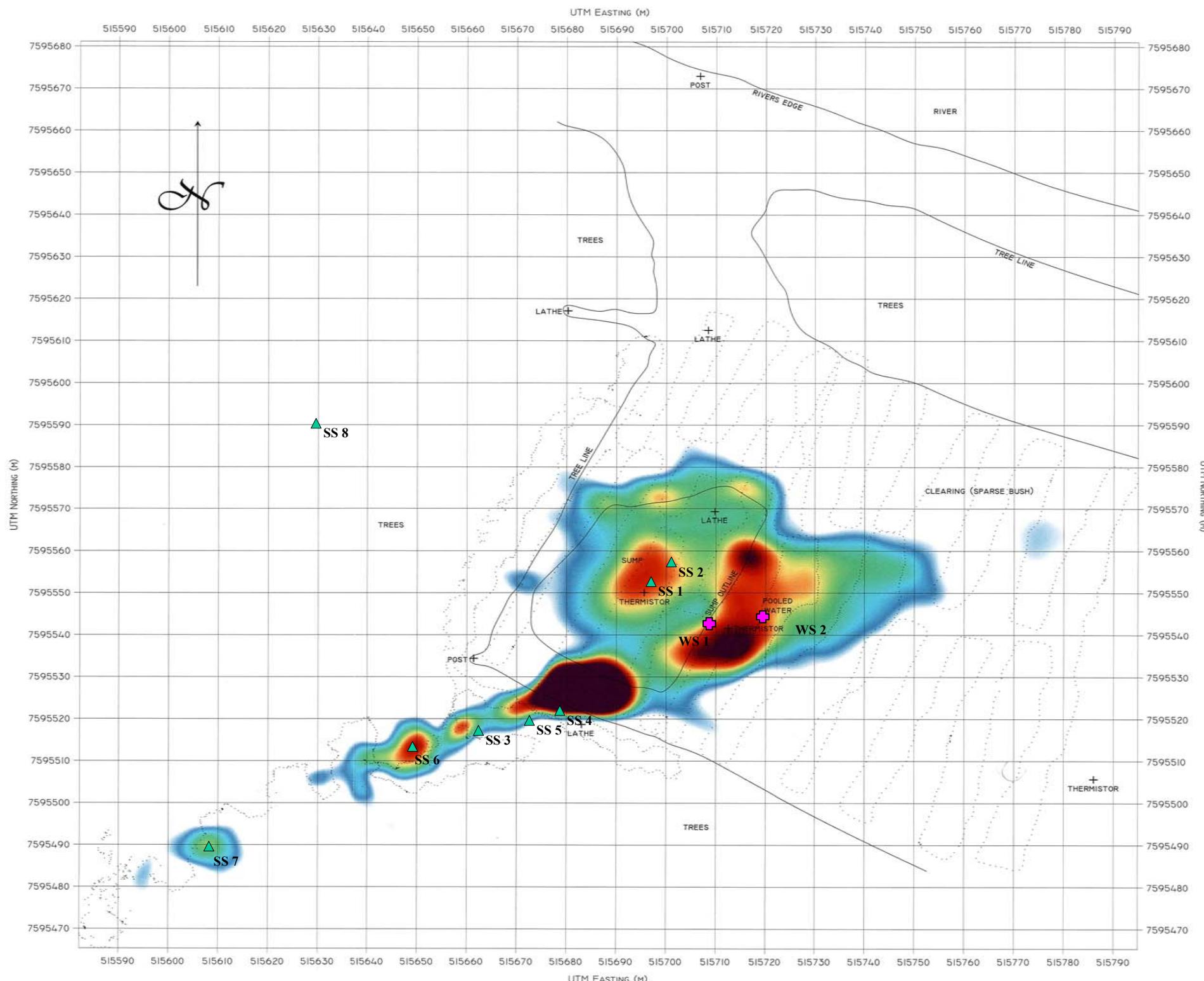
Blair Bailey M.Sc., A.Ag

Rob McLaughlin P.Eng, P.Geol

9.0 REFERENCES

CCME (Canadian Council of Ministers of the Environment), 1999 (2003 update). Canadian Environmental Quality Guidelines (and updates). Pub. No. 1299.

AMEC 2004. Protocol for the Assessment of Drilling Mud Sumps. 2004 Environmental Science Research Fund (ESRF)



▲ Soil Sample
■ Water Sample

Devon Canada Sump Assessment (F29)

IEG project: 20212

August 2005

Note: Original map adapted to incorporate 2005
sampling locations

SITE LOCATION MAP							
F29							
COMMENTS							
<p>THE COLOUR IMAGE REVEALS THE 'APPARENT CONDUCTIVITY DISTRIBUTION' ON SITE. THE TERM 'APPARENT CONDUCTIVITY' IMPLIES THAT CONDUCTIVITY MEASUREMENTS DO NOT LINEARLY RELATE TO ACTUAL SOIL CONDUCTIVITIES.</p> <p>THE PRESENTED EM DATA SHOULD BE USED QUALITATIVELY TO SELECT TARGETS FOR VERTICAL (DEPTH) GEOPHYSICAL PROFILING OR SOIL SAMPLING. GEOPHYSICAL RESULTS ARE ONLY CONCLUSIVE AFTER CORRELATION TO SOIL SAMPLE DATA (GROUND-TRUTHING). THE DEPTH RESPONSE OF THE ELECTROMAGNETIC (EM) FIELD VARIES FROM SURFACE TO A UNIQUE DEPTH, THE 'SKINDEPTH' OF THAT PARTICULAR EM SIGNAL. THE SKINDEPTH OF ANY EM SIGNAL IS STRONGLY INFLUENCED BY OVERALL SOIL CONDUCTIVITY. SINCE SOIL CONDUCTIVITY VARIES RANDOMLY, THE APPARENT CONDUCTIVITY DISTRIBUTION DOES NOT REPRESENT DATA FROM ANY PARTICULAR DEPTH.</p> <p>POSTED FEATURES ARE SURVEYED USING DGPS. A POSITIONAL ACCURACY OF SEVERAL DECIMETERS IS GENERALLY POSSIBLE. POSITIONAL ACCURACY DIMINISHES NEAR LARGER BUILDINGS AND OTHER SATELLITE-OBSSTRUCTING FEATURES.</p>							
TECHNICAL SUMMARY							
GEOPHYSICAL SPECIFICATIONS							
<p>INSTRUMENT: GEOFONICS EM38 MEASURED QUANTITIES: QUADRATURE IN MS/M PRIMARY FIELD SOURCE (Tx): INPHASE IN PPT, HS/HP RECEIVER (Rx): SELF-CONTAINED DIPOLE Tx INTERCOIL SPACING: SELF-CONTAINED DIPOLE Rx OPERATING FREQUENCY: 1.0 M CONDUCTIVITY RANGES: 14.6 KHZ 10 - 1000 MS/M</p>							
POSITIONING (DGPS) SPECIFICATIONS							
<p>GPS ROVER: TRIMBLE PATHFINDER POWER GPS BASE: TRIMBLE 4000SSI DUAL DATA S/A CORRECTIONS: POST-PROCESSED DIFFERENTIAL COORDINATE PROJECTION: UNIVERSAL TRANSVERSE MERCATOR (UTM) UTM ROVER ZONE: 8 DATUM: NORTH AMERICAN DATUM 1983 (NADB3) CORS: CENTRAL ALASKA, ALASKA, USA X: 607453.44E Y: 7265957.73N ELEV.: 283.51 M (ORTHOMETRIC)</p>							
LEGEND							
MAP 1/2 SCALE = 1:600 SEPTEMBER 2004 JOB NUMBER: 1453.06							
LATERAL CONDUCTIVITY DISTRIBUTION (EM38) & SITE FEATURES							
F29							
<table border="1"> <tr> <td>CLIENT: </td> <td>APPROVED: </td> </tr> <tr> <td>DIRECTED BY: </td> <td>CREATED: </td> </tr> <tr> <td>PRODUCED BY: </td> <td>PERMITS TO PRACTICE ESSIS LTD. Signature Date Nov 4, 2004 PERMIT NUMBER: P 6825 The Association of Professional Engineers, Geologists and Geophysicists of Alberta</td> </tr> </table>		CLIENT: 	APPROVED: 	DIRECTED BY: 	CREATED: 	PRODUCED BY: 	PERMITS TO PRACTICE ESSIS LTD. Signature Date Nov 4, 2004 PERMIT NUMBER: P 6825 The Association of Professional Engineers, Geologists and Geophysicists of Alberta
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Figure 1 Study site map and sampling locations

Table 1. Summary of Soil Analytical Results for Devon Canada Sump F-29.

Location	Sample Designation	Depth (m)	Sample Date	Salinity																Metals							Microtox Assay							
				pH	EC (dS/m)	Saturation (%)	SAR	Calcium (meq/L)	Calcium (mg/L)	Magnesium (meq/L)	Magnesium (mg/L)	Sodium (meq/L)	Sodium (mg/L)	Potassium (meq/L)	Potassium (mg/L)	Chloride (meq/L)	Chloride (mg/L)	Sulfate-S (meq/L)	Sulfate-S (mg/L)	TGR (T/ae)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Iron (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)	Moisture (Wet Weight %)	Interpretation (AEUB, G-50)	EC50 15 minutes	EC20 5 minutes	EC20 15 minutes	EC20 5 minutes	
CRITERIA CCME 2002 Env Quality CONTROL SAMPLES	Parkland Fine-grained soil			6-8.0	2	-	5	-	-	-	-	-	-	-	-	-	-	-	-	10	64	63	-	140	50	200	-	-	-	-	-	-		
BH05-008	0	7/25/2005		7.2	0.51	202	0.20	3.83	154	1.71	41.8	0.3	10	0.2	20	0.55	40	3	98	<0.1	0.00083	0.0166	0.0210	21.10	0.0111	0.0261	0.1200	68.1	Pass	>100	>100	>100	>100	
BH05-008	0.47	7/25/2005		8.0	0.35	64	0.20	3.02	38.6	1.15	8.8	0.2	4	0.08	2	0.28	6	1.5	15	<0.1	0.00062	0.0196	0.0220	26.00	0.0111	0.0332	0.1100	33.8	Pass	>100	>100	>100	>100	
BH05-008	0.65	7/25/2005		8.0	0.32	56	0.20	2.51	28.2	0.95	6.5	0.2	3	0.06	1	0.29	6	1.3	12	<0.1	0.00058	0.0202	0.0230	25.60	0.0117	0.0312	0.1090	33.1	Pass	>100	>100	>100	>100	
SOIL CHARACTERIZATION																																		
Sump Cap Area	BH05-001	0	7/25/2005	7.6	12.10	50	2.70	6.00	623	43.70	263.00	19.00	220	23.00	450	110.00	1930	40.00	320	<0.1	0.00084	0.01550	0.0230	21.40	0.0095	0.0298	0.0950	19.7	Pass	>100	>100	>100	>100	
	BH05-001	0.75	7/25/2005	7.7	2.55	49	0.50	18.90	185	4.70	28.00	2.00	20	4.60	87	12.10	210	16.00	120	<0.1	0.00067	0.01910	0.0220	22.30	0.0112	0.0297	0.0990	25.6	Pass	>100	>100	>100	>100	
	BH05-001	1.10	7/25/2005	7.7	3.04	48	0.60	21.20	204	6.00	35.00	2.00	20	5.30	100	17.30	296	16.00	120	<0.1	0.00073	0.01690	0.0220	22.40	0.0111	0.0294	0.1010	28.5	Pass	>100	>100	>100	>100	
	BH05-002	0	7/25/2005	7.8	4.29	49	0.90	30.90	303	10.40	61.80	4.00	40	8.30	160	21.30	369	31.00	240	<0.1	0.00065	0.01740	0.0220	22.00	0.0126	0.028	0.1090	26.5	Pass	>100	>100	>100	>100	
	BH05-002	0.65	7/25/2005	7.7	1.63	48	0.30	12.10	117	3.03	17.60	0.94	10	2.50	48	4.11	70	13.10	101	<0.1	0.00072	0.01760	0.0220	21.00	0.0101	0.0311	0.1020	22.5	Pass	>100	>100	>100	>100	
	BH05-002	1.05	7/25/2005	7.6	2.22	44	0.40	21.90	194	5.40	29.00	1.00	10	1.00	20	5.59	88	23.00	160	<0.1	0.00064	0.01520	0.0190	20.20	0.0092	0.028	0.0930	23.7	Pass	>100	>100	>100	>100	
Off Lease Spill Area	BH05-003	0	7/25/2005	7.8	9.63	59	2.30	32.60	383	12.50	88.70	11.00	150	40.30	923	88.20	1830	7.10	67	<0.1	0.00061	0.01630	0.0210	21.60	0.0099	0.0295	0.1000	33.3	Pass	>100	>100	>100	>100	
	BH05-003	0.50	7/25/2005	7.5	15.90	64	3.90	51.40	653	15.90	122.00	23.00	330	78.50	1940	163.00	3670	6.00	60	<0.1	0.00074	0.02170	0.0250	27.50	0.0131	0.0345	0.1220	33.0	Pass	>100	>100	>100	>100	
	BH05-003	0.78	7/25/2005	7.3	14.50	55	3.90	43.70	479	13.20	87.60	21.00	260	73.70	1570	149.00	2890	6.00	50	<0.1	0.0006	0.01860	0.0220	24.70	0.0114	0.0312	0.1040	33.2	Pass	>100	>100	>100	>100	
	BH05-004	0	7/25/2005	7.3	11.80	52	3.20	28.20	290	11.50	71.70	14.00	170	65.80	1320	116.00	2120	11.00	95	<0.1	0.0006	0.01670	0.0210	21.40	0.0099	0.0273	0.0990	36.0	Pass	>100	>100	>100	>100	
	BH05-004	0.30	7/25/2005	7.4	20.90	69	4.50	49.30	681	14.00	110.00	25.00	400	132.00	3570	216.00	5300	6.00	60	<0.1	0.0008	0.02310	0.0260	27.00	0.0122	0.0381	0.1400	41.5	Pass	>100	>100	>100	>100	
	BH05-004	0.65	7/25/2005	7.6	12.00	52	2.50	40.70	426	11.90	75.40	13.00	150	55.50	1130	118.00	2180	5.00	40	<0.1	0.0006	0.01820	0.0220	24.60	0.0106	0.0325	0.1100	31.2	Pass	>100	>100	>100	>100	
	BH05-005	0	7/25/2005	7.2	10.70	62	3.00	26.90	335	11.10	83.90	13.00	180	54.20	1320	96.50	2130	5.00	50	<0.1	0.00063	0.01710	0.0210	22.30	0.0109	0.0314	0.1020	52.6	Pass	>100	>100	>100	>100	
	BH05-005	0.50	7/25/2005	7.3	24.30	63	8.00	48.40	610	14.00	100.00	45.00	650	165.00	4070	250.00	5590	15.00	150	1.00	0.00061	0.01910	0.0240	24.70	0.0121	0.0307	0.1110	29.4	Pass	>100	>100	>100	>100	
	BH05-005	0.78	7/25/2005	7.4	25.60	59	8.10	51.40	604	14.00	100.00	46.00	620	172.00	3950	289.00	6020	9.00	80	1.10	0.0007	0.01780	0.0220	24.10	0.0108	0.0324	0.1140	32.5	Pass	>100	>100	>100	>100	
	BH05-006	0	7/25/2005	7.5	6.12	138	2.30																											

Table 2. Summary of Water Analytical Results for Devon Canada Sump F-29.

Location	Sample Designation	Sample Date	Salinity															Hydrocarbons						Metals										
			pH	Temperature or observed pH (°C)	EC (µS/m at 25°C)	SAR	Calcium (meq/L)	Calcium Dissolved (mg/L)	Magnesium (meq/L)	Magnesium Dissolved (mg/L)	Sodium (meq/L)	Sodium Dissolved (mg/L)	Potassium (meq/L)	Potassium Dissolved (mg/L)	Iron Dissolved (mg/L)	Chloride Dissolved (mg/L)	Chloride (meq/L)	Sulfate-S Dissolved (mg/L)	Total Suspended Solids (mg/L)	Oil and Grease (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Lead (mg/L)	Dissolved Nickel (mg/L)	Dissolved Zinc (mg/L)	Total Iron (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)	Total Copper (mg/L)	Total Lead (mg/L)	Total Nickel (mg/L)	Total Zinc (mg/L)	
CRITERIA																																		
CCME 2003 Env Quality	Water :Aquatic Life, Freshwater		6.5-9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.000017	0.0089	0.004	0.01	0.025	0.03		
East of Sump	WS05-001	7/25/2005	20.5	7.81	1.370	0.5	7.54	151	4.54	55.2	1.23	28.3	1.29	50.4	0.53	322	9.09	0.23	3.6	49	7.00	0.00002	<0.0005	0.0030	0.0001	0.0018	0.002	<0.0005	0.003	0.0001	0.0018	0.002		
East of Sump	WS05-002	7/25/2005	20.5	7.69	1.370	0.5	7.34	147	4.44	53.9	1.2	27.5	1.25	49	0.68	308	8.7	0.17	2.8	16	7.00	<0.00001	<0.0005	0.0020	0.0001	0.0030	0.0020	1.6	<0.00001	<0.0005	0.002	0.0001	0.003	0.002
Background	WS05-003	7/25/2005	20.7	8.11	0.285	0.3	2	40.1	0.84	10.2	0.3	7	0.04	1.4	0.04	7.6	0.21	0.774	12.4	7	6.00	0.00002	<0.0005	0.0020	<0.0001	0.0009	0.010	0.6	0.00002	<0.0005	0.002	<0.0001	0.0009	0.001
Background	WS05-004	7/25/2005	21	8.19	0.374	0.3	2.49	49.9	1.15	14	0.38	8.8	0.08	3.1	0.06	14.6	0.41	1.12	18	21	6.00	0.00001	<0.0005	0.0010	0.0001	0.0010	<0.001	0.8	0.00001	<0.0005	0.001	0.0001	0.001	<0.001

Current and/or relevant criteria are bolded

Yellow box = Exceeds relevant criteria

View analytical report for more detailed results

CCME 2003 Env. Quality = CCME (Canadian Council of Ministers of the Environment), 1999 (2003 update). Canadian Environmental Quality Guidelines (and updates). Pub. No. 1299.



Appendix A



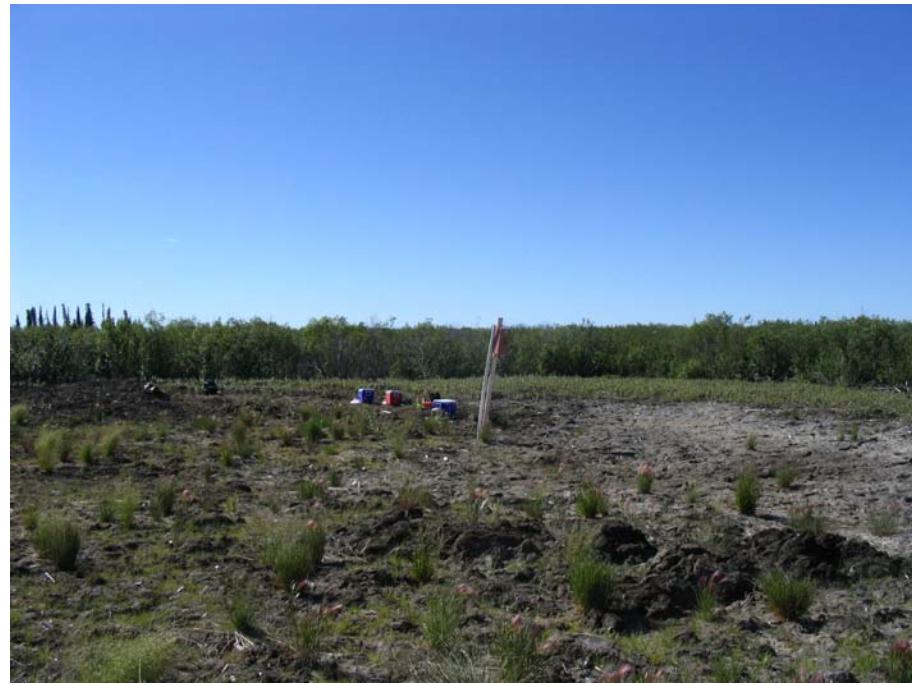
Photograph 1: Aerial view of lease area.



Photograph 2: Aerial view of sump, spill area (right) and pooled water.

devon





Photograph 3: Northeast view of sump area.



Photograph 4: Salt efflorescence observed in sump and off-lease spill area.

devon





Photograph 5: Southwest view of impacted vegetation.

devon



Appendix B



**NORWEST
LABS**

398310

Control Number E 236582

Environmental Sample Information Sheet

NOTE: Proper completion of this form is required in order to proceed with analysis

See reverse for your nearest Norwest location and proper sampling protocol

Billing Address: <i>See Note Below</i> <input checked="" type="checkbox"/>	Copy of Report To:	Copy of invoice: <input type="checkbox"/>
Company: Inuvialuit Env & Geotechnical Inc. <i>Devon Canada</i> Address: PO Box 3178 <i>Peter Millman Report</i> <input checked="" type="checkbox"/> 29 Industrial Road Inuvik, NT Z0E 0T0	Company: Inuvialuit Env & Geotechnical Inc. Mail invoice to this address for approval <input checked="" type="checkbox"/> Address: PO Box 3178 29 Industrial Road Inuvik, NT Z0E 0T0	<i>See note below</i> Report Result: Fax <input checked="" type="checkbox"/> Mail <input checked="" type="checkbox"/> Courier <input type="checkbox"/> e-mail <input checked="" type="checkbox"/> e-Service <input type="checkbox"/>
Attention: David Wells Phone: (867) 777-7062 Fax: 867.777.2747 Cell: (867) 777-1440 e-mail: david.wells@ieg.ca	Attention: David Wells Phone: (867) 777-7062 Fax: 867.777.2747 Cell: (867) 777-1440 e-mail: david.wells@ieg.ca	<i>1 Peter Millman 403-232-7294 Peter.Millman@devoncanada.ca</i> Report Result: Fax <input type="checkbox"/> Mail <input type="checkbox"/> Courier <input type="checkbox"/> e-mail <input type="checkbox"/> e-service <input type="checkbox"/>

Information to be included on Report and Invoice	RUSH Please contact the laboratory to confirm rush dates and times before submitting samples. Upon filling out this section, client accepts that surcharges will be attached to this analysis Required on: all analyses or as indicated	Sample Custody (Please Print) Relinquished by: <i>David Wells</i> Company <i>IEG</i> Signature <i>[Signature]</i> I authorize Norwest Labs to proceed with the work indicated on this form: Date: <i>July 28</i> Initial: <i>DW</i>
Project ID: (project #) Project Name: <i>F29 - Devon Sump Assessment</i> Project Location: <i>F29 - Mackenzie Delta</i> Legal Location: PO# <i>(PO#) See Note</i> Proj. Acct. Code: <i>46306 69524</i> Agreement ID:	Date Required: <i>Wednesday Aug 3/05</i> Signature: <i>[Signature]</i> Norwest Authorization: <i>C. Begin</i>	Received by: <input type="checkbox"/> Coolers Waybill # <input type="checkbox"/> Date <input type="checkbox"/> Boxes Company <input type="checkbox"/> Time <input type="checkbox"/> Samples

Special Instructions / Comments <input type="checkbox"/> Check here if Norwest is required to report results directly to a regulatory body (Please include contact information)	<i>- Metals as per May 27 IEG quote</i> <i>License requirements</i> <i>* Invoice: Peter Millman</i> <i>Devon Canada</i> <i>403-232-7294</i>	
<i>Number of Containers</i> <i>Oil / Cell / Matrix</i> <i>Rootline</i> <i>Total weight</i> <i>Sample quantity</i> <i>Quality</i>	Received By: <input type="checkbox"/> Date: <input type="checkbox"/> Company: <i>[Signature]</i> Time: <input type="checkbox"/>	

Sample Identification		Location	Depth IN CM M	Date / Time Sampled	Matrix	Sampling Method	Enter tests above (✓ relevant samples below)			
1	WS 1	F29	-	July 25	water	grab	3	✓	✓	✓
2	WS 2	F29	-				1	✓	✓	✓
3	WS 3	F29	-				1	✓	✓	✓
4	WS 4	F29	-				1	✓	✓	✓
5	SS1-1		-		Soil	Avg	2	✓	✓	✓
6	SS1-2		-				1	✓	✓	✓
7	SS1-3		-				1	✓	✓	✓
8	SS2-1		-				1	✓	✓	✓
9	SS2-2		-				1	✓	✓	✓
10	SS2-3		-				1	✓	✓	✓
11	SS3-1		-				1	✓	✓	✓
12	SS3-2		-				1	✓	✓	✓
13	SS3-3		-				1	✓	✓	✓
14	SS4-1		-				1	✓	✓	✓
15	SS4-2		-				1	✓	✓	✓

NOTE: All hazardous samples must be labelled according to WHMIS guidelines.

Accredited by the Standards Council of Canada for specific tests

Page 1 of 2
##



**NORWEST
LABS**

Control Number E 236581

Environmental Sample Information Sheet

NOTE: Proper completion of this form is required in order to proceed with analysis
See reverse for your nearest Norwest location and proper sampling protocol

Billing Address: <input checked="" type="checkbox"/>		Copy of Report To:		Copy of invoice: <input type="checkbox"/>	
Company: Inuvialuit Env & Geotechnical Inc. Address: PO Box 3178 29 Industrial Road Inuvik, NT Z0E 0T0		Company: Inuvialuit Env & Geotechnical Inc. Address: PO Box 3178 29 Industrial Road Inuvik, NT Z0E 0T0		Mail invoice to this address for approval <input checked="" type="checkbox"/>	
Attention: David Wells Phone: (867) 777-7062 Fax: Cell: (867) 777-1440 e-mail: david.wells@ieg.ca		Report Result: Fax <input type="checkbox"/> Mail <input type="checkbox"/> Courier <input type="checkbox"/> e-mail <input type="checkbox"/> e-Service <input type="checkbox"/>		Report Result: Fax <input type="checkbox"/> Mail <input type="checkbox"/> Courier <input type="checkbox"/> e-mail <input type="checkbox"/> e-service <input type="checkbox"/>	

Information to be included on Report and Invoice

Project ID: **(project #)**

Project Name:

Project Location:

Legal Location:

PO#: **(po#)**

Proj. Acct. Code:

Agreement ID: **46306**

RUSH Please contact the laboratory to confirm rush dates and times before submitting samples.

Upon filling out this section, client accepts that surcharges will be attached to this analysis

Required on: all analyses or as indicated

or

Date Required: _____

Signature: _____

Norwest Authorization: _____

Special Instructions / Comments

Check here if Norwest is required to report results directly to a regulatory body (Please include contact information)

Sample Custody (Please Print)

Relinquished by:

Company _____ Signature _____

I authorize Norwest Labs to proceed with the work indicated on this form:

Date: _____

Initial: _____

Received by: Coolers

Waybill # _____ Date Boxes

Company _____ Time Samples

Received By: _____ Date: _____

Company _____ Time: _____

Number of Containers	Sampling Method											
	1	2	3	4	5	6	7	8	9	10	11	12
1	SS4-3	F29	-	July 25 2011	Ayer							
2	SS5-1		-									
3	SS5-2		-									
4	SS5-3		-									
5	SS6-1		-									
6	SS6-2		-									
7	SS6-3 SS8-1		-									
8	SS7-2		-									
9	SS8-1		-									
10	SS8-2		-									
11	SS8-3		-									
12			-									
13			-									
14			-									
15			-									

Enter tests above (✓ relevant samples below)

	1	2	3	4	5	6	7	8	9	10	11	12
1	SS4-3	F29	-	July 25 2011	Ayer							
2	SS5-1		-									
3	SS5-2		-									
4	SS5-3		-									
5	SS6-1		-									
6	SS6-2		-									
7	SS6-3 SS8-1		-									
8	SS7-2		-									
9	SS8-1		-									
10	SS8-2		-									
11	SS8-3		-									
12			-									
13			-									
14			-									
15			-									

NOTE: All hazardous samples must be labelled according to WHMIS guidelines.

Accredited by the Standards Council of Canada for specific tests

Page 2 of 2 #



Report Transmission Cover Page

Norwest Labs
 7217 Roper Road NW
 Edmonton, AB. T6B 3J4
 Phone: (780) 438-5522
 Fax: (780) 438-0396

Bill to: Devon Canada Corporation
Report to: Devon Canada Corporation
 2000, 400-3 Ave SW
 Calgary, AB, Canada
 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **398310**
Control Number: E 236582
Date Received: Jul 29, 2005
Date Reported: Aug 18, 2005
Report Number: 727851

Contact	Company	Address
David Wells Web Email Notification	Inuvialuit Env & Geotechnical Inc.	PO Box 3178, 29 Industrial Road Inuvik, NT Z0E 0T0 Phone: (867) 777-8520 Email: david.wells@ieg.ca
Pete Millman Web Email Notification	Devon Canada Corporation	2000, 400-3 Ave SW Calgary, AB T2P 4H2 Phone: (403) 232-7294 Email: peter.millman@devoncanada.com
Copies <u>D</u> elivery <u>S</u> trategy Format A 1 Email - Single Report PDF		Fax: (403) 232-7211

NOTE: P indicates a preliminary report is required

NOTE: A indicates report is delivered using automated delivery

_____ # OF PAGES IN THIS TRANSMISSION

Report Transmission Notes

Agreement Notes

Lot Notes

Please send copy of results to peter.millman@devoncanada.com as per COC.

Sample Notes:

Notes to Clients

Lot Notes:

Added MTX5 and DS1 to sample 14. due Aug. 3

Sample Notes:

1540059 Sample 1 formed an emulsion during oil and grease analysis extraction. Centrifugation was required in order to complete analysis.

Sample Notes:

1540061 Sample 2 formed an emulsion during oil and grease analysis extraction. Centrifugation was required in order to complete analysis.

Sample Notes:

1540062 Sample 3 formed an emulsion during oil and grease analysis extraction. Centrifugation was required in order to complete analysis.

Sample Notes:

1540063 Sample 4 formed an emulsion during oil and grease analysis extraction. Centrifugation was required in order to complete analysis.

Batch Notes:

Method Notes:



Report Transmission Cover Page

Norwest Labs
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Phone: (780) 438-5522
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Attn: Pete Millman
Sampled By: David Wells
Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **398310**
Control Number: E 236582
Date Received: Jul 29, 2005
Date Reported: Aug 18, 2005
Report Number: 727851

Method Result Notes:

Reports associated with this Lot

Id/Format/Reported Date
727851 Env2QC 3 Smp & DL 18-Aug-05

Id/Format/Reported Date

Id/Format/Reported Date

Comment:

See Methodology and Notes page of Analytical Report for all comments pertaining to this report.

If this report transmission is not satisfactory, please send report requirements to the address at the top of this page.

8/4/05 * **727851** 04-Aug-2005



Sample Custody

Norwest Labs
7217 Roper Road NW
Edmonton, AB. T6B 3J4
Phone: (780) 438-5522
Fax: (780) 438-0396

Bill to: Devon Canada Corporation
Report to: Devon Canada Corporation
2000, 400-3 Ave SW
Calgary, AB, Canada
T2P 4H2
Attn: Pete Millman
Sampled By: David Wells
Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **398310**
Control Number: E 236582
Date Received: Jul 29, 2005
Date Reported: Aug 18, 2005
Report Number: 727851

Sample Disposal Date: Nov 02, 2005

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the upper right of this page.

Extend Sample Storage Until _____ **(MM/DD/YY)**

The following charges apply to extended sample storage:

Storage for 1 to 5 samples per month	\$ 10.00
Storage for 6 to 20 samples per month	\$ 15.00
Storage for 21 to 50 samples per month	\$ 30.00
Storage for 51 to 200 samples per month	\$ 60.00
Storage for more than 200 samples per month	\$ 110.00

Return Sample, collect, to the address below via:

- _____
Greyhound

Loomis

Purolator

Other (Specify) _____

Name: _____

Company: _____

Address: _____

Phone: _____

Fax: _____

Signature: _____

If no other arrangements have been made, samples will be disposed of on Nov 02, 2005.

Bill to: Devon Canada Corporation
Report to: Devon Canada Corporation
 2000, 400-3 Ave SW
 Calgary, AB, Canada
 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project **NWL Lot ID:** **398310**
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

Page: 1 of 37

	NWL Number	398310-1	398310-2	398310-3
	Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
	Sample Description	F29 / WS05-001	F29 / WS05-002	F29 / WS05-003
	Matrix	Water - General	Water - General	Water - General

Analyte	Units	Results	Results	Results	Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total mg/L	7	7	6	5
pH	adjustment required	No	No	No	
Metals Dissolved					
Cadmium	Dissolved mg/L	0.00001	<0.00001	<0.00001	0.00001
Chromium	Dissolved mg/L	<0.0005	<0.0005	<0.0005	0.0005
Copper	Dissolved mg/L	0.002	0.002	0.002	0.001
Lead	Dissolved mg/L	0.0001	0.0001	<0.0001	0.0001
Nickel	Dissolved mg/L	0.0009	0.0024	0.0007	0.0005
Zinc	Dissolved mg/L	0.001	<0.001	<0.001	0.001
Metals Total					
Iron	Total mg/L	2.3	1.6	0.6	0.1
Cadmium	Total mg/L	0.00002	<0.00001	0.00002	0.00001
Chromium	Total mg/L	<0.0005	<0.0005	<0.0005	0.0005
Copper	Total mg/L	0.003	0.002	0.002	0.001
Lead	Total mg/L	0.0001	0.0001	<0.0001	0.0001
Nickel	Total mg/L	0.0018	0.0030	0.0009	0.0005
Zinc	Total mg/L	0.002	0.002	0.001	0.001
Physical and Aggregate Properties					
Temperature of observed pH	°C	20.5	20.5	20.7	
Solids	Total Suspended mg/L	49	16	7	1
Routine Water					
pH		7.81	7.69	8.11	
Electrical Conductivity	dS/m at 25 C	1.37	1.38	0.285	0.001
Calcium	meq/L	7.54	7.34	2.00	0.01
Calcium	Dissolved mg/L	151	147	40.1	0.2
Magnesium	meq/L	4.54	4.44	0.84	0.01
Magnesium	Dissolved mg/L	55.2	53.9	10.2	0.1
Sodium	meq/L	1.23	1.20	0.30	0.02
Sodium	Dissolved mg/L	28.3	27.5	7.0	0.4
Potassium	meq/L	1.29	1.25	0.04	0.01
Potassium	Dissolved mg/L	50.4	49.0	1.4	0.4
Iron	Dissolved mg/L	0.53	0.68	0.04	0.01
Chloride	Dissolved mg/L	322	308	7.6	0.4
Chloride	meq/L	9.09	8.70	0.21	0.01
Sulfate-S	meq/L	0.23	0.17	0.774	



Analytical Report

Norwest Labs
7217 Roper Road NW
Edmonton, AB. T6B 3J4
Phone: (780) 438-5522
Fax: (780) 438-0396

Bill to: Devon Canada Corporation
Report to: Devon Canada Corporation
2000, 400-3 Ave SW
Calgary, AB, Canada
T2P 4H2
Attn: Pete Millman
Sampled By: David Wells
Company: IEG

Project **NWL Lot ID:** **398310**
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

Control Number: E 236582
Date Received: Jul 29, 2005
Date Reported: Aug 18, 2005
Report Number: 727851

Page: 2 of 37

	NWL Number	398310-1	398310-2	398310-3	
	Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005	
	Sample Description	F29 / WS05-001	F29 / WS05-002	F29 / WS05-003	
	Matrix	Water - General	Water - General	Water - General	
Analyte	Units	Results	Results	Results	Detection Limit
Routine Water - Continued					
Sulfate-S	Dissolved	mg/L	3 . 6	2 . 8	12 . 4
SAR	Dissolved		0 . 5	0 . 5	0 . 3

Analytical Report

Norwest Labs
 7217 Roper Road NW
 Edmonton, AB. T6B 3J4
 Phone: (780) 438-5522
 Fax: (780) 438-0396

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 2000, 400-3 Ave SW
 Calgary, AB, Canada
 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **398310**
 Control Number: E 236582
 Date Received: Jul 29, 2005
 Date Reported: Aug 18, 2005
 Report Number: 727851

Page: 3 of 37

NWL Number	398310-4
Sample Date	Jul 25, 2005
Sample Description	F29 / WS05-004
Matrix	Water - General

Analyte	Units	Results	Results	Results	Detection Limit
Metals Dissolved					
Cadmium	Dissolved	mg/L	<0.00001		0.00001
Chromium	Dissolved	mg/L	<0.0005		0.0005
Copper	Dissolved	mg/L	0.001		0.001
Lead	Dissolved	mg/L	<0.0001		0.0001
Nickel	Dissolved	mg/L	0.0007		0.0005
Zinc	Dissolved	mg/L	<0.001		0.001
Metals Total					
Iron	Total	mg/L	0.8		0.1
Cadmium	Total	mg/L	0.00001		0.00001
Chromium	Total	mg/L	<0.0005		0.0005
Copper	Total	mg/L	0.001		0.001
Lead	Total	mg/L	0.0001		0.0001
Nickel	Total	mg/L	0.0010		0.0005
Zinc	Total	mg/L	<0.001		0.001
Routine Water					
pH			8.19		
Electrical Conductivity		dS/m at 25 C	0.374		0.001
Calcium		meq/L	2.49		0.01
Calcium	Dissolved	mg/L	49.9		0.2
Magnesium		meq/L	1.15		0.01
Magnesium	Dissolved	mg/L	14.0		0.1
Sodium		meq/L	0.38		0.02
Sodium	Dissolved	mg/L	8.8		0.4
Potassium		meq/L	0.08		0.01
Potassium	Dissolved	mg/L	3.1		0.4
Iron	Dissolved	mg/L	0.06		0.01
Chloride	Dissolved	mg/L	14.6		0.4
Chloride		meq/L	0.41		0.01
Sulfate-S		meq/L	1.12		
Sulfate-S	Dissolved	mg/L	18.0		0.3
SAR	Dissolved		0.3		

Analytical Report

Norwest Labs
 7217 Roper Road NW
 Edmonton, AB. T6B 3J4
 Phone: (780) 438-5522
 Fax: (780) 438-0396

Bill to: Devon Canada Corporation
Report to: Devon Canada Corporation
 2000, 400-3 Ave SW
 Calgary, AB, Canada
 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project	NWL Lot ID: 398310
ID:	License Requirements
Name:	F29 - Devon Sump Assessment
Location:	F29 - Mackenzie Delta
LSD:	
P.O.:	
Acct. Code:	

Control Number: E 236582
 Date Received: Jul 29, 2005
 Date Reported: Aug 18, 2005
 Report Number: 727851

Page: 4 of 37

NWL Number	398310-4	398310-14
Sample Date	Jul 25, 2005	Jul 25, 2005
Sample Description	F29 / WS05-004	BH05-004(0)
Matrix	Water - General	Solids

Analyte	Units	Results	Results	Results	Detection Limit
Aggregate Organic Constituents					
Oil and Grease	Total mg/L	6	-	-	5
pH	adjustment required	No	-	-	
Oil	Dean Stark, dry wt.	%	-	0.10	0.05
Oil	Dean Stark, wet wt.	%	-	0.06	0.05
Water		%	-	36.2	0.1
Solids		%	-	63.8	0.1

NWL Number	398310-4	398310-5	398310-6
Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
Sample Description	F29 / WS05-004	BH05-001 (0m)	BH05-001 (0.75)
Matrix	Water - General	Solids	Solids

Analyte	Units	Results	Results	Results	Detection Limit
Physical and Aggregate Properties					
Temperature of observed pH	°C	21.0	-	-	-
Solids	Total Suspended mg/L	21	-	-	1
Moisture	Wet Weight %	-	19.7	25.6	0.1

Analytical Report

Norwest Labs
 7217 Roper Road NW
 Edmonton, AB. T6B 3J4
 Phone: (780) 438-5522
 Fax: (780) 438-0396

Bill to: Devon Canada Corporation
Report to: Devon Canada Corporation
 2000, 400-3 Ave SW
 Calgary, AB, Canada
 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project **NWL Lot ID:** **398310**
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

Control Number: E 236582
 Date Received: Jul 29, 2005
 Date Reported: Aug 18, 2005
 Report Number: 727851

Page: 5 of 37

		NWL Number	398310-5	398310-6	398310-7
		Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
		Sample Description	BH05-001 (0m)	BH05-001 (0.75)	BH05-001 (1.10)
		Matrix	Solids	Solids	Solids
Analyte		Units	Results	Results	Results
Metals Strong Acid Digestion					
Cadmium	Strong Acid Extractable	ug/g	0.84	0.67	0.73
Chromium	Strong Acid Extractable	ug/g	15.5	19.1	16.9
Copper	Strong Acid Extractable	ug/g	23	22	22
Iron	Strong Acid Extractable	ug/g	21400	22300	22400
Lead	Strong Acid Extractable	ug/g	9.5	11.2	11.1
Nickel	Strong Acid Extractable	ug/g	29.8	29.7	29.4
Zinc	Strong Acid Extractable	ug/g	95	99	101
Microtox					
Interpretation (AEUB, G-50)			Pass	Pass	Pass
EC50	15 minutes	% Sample	>100	>100	>100
EC50	5 minutes	% Sample	>100	>100	>100
EC20	15 minutes	% Sample	>100	>100	>100
EC20	5 minutes	% Sample	>100	>100	>100
Lab Treatment			None	None	None
Sample Type	1:1	Sludge	1:1	Sludge	1:1
pH	Clarified Sample- Initial		7.6	7.7	7.7
Turbidity	As Received	High	High	High	High
Colour	As Received	Dark Brown	Dark Brown	Dark Brown	Dark Brown
Colour	As Tested	Pale Yellow	Clear	Clear	Clear
Turbidity	As Tested	None	None	None	None
pH	Clarified Sample- Final	Not Adjusted	Not Adjusted	Not Adjusted	Not Adjusted
Colour Corrected Data		No	No	No	No
Salinity					
pH	Saturated Paste	pH	7.5	7.6	7.5
Electrical Conductivity	Saturated Paste	dS/m at 25 C	12.1	2.55	3.04
SAR	Saturated Paste		2.7	0.5	0.6
% Saturation		%	50	49	48
Calcium	Saturated Paste	meq/L	62.7	18.9	21.2
Calcium	Saturated Paste	mg/kg	623	185	204
Magnesium	Saturated Paste	meq/L	43.7	4.7	6.0
Magnesium	Saturated Paste	mg/kg	263	28	35
Sodium	Saturated Paste	meq/L	19	2	2
Sodium	Saturated Paste	mg/kg	220	20	20
Potassium	Saturated Paste	meq/L	23	4.6	5.3
Potassium	Saturated Paste	mg/kg	450	87	100

Analytical Report

Norwest Labs
 7217 Roper Road NW
 Edmonton, AB. T6B 3J4
 Phone: (780) 438-5522
 Fax: (780) 438-0396

Bill to: Devon Canada Corporation
Report to: Devon Canada Corporation
 2000, 400-3 Ave SW
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 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project **NWL Lot ID:** **398310**
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

Control Number: E 236582
 Date Received: Jul 29, 2005
 Date Reported: Aug 18, 2005
 Report Number: 727851

Page: 6 of 37

		NWL Number	398310-5	398310-6	398310-7
		Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
		Sample Description	BH05-001 (0m)	BH05-001 (0.75)	BH05-001 (1.10)
		Matrix	Solids	Solids	Solids
Analyte		Units	Results	Results	Results
Salinity - Continued					
Chloride	Saturated Paste	meq/L	110	12.1	17.3
Chloride	Saturated Paste	mg/kg	1930	210	296
Sulfate-S	Saturated Paste	meq/L	40	16	16
Sulfate-S	Saturated Paste	mg/kg	320	120	120
TGR	Saturated Paste	T/ac	<0.1	<0.1	<0.1
		NWL Number	398310-7	398310-8	398310-9
		Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
		Sample Description	BH05-001 (1.10)	BH05-007(0)	BH05-007(0.63)
		Matrix	Solids	Solids	Solids
Analyte		Units	Results	Results	Detection Limit
Physical and Aggregate Properties					
Moisture	Wet Weight	%	28.5	26.5	22.5
					0.1

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Report to: Devon Canada Corporation
 2000, 400-3 Ave SW
 Calgary, AB, Canada
 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project **NWL Lot ID:** **398310**
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

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	NWL Number	398310-8	398310-9	398310-10
	Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
	Sample Description	BH05-007(0)	BH05-007(0.63)	BH05-008(0)

Matrix	Solids	Solids	Solids
--------	--------	--------	--------

Analyte	Units	Results	Results	Results	Detection Limit
Metals Strong Acid Digestion					
Cadmium	Strong Acid Extractable ug/g	0.65	0.72	0.64	0.01
Chromium	Strong Acid Extractable ug/g	17.4	17.6	15.2	0.5
Copper	Strong Acid Extractable ug/g	22	22	19	1
Iron	Strong Acid Extractable ug/g	22000	21000	20200	50
Lead	Strong Acid Extractable ug/g	12.6	10.1	9.2	0.1
Nickel	Strong Acid Extractable ug/g	28.0	31.1	28.0	0.5
Zinc	Strong Acid Extractable ug/g	109	102	93	1
Microtox					
Interpretation (AEUB, G-50)		Pass	Pass	Pass	
EC50	15 minutes % Sample	>100	>100	>100	10.0
EC50	5 minutes % Sample	>100	>100	>100	10.0
EC20	15 minutes % Sample	>100	>100	>100	10.0
EC20	5 minutes % Sample	>100	>100	>100	10.0
Lab Treatment		None	None	None	
Sample Type	1:1	Sludge 1:1	Sludge 1:1	Sludge 1:1	
pH	Clarified Sample- Initial	7.8	7.7	7.6	
Turbidity	As Received	High	High	High	
Colour	As Received	Dark Brown	Dark Brown	Dark Brown	
Colour	As Tested	Clear	Clear	Clear	
Turbidity	As Tested	None	None	None	
pH	Clarified Sample- Final	Not Adjusted	Not Adjusted	Not Adjusted	
Colour Corrected Data		No	No	No	
Salinity					
pH	Saturated Paste pH	7.6	7.7	7.6	
Electrical Conductivity	Saturated Paste dS/m at 25 C	4.29	1.63	2.22	0.01
SAR	Saturated Paste	0.9	0.3	0.4	
% Saturation	%	49	48	44	
Calcium	Saturated Paste meq/L	30.9	12.1	21.9	0.01
Calcium	Saturated Paste mg/kg	303	117	194	
Magnesium	Saturated Paste meq/L	10.4	3.03	5.4	0.02
Magnesium	Saturated Paste mg/kg	61.8	17.6	29	
Sodium	Saturated Paste meq/L	4	0.94	1	0.04
Sodium	Saturated Paste mg/kg	40	10	10	
Potassium	Saturated Paste meq/L	8.3	2.5	1	0.03
Potassium	Saturated Paste mg/kg	160	48	20	

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 Sampled By: David Wells
 Company: IEG

Project	NWL Lot ID: 398310
ID:	License Requirements
Name:	F29 - Devon Sump Assessment
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Analyte	Units	Results		Results	Detection Limit
		NWL Number	Sample Date		
Salinity - Continued					
Chloride	Saturated Paste	meq/L	21 . 3	4 . 11	5 . 59
Chloride	Saturated Paste	mg/kg	369	70	88
Sulfate-S	Saturated Paste	meq/L	31	13 . 1	23
Sulfate-S	Saturated Paste	mg/kg	240	101	160
TGR	Saturated Paste	T/ac	<0 . 1	<0 . 1	<0 . 1
Analyte	Units	Results		Results	Detection Limit
		NWL Number	Sample Date		
Physical and Aggregate Properties					
Moisture	Wet Weight	%	23 . 7	33 . 3	33 . 0
					0 . 1

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NWL Number	398310-11	398310-12	398310-13
Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
Sample Description	BH05-003(0.47)	BH05-003(0.5)	BH05-003(0.78)

Matrix	Solids	Solids	Solids
--------	--------	--------	--------

Analyte	Units	Results	Results	Results	Detection Limit
Metals Strong Acid Digestion					
Cadmium	Strong Acid Extractable ug/g	0.61	0.74	0.60	0.01
Chromium	Strong Acid Extractable ug/g	16.3	21.7	18.6	0.5
Copper	Strong Acid Extractable ug/g	21	25	22	1
Iron	Strong Acid Extractable ug/g	21600	27500	24700	50
Lead	Strong Acid Extractable ug/g	9.9	13.1	11.4	0.1
Nickel	Strong Acid Extractable ug/g	29.5	34.5	31.2	0.5
Zinc	Strong Acid Extractable ug/g	100	122	104	1
Microtox					
Interpretation (AEUB, G-50)		Pass	Pass	Pass	
EC50	15 minutes	% Sample	>100	>100	10.0
EC50	5 minutes	% Sample	>100	>100	10.0
EC20	15 minutes	% Sample	>100	>100	10.0
EC20	5 minutes	% Sample	>100	>100	10.0
Lab Treatment		None	None	None	
Sample Type	1:1	Sludge	1:1	Sludge	1:1
pH	Clarified Sample- Initial		7.8	7.5	7.3
Turbidity	As Received	High	High	High	
Colour	As Received	Dark Brown	Dark Brown	Dark Brown	
Colour	As Tested	Clear	Clear	Clear	
Turbidity	As Tested	None	None	None	
pH	Clarified Sample- Final	Not Adjusted	Not Adjusted	Not Adjusted	
Colour Corrected Data		No	No	No	
Salinity					
pH	Saturated Paste	pH	7.5	7.4	7.5
Electrical Conductivity	Saturated Paste	dS/m at 25 C	9.63	15.9	14.5
SAR	Saturated Paste		2.3	3.9	3.9
% Saturation		%	59	64	55
Calcium	Saturated Paste	meq/L	32.6	51.4	43.7
Calcium	Saturated Paste	mg/kg	383	653	479
Magnesium	Saturated Paste	meq/L	12.5	15.9	13.2
Magnesium	Saturated Paste	mg/kg	88.7	122	87.6
Sodium	Saturated Paste	meq/L	11	23	21
Sodium	Saturated Paste	mg/kg	150	330	260
Potassium	Saturated Paste	meq/L	40.3	78.5	73.7
Potassium	Saturated Paste	mg/kg	923	1940	1570

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 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project **NWL Lot ID:** **398310**
ID: License Requirements
Name: F29 - Devon Sump Assessment
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LSD:
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Acct. Code:

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NWL Number	398310-11	398310-12	398310-13
Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
Sample Description	BH05-003(0.47)	BH05-003(0.5)	BH05-003(0.78)

Matrix	Solids	Solids	Solids
--------	--------	--------	--------

Analyte	Units	Results	Results	Results	Detection Limit
Salinity - Continued					
Chloride	Saturated Paste	meq/L	88 . 2	163	0 . 03
Chloride	Saturated Paste	mg/kg	1830	3670	2890
Sulfate-S	Saturated Paste	meq/L	7 . 1	6	0 . 06
Sulfate-S	Saturated Paste	mg/kg	67	60	50
TGR	Saturated Paste	T/ac	<0 . 1	<0 . 1	<0 . 1

NWL Number	398310-13	398310-14	398310-15
Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
Sample Description	BH05-003(0.78)	BH05-004(0)	BH05-004(0.3)

Matrix	Solids	Solids	Solids
--------	--------	--------	--------

Analyte	Units	Results	Results	Results	Detection Limit
Physical and Aggregate Properties					
Moisture	Wet Weight	%	33 . 2	36 . 0	0 . 1
		NWL Number	398310-14		
		Sample Date	Jul 25, 2005		
		Sample Description	BH05-004(0)		
		Matrix	Solids		

Analyte	Units	Results	Results	Results	Detection Limit
Microtox Charcoal Treatment					
Interpretation (AEUB, G-50)		Pass			
EC50	15 minutes	% Sample	>100		10
EC50	5 minutes	% Sample	>100		10
EC20	15 minutes	% Sample	>100		10
EC20	5 minutes	% Sample	>100		10
Lab Treatment		G50 Charcoal			
Colour	As Tested		Yellow		
Turbidity	As Tested		None		
pH	Clarified Sample- Initial		7 . 3		
Colour Corrected Data			Yes		

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Project **NWL Lot ID:** **398310**
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NWL Number	398310-14	398310-15	398310-16
Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
Sample Description	BH05-004(0)	BH05-004(0.3)	BH05-004(0.65)

Matrix	Solids	Solids	Solids
--------	--------	--------	--------

Analyte	Units	Results	Results	Results	Detection Limit
Metals Strong Acid Digestion					
Cadmium	Strong Acid Extractable ug/g	0.60	0.80	0.60	0.01
Chromium	Strong Acid Extractable ug/g	16.7	23.1	18.2	0.5
Copper	Strong Acid Extractable ug/g	21	26	22	1
Iron	Strong Acid Extractable ug/g	21400	27000	24600	50
Lead	Strong Acid Extractable ug/g	9.9	12.2	10.6	0.1
Nickel	Strong Acid Extractable ug/g	27.3	38.1	32.5	0.5
Zinc	Strong Acid Extractable ug/g	99	140	110	1
Microtox					
Interpretation (AEUB, G-50)		Fail	Pass	Pass	
EC50	15 minutes	% Sample	34	>100	>100
EC50	5 minutes	% Sample	34	>100	>100
EC20	15 minutes	% Sample	10	>100	>100
EC20	5 minutes	% Sample	<10	>100	>100
Lab Treatment		None	None	None	
Sample Type	1:1	Sludge	1:1	Sludge	1:1
pH	Clarified Sample- Initial		7.3	7.4	7.6
Turbidity	As Received	High	High	High	
Colour	As Received	Dark Brown	Dark Brown	Dark Brown	
Colour	As Tested	Yellow	Pale Yellow	Clear	
Turbidity	As Tested	None	None	None	
pH	Clarified Sample- Final	Not Adjusted	Not Adjusted	Not Adjusted	
Colour Corrected Data		Yes	No	No	
Salinity					
pH	Saturated Paste	pH	7.8	7.4	7.5
Electrical Conductivity	Saturated Paste	dS/m at 25 C	11.8	20.9	12.0
SAR	Saturated Paste		3.2	4.5	2.5
% Saturation		%	52	69	52
Calcium	Saturated Paste	meq/L	28.2	49.3	40.7
Calcium	Saturated Paste	mg/kg	290	681	426
Magnesium	Saturated Paste	meq/L	11.5	14	11.9
Magnesium	Saturated Paste	mg/kg	71.7	110	75.4
Sodium	Saturated Paste	meq/L	14	25	13
Sodium	Saturated Paste	mg/kg	170	400	150
Potassium	Saturated Paste	meq/L	65.8	132	55.5
Potassium	Saturated Paste	mg/kg	1320	3570	1130

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 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project **NWL Lot ID:** **398310**
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
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		NWL Number	398310-14	398310-15	398310-16
		Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
		Sample Description	BH05-004(0)	BH05-004(0.3)	BH05-004(0.65)
		Matrix	Solids	Solids	Solids
Analyte		Units	Results	Results	Results
Salinity - Continued					
Chloride	Saturated Paste	meq/L	116	216	118
Chloride	Saturated Paste	mg/kg	2120	5300	2180
Sulfate-S	Saturated Paste	meq/L	11	6	5
Sulfate-S	Saturated Paste	mg/kg	95	60	40
TGR	Saturated Paste	T/ac	<0 . 1	<0 . 1	<0 . 1
		NWL Number	398310-16	398310-17	398310-18
		Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
		Sample Description	BH05-004(0.65)	BH05-005(0)	BH05-005(0.5)
		Matrix	Solids	Solids	Solids
Analyte		Units	Results	Results	Detection Limit
Physical and Aggregate Properties					
Moisture	Wet Weight	%	31 . 2	52 . 6	29 . 4
					0 . 1

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Project	NWL Lot ID: 398310
ID:	License Requirements
Name:	F29 - Devon Sump Assessment
Location:	F29 - Mackenzie Delta
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		NWL Number	398310-17	398310-18	398310-19
		Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
		Sample Description	BH05-005(0)	BH05-005(0.5)	BH05-005(0.78)
		Matrix	Solids	Solids	Solids
Analyte		Units	Results	Results	Results
Metals Strong Acid Digestion					
Cadmium	Strong Acid Extractable	ug/g	0.63	0.61	0.70
Chromium	Strong Acid Extractable	ug/g	17.1	19.1	17.8
Copper	Strong Acid Extractable	ug/g	21	24	22
Iron	Strong Acid Extractable	ug/g	22300	24700	24100
Lead	Strong Acid Extractable	ug/g	10.9	12.1	10.8
Nickel	Strong Acid Extractable	ug/g	31.4	30.7	32.4
Zinc	Strong Acid Extractable	ug/g	102	111	114
Microtox					
Interpretation (AEUB, G-50)			Pass	Pass	Pass
EC50	15 minutes	% Sample	>100	>100	>100
EC50	5 minutes	% Sample	>100	>100	>100
EC20	15 minutes	% Sample	>100	>100	>100
EC20	5 minutes	% Sample	>100	>100	>100
Lab Treatment			None	None	None
Sample Type	1:1	Sludge	1:1	Sludge	1:1
pH	Clarified Sample- Initial		7.2	7.3	7.4
Turbidity	As Received		High	High	High
Colour	As Received		Dark Brown	Dark Brown	Dark Brown
Colour	As Tested		Yellow	Pale Yellow	Clear
Turbidity	As Tested		None	None	None
pH	Clarified Sample- Final		Not Adjusted	Not Adjusted	Not Adjusted
Colour Corrected Data			Yes	No	No
Salinity					
pH	Saturated Paste	pH	7.4	7.4	7.4
Electrical Conductivity	Saturated Paste	dS/m at 25 C	10.7	24.3	25.6
SAR	Saturated Paste		3.0	8.0	8.1
% Saturation		%	62	63	59
Calcium	Saturated Paste	meq/L	26.9	48.4	51.4
Calcium	Saturated Paste	mg/kg	335	610	604
Magnesium	Saturated Paste	meq/L	11.1	14	14
Magnesium	Saturated Paste	mg/kg	83.9	100	100
Sodium	Saturated Paste	meq/L	13	45	46
Sodium	Saturated Paste	mg/kg	180	650	620
Potassium	Saturated Paste	meq/L	54.2	165	172
Potassium	Saturated Paste	mg/kg	1320	4070	3950

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Project	NWL Lot ID: 398310
ID:	License Requirements
Name:	F29 - Devon Sump Assessment
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		NWL Number	398310-17	398310-18	398310-19
		Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
		Sample Description	BH05-005(0)	BH05-005(0.5)	BH05-005(0.78)
		Matrix	Solids	Solids	Solids
Analyte		Units	Results	Results	Results
Salinity - Continued					
Chloride	Saturated Paste	meq/L	96 . 5	250	289
Chloride	Saturated Paste	mg/kg	2130	5590	6020
Sulfate-S	Saturated Paste	meq/L	5	15	9
Sulfate-S	Saturated Paste	mg/kg	50	150	80
TGR	Saturated Paste	T/ac	<0 . 1	1 . 0	1 . 1
		NWL Number	398310-19	398310-20	398310-21
		Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
		Sample Description	BH05-005(0.78)	BH05-006(0)	BH05-006(0.43)
		Matrix	Solids	Solids	Solids
Analyte		Units	Results	Results	Detection Limit
Physical and Aggregate Properties					
Moisture	Wet Weight	%	32 . 5	44 . 5	48 . 3
					0 . 1

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Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
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		NWL Number	398310-20	398310-21	398310-22
		Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
		Sample Description	BH05-006(0)	BH05-006(0.43)	BH05-007(0)
		Matrix	Solids	Solids	Solids
Analyte		Units	Results	Results	Results
Metals Strong Acid Digestion					
Cadmium	Strong Acid Extractable	ug/g	0.93	0.63	0.76
Chromium	Strong Acid Extractable	ug/g	19.7	24.2	19.5
Copper	Strong Acid Extractable	ug/g	29	26	24
Iron	Strong Acid Extractable	ug/g	26000	30500	22100
Lead	Strong Acid Extractable	ug/g	12.0	13.7	12.5
Nickel	Strong Acid Extractable	ug/g	32.2	37.0	28.6
Zinc	Strong Acid Extractable	ug/g	131	126	110
Microtox					
Interpretation (AEUB, G-50)			Pass	Pass	Pass
EC50	15 minutes	% Sample	>100	>100	>100
EC50	5 minutes	% Sample	>100	>100	>100
EC20	15 minutes	% Sample	>100	>100	>100
EC20	5 minutes	% Sample	>100	>100	>100
Lab Treatment			None	None	None
Sample Type	1:1		Chemical Product	Sludge 1:1	Sludge 1:1
pH	Clarified Sample- Initial		7.5	7.4	7.2
Turbidity	As Received		High	High	High
Colour	As Received		Dark Brown	Dark Brown	Dark Brown
Colour	As Tested		Clear	Clear	Pale Yellow
Turbidity	As Tested		None	None	None
pH	Clarified Sample- Final		Not Adjusted	Not Adjusted	Not Adjusted
Colour Corrected Data			No	No	No
Salinity					
pH	Saturated Paste	pH	7.2	7.2	7.0
Electrical Conductivity	Saturated Paste	dS/m at 25 C	6.12	12.8	6.40
SAR	Saturated Paste		2.3	2.1	2.0
% Saturation		%	138	100	162
Calcium	Saturated Paste	meq/L	17.3	78.7	22.2
Calcium	Saturated Paste	mg/kg	479	1570	719
Magnesium	Saturated Paste	meq/L	7.0	26.3	8.84
Magnesium	Saturated Paste	mg/kg	120	317	173
Sodium	Saturated Paste	meq/L	8.0	15	8.0
Sodium	Saturated Paste	mg/kg	250	340	300
Potassium	Saturated Paste	meq/L	28.0	21	23
					0.03

Analytical Report

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Project **NWL Lot ID:** **398310**
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
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NWL Number	398310-20	398310-21	398310-22
Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
Sample Description	BH05-006(0)	BH05-006(0.43)	BH05-007(0)

Matrix	Solids	Solids	Solids
--------	--------	--------	--------

Analyte	Units	Results	Results	Results	Detection Limit
Salinity - Continued					
Potassium	Saturated Paste	mg/kg	1510	820	1400
Chloride	Saturated Paste	meq/L	50 .4	129	55 .0
Chloride	Saturated Paste	mg/kg	2470	4560	3160
Sulfate-S	Saturated Paste	meq/L	7 .4	10	8 .3
Sulfate-S	Saturated Paste	mg/kg	160	160	220
TGR	Saturated Paste	T/ac	<0 .1	<0 .1	<0 .1

NWL Number	398310-22	398310-23	398310-24
Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
Sample Description	BH05-007(0)	BH05_007(0.63)	BH05-008(0)

Matrix	Solids	Solids	Solids
--------	--------	--------	--------

Analyte	Units	Results	Results	Results	Detection Limit
Physical and Aggregate Properties					
Moisture	Wet Weight	%	83 .6	24 .1	68 .1

Analytical Report

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 Phone: (780) 438-5522
 Fax: (780) 438-0396

Bill to: Devon Canada Corporation
Report to: Devon Canada Corporation
 2000, 400-3 Ave SW
 Calgary, AB, Canada
 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
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Acct. Code:

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	NWL Number	398310-23	398310-24	398310-25
	Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
	Sample Description	BH05_007(0.63)	BH05-008(0)	BH05-008(0.47)

Matrix	Solids	Solids	Solids
--------	--------	--------	--------

Analyte	Units	Results	Results	Results	Detection Limit
Metals Strong Acid Digestion					
Cadmium	Strong Acid Extractable ug/g	0.63	0.83	0.62	0.01
Chromium	Strong Acid Extractable ug/g	19.1	16.6	19.6	0.5
Copper	Strong Acid Extractable ug/g	23	21	22	1
Iron	Strong Acid Extractable ug/g	26400	21100	26000	50
Lead	Strong Acid Extractable ug/g	11.4	11.1	11.1	0.1
Nickel	Strong Acid Extractable ug/g	33.3	26.1	33.2	0.5
Zinc	Strong Acid Extractable ug/g	109	120	110	1
Microtox					
Interpretation (AEUB, G-50)		Pass	Pass	Pass	
EC50	15 minutes	% Sample	>100	>100	10.0
EC50	5 minutes	% Sample	>100	>100	10.0
EC20	15 minutes	% Sample	>100	>100	10.0
EC20	5 minutes	% Sample	>100	>100	10.0
Lab Treatment		None	None	None	
Sample Type	1:1	Sludge	1:1	Sludge	1:1
pH	Clarified Sample- Initial		7.9	7.2	8.0
Turbidity	As Received	High	High	High	
Colour	As Received	Dark Brown	Dark Brown	Dark Brown	
Colour	As Tested	Clear	Yellow	Pale Yellow	
Turbidity	As Tested	None	None	None	
pH	Clarified Sample- Final	Not Adjusted	Not Adjusted	Not Adjusted	
Colour Corrected Data		No	No	No	
Salinity					
pH	Saturated Paste	pH	7.5	6.6	7.9
Electrical Conductivity	Saturated Paste	dS/m at 25 C	6.34	0.51	0.35
SAR	Saturated Paste		1.9	0.2	0.2
% Saturation		%	54	202	64
Calcium	Saturated Paste	meq/L	34.5	3.83	3.02
Calcium	Saturated Paste	mg/kg	371	154	38.6
Magnesium	Saturated Paste	meq/L	10.9	1.71	1.15
Magnesium	Saturated Paste	mg/kg	70.6	41.8	8.8
Sodium	Saturated Paste	meq/L	9.0	0.3	0.2
Sodium	Saturated Paste	mg/kg	110	10	4
Potassium	Saturated Paste	meq/L	12	0.2	0.08
Potassium	Saturated Paste	mg/kg	250	20	0.03



Analytical Report

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Attn: Pete Millman
Sampled By: David Wells
Company: IEG

Project NWL Lot ID: **398310**
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
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NWL Number	398310-23	398310-24	398310-25
Sample Date	Jul 25, 2005	Jul 25, 2005	Jul 25, 2005
Sample Description	BH05_007(0.63)	BH05-008(0)	BH05-008(0.47)

Analyte	Units	Results	Results	Results	Detection Limit
Salinity - Continued					
Chloride	Saturated Paste	meq/L	45 . 8	0 . 55	0 . 28
Chloride	Saturated Paste	mg/kg	873	40	6
Sulfate-S	Saturated Paste	meq/L	6	3 . 0	1 . 5
Sulfate-S	Saturated Paste	mg/kg	50	98	15
TGR	Saturated Paste	T/ac	<0 . 1	<0 . 1	<0 . 1

NWL Number	398310-25	398310-26
Sample Date	Jul 25, 2005	Jul 25, 2005
Sample Description	BH05-008(0.47)	BH05-008(0.65)

Analyte	Units	Results	Results	Results	Detection Limit
Physical and Aggregate Properties					
Moisture	Wet Weight	%	33 . 8	33 . 1	0 . 1

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ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **398310**
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NWL Number	398310-26
Sample Date	Jul 25, 2005
Sample Description	BH05-008(0.65)
Matrix	Solids

Analyte	Units	Results	Results	Results	Detection Limit
Metals Strong Acid Digestion					
Cadmium	Strong Acid Extractable ug/g	0 .58			0 .01
Chromium	Strong Acid Extractable ug/g	20 .2			0 .5
Copper	Strong Acid Extractable ug/g	23			1
Iron	Strong Acid Extractable ug/g	25600			50
Lead	Strong Acid Extractable ug/g	11 .7			0 .1
Nickel	Strong Acid Extractable ug/g	31 .2			0 .5
Zinc	Strong Acid Extractable ug/g	109			1
Microtox					
Interpretation (AEUB, G-50)		Pass			
EC50	15 minutes	% Sample	>100		10 .0
EC50	5 minutes	% Sample	>100		10 .0
EC20	15 minutes	% Sample	>100		10 .0
EC20	5 minutes	% Sample	>100		10 .0
Lab Treatment			None		
Sample Type	1:1		Sludge 1:1		
pH	Clarified Sample- Initial		8 .0		
Turbidity	As Received		High		
Colour	As Received		Dark Brown		
Colour	As Tested		Clear		
Turbidity	As Tested		None		
pH	Clarified Sample- Final		Not Adjusted		
Colour Corrected Data			Yes		
Salinity					
pH	Saturated Paste	pH	8 .1		
Electrical Conductivity	Saturated Paste	dS/m at 25 C	0 .32		0 .01
SAR	Saturated Paste		0 .2		
% Saturation		%	56		
Calcium	Saturated Paste	meq/L	2 .51		0 .01
Calcium	Saturated Paste	mg/kg	28 .2		
Magnesium	Saturated Paste	meq/L	0 .95		0 .02
Magnesium	Saturated Paste	mg/kg	6 .5		
Sodium	Saturated Paste	meq/L	0 .2		0 .04
Sodium	Saturated Paste	mg/kg	3		
Potassium	Saturated Paste	meq/L	0 .06		0 .03
Potassium	Saturated Paste	mg/kg	1		

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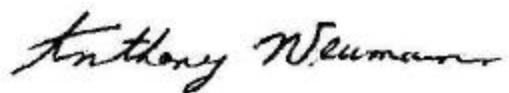
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NWL Number	398310-26
Sample Date	Jul 25, 2005
Sample Description	BH05-008(0.65)
Matrix	Solids

Analyte	Units	Results	Results	Results	Detection Limit
Salinity - Continued					
Chloride	Saturated Paste	meq/L	0 . 29		0 . 03
Chloride	Saturated Paste	mg/kg	6		
Sulfate-S	Saturated Paste	meq/L	1 . 3		0 . 06
Sulfate-S	Saturated Paste	mg/kg	12		
TGR	Saturated Paste	T/ac	<0 . 1		

Approved by:



Anthony Neumann, MSc
 Laboratory Operations Manager



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Aggregate Organic Constituents

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Oil	%	0.31	0.39	20.01	0.10	✓
Water	%	67.4	63.6	20.0	0.1	✓
Solids	%	32.3	36.0	20.0	0.1	✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Aug 02, 2005					
Acquired By:	Heather Milne					
Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Oil	%	2.40	2.47	1.82	3.12	✓
Material Used:	2005 Oil Standard					
Date Acquired:	Aug 02, 2005					
Acquired By:	Heather Milne					
Oil and Grease	mg/L	41	40	38	42	✓
Material Used:	Oil and Grease					
Date Acquired:	Aug 02, 2005					
Acquired By:	Tamara Cox					



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Metals Dissolved

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Silicon	µg/L	<0.05	0.00	-0.05	0.05	✓
Sulfur	µg/L	<0.3	0.0	-0.3	0.3	✓
Aluminum	µg/L	<5	0	-5	5	✓
Antimony	µg/L	<0.2	0.0	-0.2	0.2	✓
Arsenic	µg/L	<0.2	0.0	-0.2	0.2	✓
Barium	µg/L	<1	0	-1	1	✓
Beryllium	µg/L	<0.1	0.0	-0.1	0.1	✓
Bismuth	µg/L	<0.5	0.0	-0.5	0.5	✓
Boron	µg/L	<2	0	-2	2	✓
Cadmium	µg/L	<0.01	0.00	-0.01	0.01	✓
Chromium	µg/L	<0.5	0.0	-0.5	0.5	✓
Cobalt	µg/L	<0.1	0.0	-0.1	0.1	✓
Copper	µg/L	<1	0	-1	1	✓
Lead	µg/L	<0.1	0.0	-0.1	0.1	✓
Lithium	µg/L	<1	0	-1	1	✓
Molybdenum	µg/L	<1	0	-1	1	✓
Nickel	µg/L	<0.5	0.0	-0.5	0.5	✓
Selenium	µg/L	<0.2	0.0	-0.2	0.2	✓
Silver	µg/L	<0.1	0.0	-0.1	0.1	✓
Strontium	µg/L	<1	0	-1	1	✓
Thallium	µg/L	<0.05	0.00	-0.05	0.05	✓
Tin	µg/L	<1	0	-1	1	✓
Titanium	µg/L	<0.5	0.0	-0.5	0.5	✓
Uranium	µg/L	<0.5	0.0	-0.5	0.5	✓
Vanadium	µg/L	<0.1	0.0	-0.1	0.1	✓
Zinc	µg/L	<1	0	-1	1	✓

Material Used: Edmonton Method Blank
 Date Acquired: Jul 29, 2005
 Acquired By: Linda Li

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Sulfur	µg/L	1.3	1.3	10.0	0.1	✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Jul 29, 2005					
Acquired By:	To Thong					

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 Attn: Pete Millman
Sampled By: David Wells
Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
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Metals Dissolved (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Silicon	mg/L	24.5	25.00	22.50	27.50	✓
Sulfur	mg/L	47.1	50.0	45.0	55.0	✓
Material Used:	Metals High					
Date Acquired:	Jul 29, 2005					
Acquired By:	To Thong					
Silicon	mg/L	0.53	0.50	0.45	0.55	✓
Sulfur	mg/L	1	1.0	0.9	1.2	✓
Aluminum	ug/L	911	1000	850	1150	✓
Antimony	ug/L	39.5	40.0	34.0	46.0	✓
Arsenic	ug/L	42.3	40.0	34.0	46.0	✓
Barium	ug/L	198	200	170	230	✓
Beryllium	ug/L	19.6	20.0	17.0	23.0	✓
Bismuth	ug/L	96.4	100.0	85.0	115.0	✓
Boron	ug/L	419	400	340	460	✓
Cadmium	ug/L	2.07	2.00	1.70	2.30	✓
Chromium	ug/L	103	100.0	85.0	115.0	✓
Cobalt	ug/L	20.7	20.0	17.0	23.0	✓
Copper	ug/L	201	200	170	230	✓
Lead	ug/L	19.9	20.0	17.0	23.0	✓
Lithium	ug/L	189	200	170	230	✓
Molybdenum	ug/L	197	200	170	230	✓
Nickel	ug/L	101	100.0	85.0	115.0	✓
Selenium	ug/L	42.1	40.0	34.0	46.0	✓
Silver	ug/L	19.9	20.0	17.0	23.0	✓
Strontium	ug/L	206	200	170	230	✓
Thallium	ug/L	10.1	10.00	8.50	11.50	✓
Tin	ug/L	191	200	170	230	✓
Titanium	ug/L	103	100.0	85.0	115.0	✓
Uranium	ug/L	95.8	100.0	85.0	115.0	✓
Vanadium	ug/L	19.8	20.0	17.0	23.0	✓
Zinc	ug/L	201	200	170	230	✓
Material Used:	Metals Low					
Date Acquired:	Jul 29, 2005					
Acquired By:	Linda Li					



Quality Control

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 2000, 400-3 Ave SW
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 T2P 4H2
 Attn: Pete Millman
Sampled By: David Wells
Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
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NWL Lot ID: **398310**
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Metals Dissolved (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/L	50	50	43	58	✓
Antimony	ug/L	2.0	2.0	1.7	2.3	✓
Arsenic	ug/L	2.0	2.0	1.7	2.3	✓
Barium	ug/L	10	10	9	12	✓
Beryllium	ug/L	1	1.0	0.9	1.2	✓
Bismuth	ug/L	5.0	5.0	4.3	5.8	✓
Boron	ug/L	22	20	17	23	✓
Cadmium	ug/L	0.09	0.10	0.09	0.12	✓
Chromium	ug/L	5.2	5.0	4.3	5.8	✓
Cobalt	ug/L	1.0	1.0	0.9	1.2	✓
Copper	ug/L	10	10	9	12	✓
Lead	ug/L	1.0	1.0	0.9	1.2	✓
Lithium	ug/L	10	10	9	12	✓
Molybdenum	ug/L	10	10	9	12	✓
Nickel	ug/L	5.2	5.0	4.3	5.8	✓
Selenium	ug/L	2.1	2.0	1.7	2.3	✓
Silver	ug/L	0.9	1.0	0.9	1.2	✓
Strontium	ug/L	11	10	9	12	✓
Thallium	ug/L	0.50	0.50	0.43	0.58	✓
Tin	ug/L	10	10	9	12	✓
Titanium	ug/L	5.3	5.0	4.3	5.8	✓
Uranium	ug/L	5.0	5.0	4.3	5.8	✓
Vanadium	ug/L	1.0	1.0	0.9	1.2	✓
Zinc	ug/L	11	10	9	12	✓

Material Used: Metals Trace
 Date Acquired: Jul 29, 2005
 Acquired By: Linda Li



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Metals Strong Acid Digestion

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/q	1	0	0	0	✓
Antimony	ug/q	<0.0	0.0	0.0	0.0	✓
Arsenic	ug/q	<0.0	0.0	-0.1	0.2	✓
Barium	ug/q	<0	1	-2	3	✓
Beryllium	ug/q	<0.0	0.0	0.0	0.0	✓
Cadmium	ug/q	<0.00	0.00	-0.03	0.03	✓
Calcium	ug/q	<2	0	0	1	✓
Chromium	ug/q	<0.0	-0.3	-1.5	0.9	✓
Cobalt	ug/q	<0.0	0.0	-0.1	0.1	✓
Copper	ug/q	<0	0	-1	1	✓
Iron	ug/q	1	0	0	0	✓
Lead	ug/q	<0.0	0.1	-0.2	0.4	✓
Magnesium	ug/q	<1	0	0	0	✓
Manganese	ug/q	<0	0	0	0	✓
Molybdenum	ug/q	<0	0	0	0	✓
Nickel	ug/q	<0.0	-0.2	-1.7	1.2	✓
Phosphorus	ug/q	<0	0	0	0	✓
Selenium	ug/q	<0.0	0.0	-0.3	0.2	✓
Silicon	ug/q	<0	0	0	0	✓
Silver	ug/q	<0.0	0.0	0.0	0.0	✓
Strontium	ug/q	<0	0	-1	1	✓
Thallium	ug/q	<0.00	0.00	-0.01	0.01	✓
Tin	ug/q	0	2	2	3	✓
Titanium	ug/q	<0.0	0.1	-1.3	1.5	✓
Vanadium	ug/q	<0.0	0.0	-0.2	0.3	✓
Zinc	ug/q	<0	0	-3	3	✓
Material Used:	Edmonton Method Blank					
Date Acquired:	Aug 02, 2005					
Acquired By:	Linda Li					



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Metals Strong Acid Digestion (Continued...)

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Antimony	ug/g	<0.2	<0.2	20.0	0.4	✓
Arsenic	ug/g	7.6	7.0	20.0	0.4	✓
Barium	ug/g	335	312	20	2	✓
Beryllium	ug/g	0.7	0.8	20.0	0.2	✓
Cadmium	ug/g	0.60	0.57	20.01	0.02	✓
Chromium	ug/g	18.0	16.6	20.0	1.1	✓
Cobalt	ug/g	9.1	8.5	20.0	0.2	✓
Copper	ug/g	21	20	20	2	✓
Lead	ug/g	12.6	12.8	20.0	0.2	✓
Molybdenum	ug/g	<1	<1	20	2	✓
Nickel	ug/g	28.2	27.0	20.0	1.1	✓
Selenium	ug/g	0.9	0.7	20.0	0.7	✓
Silver	ug/g	0.1	0.1	20.0	0.2	✓
Thallium	ug/g	0.28	0.29	20.01	0.11	✓
Tin	ug/g	<1	<1	20	2	✓
Vanadium	ug/g	33.0	31.3	20.0	0.2	✓
Zinc	ug/g	88	81	20	2	✓

Material Used: Edmonton Duplicate
Date Acquired: Aug 02, 2005
Acquired By: Linda Li

Bill to: Devon Canada Corporation
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 Calgary, AB, Canada
 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project	NWL Lot ID: 398310
ID: License Requirements	Control Number: E 236582
Name: F29 - Devon Sump Assessment	Date Received: Jul 29, 2005
Location: F29 - Mackenzie Delta	Date Reported: Aug 18, 2005
LSD:	Report Number: 727851
P.O.:	
Acct. Code:	

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Metals Strong Acid Digestion (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Aluminum	ug/g	28400	30611	19685	41537	✓
Antimony	ug/g	<0.2	0.2	0.1	0.3	✓
Arsenic	ug/g	17.8	16.8	14.1	19.5	✓
Barium	ug/g	417	406	330	482	✓
Beryllium	ug/g	1.0	0.9	0.7	1.1	✓
Bismuth	ug/g	<0.5	0.0	0.0	0.0	✓
Cadmium	ug/g	0.38	0.38	0.30	0.45	✓
Calcium	ug/g	16400	16001	11570	20432	✓
Chromium	ug/g	83.4	84.7	69.4	100.0	✓
Cobalt	ug/g	14.8	13.4	11.1	15.7	✓
Copper	ug/g	33	33	27	39	✓
Iron	ug/g	34600	32989	23686	42292	✓
Lead	ug/g	13.3	13.4	11.0	15.8	✓
Magnesium	ug/g	14600	14535	10464	18606	✓
Manganese	ug/g	544	527	374	680	✓
Molybdenum	ug/g	1	1	1	1	✓
Nickel	ug/g	88.7	81.8	68.5	95.1	✓
Phosphorus	ug/g	450	419	277	561	✓
Selenium	ug/g	1.4	1.2	0.5	1.9	✓
Silicon	ug/g	636	1014	-546	2574	✓
Silver	ug/g	0.4	0.4	0.2	0.5	✓
Strontium	ug/g	114	114	94	134	✓
Thallium	ug/g	0.36	0.35	0.28	0.41	✓
Tin	ug/g	<1	1	1	1	✓
Titanium	ug/g	432	438.0	293.1	582.9	✓
Vanadium	ug/g	86.2	83.3	63.7	103.0	✓
Zinc	ug/g	108	103	85	121	✓

Material Used: Metals Soils
 Date Acquired: Aug 02, 2005
 Acquired By: Linda Li



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Attn: Pete Millman
Sampled By: David Wells
Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
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Acct. Code:

NWL Lot ID: 398310
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Metals Total

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Iron	µg/L	<0.1	0.0	0.0	0.0	✓
Cadmium	µg/L	<0.01	0.00	-0.01	0.01	✓
Chromium	µg/L	<0.5	0.0	-0.5	0.5	✓
Copper	µg/L	<1	0	-1	1	✓
Lead	µg/L	<0.1	0.0	-0.1	0.1	✓
Nickel	µg/L	<0.5	0.0	-0.5	0.5	✓
Zinc	µg/L	<1	0	-1	1	✓
Material Used:	Edmonton Method Blank					
Date Acquired:	Aug 02, 2005					
Acquired By:	Linda Li					
Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Cadmium	µg/L	<0.01	<0.01	15.00	0.02	✓
Chromium	µg/L	<0.5	<0.5	15.0	1.1	✓
Copper	µg/L	1	1	15	2	✓
Lead	µg/L	<0.1	<0.1	15.0	0.2	✓
Nickel	µg/L	<0.5	<0.5	15.0	1.1	✓
Zinc	µg/L	<1	1	15	2	✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Aug 02, 2005					
Acquired By:	Linda Li					

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Project
ID: License Requirements
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Location: F29 - Mackenzie Delta
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NWL Lot ID: **398310**
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Metals Total (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Iron	µg/L	2.0	2.0	1.8	2.2	✓
Cadmium	µg/L	0.48	0.63	0.47	0.78	✓
Chromium	µg/L	31.2	31.8	27.5	36.2	✓
Copper	µg/L	59	63	55	70	✓
Lead	µg/L	6.0	6.2	5.4	7.0	✓
Nickel	µg/L	29.8	31.4	27.0	35.8	✓
Zinc	µg/L	54	59	49	69	✓
Material Used:	Edmonton Digestion Check					
Date Acquired:	Aug 02, 2005					
Acquired By:	Linda Li					
Iron	mg/L	9.8	10.0	9.0	11.0	✓
Material Used:	Metals High					
Date Acquired:	Aug 02, 2005					
Acquired By:	To Thong					
Iron	µg/L	0.2	0.2	0.2	0.2	✓
Cadmium	µg/L	2.04	2.00	1.70	2.30	✓
Chromium	µg/L	98.7	100.0	85.0	115.0	✓
Copper	µg/L	194	200	170	230	✓
Lead	µg/L	20.3	20.0	17.0	23.0	✓
Nickel	µg/L	98.0	100.0	85.0	115.0	✓
Zinc	µg/L	196	200	170	230	✓
Material Used:	Metals Low					
Date Acquired:	Aug 02, 2005					
Acquired By:	Linda Li					
Cadmium	µg/L	0.11	0.10	0.09	0.12	✓
Chromium	µg/L	5.3	5.0	4.3	5.8	✓
Copper	µg/L	10	10	9	12	✓
Lead	µg/L	1.1	1.0	0.9	1.2	✓
Nickel	µg/L	5.2	5.0	4.3	5.8	✓
Zinc	µg/L	10	10	9	12	✓
Material Used:	Metals Trace					
Date Acquired:	Aug 02, 2005					
Acquired By:	Linda Li					

Microtox

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Material Used:	Phenol					
Date Acquired:	Aug 02, 2005					
Acquired By:	Andrew Jong					



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 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
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Acct. Code:

NWL Lot ID: **398310**

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Microtox Charcoal Treatment

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
EC50	% Sample	14	14.0	8.2	19.8	✓
Material Used:	Phenol					
Date Acquired:	Aug 03, 2005					
Acquired By:	Darren Crichton					

Physical and Aggregate Properties

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
Solids	mg/L	535	532	10	15	✓
Moisture	%	48.3	47.0	10.0		✓
Material Used:	Edmonton Duplicate					
Date Acquired:	Jul 30, 2005					
Acquired By:	Sam(Hung) Duong					
Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Solids	mg/L	198	200	180	220	✓
Material Used:	Water High					
Date Acquired:	Aug 02, 2005					
Acquired By:	Christina Onyskiw					
Solids	mg/L	20	20	18	22	✓
Material Used:	Water Low					
Date Acquired:	Aug 02, 2005					
Acquired By:	Christina Onyskiw					



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Company: IEG

Project	NWL Lot ID: 398310
ID: License Requirements	Control Number: E 236582
Name: F29 - Devon Sump Assessment	Date Received: Jul 29, 2005
Location: F29 - Mackenzie Delta	Date Reported: Aug 18, 2005
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Routine Water

	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Blanks						
Calcium	mg/L	<0.2	0.0	-0.2	0.2	✓
Magnesium	mg/L	<0.1	0.0	-0.1	0.1	✓
Sodium	mg/L	<0.4	0.0	-0.4	0.4	✓
Potassium	mg/L	<0.4	0.0	-0.4	0.4	✓
Iron	mg/L	<0.01	0.00	-0.01	0.01	✓
Manganese	mg/L	<0.005	0.000	-0.005	0.005	✓
Chloride	mg/L	<0.4	0.0	-0.5	0.5	✓
Nitrate - N	mg/L	<0.01	0.00	-0.01	0.01	✓
Nitrite - N	mg/L	<0.005	0.000	-0.005	0.005	✓

Material Used: Edmonton Method Blank

Date Acquired: Jul 29, 2005

Acquired By: Marc Dzura

	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
pH		7.60	7.60	9.99	0.10	✓
Electrical Conductivity	dS/m at 25 C	3.97	3.99	9.990	0.002	✓
Calcium	mg/L	31.6	31.6	10.0	0.6	✓
Magnesium	mg/L	6.0	6.0	10.0	0.7	✓
Sodium	mg/L	10.6	10.6	10.0	1.2	✓
Potassium	mg/L	0.7	0.7	10.0	1.2	✓
Iron	mg/L	0.05	0.05	9.99	0.05	✓
Manganese	mg/L	0.016	0.015	9.990	0.010	✓
Chloride	mg/L	175	172	10.0	0.5	✓
Nitrate - N	mg/L	<0.01	<0.01	9.99	0.01	✓
Nitrite - N	mg/L	<0.005	<0.005	9.990	0.010	✓
Hydroxide	mg/L	<5	<5	10		✓
Carbonate	mg/L	<6	<6	10		✓
Bicarbonate	mg/L	84	85	10		✓
P-Alkalinity	mg/L	<5	<5	10	5	✓
T-Alkalinity	mg/L	69	70	10	5	✓

Material Used: Edmonton Duplicate

Date Acquired: Jul 29, 2005

Acquired By: Annya Hundal



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Sampled By: David Wells
Company: IEG

Project	NWL Lot ID: 398310
ID: License Requirements	Control Number: E 236582
Name: F29 - Devon Sump Assessment	Date Received: Jul 29, 2005
Location: F29 - Mackenzie Delta	Date Reported: Aug 18, 2005
LSD:	Report Number: 727851
P.O.:	
Acct. Code:	

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Routine Water (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Chloride	mg/L	2050	2087.0	1875.2	2298.8	✓
Material Used:	Chloride High					
Date Acquired:	Aug 02, 2005					
Acquired By:	Wilailuk Somiit					
Calcium	mg/L	236	250.0	225.0	275.0	✓
Magnesium	mg/L	94.8	100.0	90.0	110.0	✓
Sodium	mg/L	238	250.0	225.0	275.0	✓
Potassium	mg/L	242	250.0	225.0	275.0	✓
Iron	mg/L	9.84	10.00	9.01	10.99	✓
Manganese	mg/L	2.34	2.500	2.260	2.740	✓
Material Used:	Metals High					
Date Acquired:	Jul 29, 2005					
Acquired By:	To Thong					
Calcium	mg/L	5.0	5.0	4.5	5.5	✓
Magnesium	mg/L	2.0	2.0	1.8	2.2	✓
Sodium	mg/L	4.7	5.0	4.5	5.5	✓
Potassium	mg/L	4.7	5.0	4.5	5.5	✓
Iron	mg/L	0.20	0.20	0.18	0.22	✓
Manganese	mg/L	0.049	0.050	0.045	0.055	✓
Material Used:	Metals Low					
Date Acquired:	Jul 29, 2005					
Acquired By:	To Thong					
pH		9.21	9.23	9.11	9.35	✓
Electrical Conductivity	dS/m at 25 C	2.81	2.730	2.611	2.849	✓
Chloride	mg/L	80.6	81.0	76.4	85.6	✓
Nitrate - N	mg/L	10.3	10.00	9.61	10.39	✓
Nitrite - N	mg/L	10.3	10.000	9.562	10.438	✓
P-Alkalinity	mg/L	484	507	415	599	✓
T-Alkalinity	mg/L	1000	1009	969	1049	✓
Material Used:	Water High					
Date Acquired:	Jul 29, 2005					
Acquired By:	Annva Hundal					



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Project **NWL Lot ID:** **398310**
ID: License Requirements **Control Number:** E 236582
Name: F29 - Devon Sump Assessment **Date Received:** Jul 29, 2005
Location: F29 - Mackenzie Delta **Date Reported:** Aug 18, 2005
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Routine Water (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
pH		6.90	6.90	6.83	6.97	✓
Electrical Conductivity	dS/m at 25 C	0.078	0.076	0.070	0.081	✓
Chloride	mg/L	14.9	14.9	13.2	16.6	✓
Nitrate - N	mg/L	0.51	0.50	0.44	0.56	✓
Nitrite - N	mg/L	0.518	0.495	0.437	0.553	✓
P-Alkalinity	mg/L	52	54	20	88	✓
T-Alkalinity	mg/L	133	127	118	136	✓
Material Used:	Water Low					
Date Acquired:	Jul 29, 2005					
Acquired By:	Annva Hundal					



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Salinity

Blanks	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	<0.2	0.4	-0.5	1.3	✓
Magnesium	mg/L	<0.2	0.1	-0.3	0.5	✓
Sodium	mg/L	<1	3	-2	8	✓
Potassium	mg/L	<1	0	0	1	✓
Chloride	mg/L	<1	0	-1	2	✓
Sulfate-S	mg/L	<1	0	0	0	✓

Material Used: Edmonton Method Blank
 Date Acquired: Aug 01, 2005
 Acquired By: Fernando Maclalang

Replicates	Units	Replicate1	Replicate2	% RSD Criteria	Absolute Criteria	Passed QC
pH	pH	7.6	7.6	0.3	0.3	✓
Electrical Conductivity	dS/m at 25 C	12.8	13.2	9.99	0.01	✓
Calcium	mg/kg	47.6	47.3	10.0	0.6	✓
Sodium	mg/kg	42	43	10	1	✓
Potassium	mg/kg	820	790	10	1	✓
Chloride	mg/kg	79	78	10	1	✓
Sulfate-S	mg/kg	18	18	10.0	1.2	✓

Material Used: Edmonton Duplicate
 Date Acquired: Aug 01, 2005
 Acquired By: Fernando Maclalang



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Control Number: E 236582
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Salinity (Continued...)

Control Sample	Units	Measured	Mean	Lower Limit	Upper Limit	Passed QC
pH	pH	7.6	7.7	7.5	7.8	✓
Electrical Conductivity	dS/m at 25 C	16.5	16.50	14.37	18.63	✓
% Saturation	%	71	75	68	82	✓
Calcium	mg/L	422	442.0	337.3	546.7	✓
Magnesium	mg/L	95	95.8	71.4	120.3	✓
Sodium	mg/L	3770	3792	3063	4521	✓
Potassium	mg/L	10	0	0	0	✓
Chloride	mg/L	6380	6185	4637	7733	✓
Sulfate-S	mg/L	80	85	64	106	✓
Material Used:	2003 Salinity Standard					
Date Acquired:	Aug 01, 2005					
Acquired By:	Fernando Maclalane					
Calcium	mg/L	250.0	225.0	225.0	275.0	✓
Magnesium	mg/L	100.00	90.01	109.99	109.99	✓
Sodium	mg/L	250.0	225.0	225.0	275.0	✓
Potassium	mg/L	250.0	225.0	225.0	275.0	✓
Chloride	mg/L	2087.0	1875.2	1875.2	2298.8	✓
Sulfate-S	mg/L	50.0	45.0	45.0	55.0	✓
Material Used:	Metals High					
Date Acquired:	Jul 29, 2005					
Acquired By:						

Methodology and Notes

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Method of Analysis:

MethodName	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Conductivity - Laboratory Method, 2510 B	2-Aug-05	Norwest Labs Edmonton
Alkalinity, pH, and EC in water	APHA	* Electrometric Method, 4500-H+ B	2-Aug-05	Norwest Labs Edmonton
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- E	2-Aug-05	Norwest Labs Edmonton
Metals ICP-MS (Dissolved) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	2-Aug-05	Norwest Labs Edmonton
Metals ICP-MS (Hot Block) in soil	SW-846	* Acid Digestion of Sediments, Sludges, and Soils, EPA 3050B	2-Aug-05	Norwest Labs Edmonton
Metals ICP-MS (Total) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	3-Aug-05	Norwest Labs Edmonton
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	1-Aug-05	Norwest Labs Edmonton
Metals Trace (Total) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	3-Aug-05	Norwest Labs Edmonton
Microtox-1:1 Soil 15 Minute Multiple Concentration Bioassay	Environment Canada	* Biological Test Method: Toxicity Test Luminescent Bacteria, 1/RM/24	2-Aug-05	Norwest Labs Edmonton
Microtox-1:1 Soil 15 Minute Multiple Concentration Bioassay	Environment Canada	* Biological Test Method: Toxicity Test Luminescent Bacteria, 1/RM/24	3-Aug-05	Norwest Labs Edmonton
Microtox-1:1 Soil 15 Minute Multiple Concentration Bioassay	Environment Canada	* Biological Test Method: Toxicity Test Luminescent Bacteria, 1/RM/24	3-Aug-05	Norwest Labs Edmonton
Microtox-Charcoal 15 Minute Multiple Concentration Bioassay	Environment Canada	* Biological Test Method: Toxicity Test Luminescent Bacteria, 1/RM/24	3-Aug-05	Norwest Labs Edmonton
Moisture	Carter	* Gravimetric Method with Oven Drying, 51.2	30-Jul-05	Norwest Labs Edmonton
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	2-Aug-05	Norwest Labs Edmonton
Oil in soil by Dean-Stark	Dean-Stark	* Determination of the Bitumen, Water and Solids in Oil Sand, ACOSA	2-Aug-05	Norwest Labs Edmonton
Saturated Paste in General Soil	McKeague	* EC of Saturated Soil Paste, 4.13	1-Aug-05	Norwest Labs Edmonton
Saturated Paste in General Soil	McKeague	* EC of Saturated Soil Paste, 4.13	2-Aug-05	Norwest Labs Edmonton
Saturated Paste in General Soil	McKeague	* pH of Saturated Soil Paste, 3.14	1-Aug-05	Norwest Labs Edmonton
Saturated Paste in General Soil	McKeague	* pH of Saturated Soil Paste, 3.14	2-Aug-05	Norwest Labs Edmonton
Saturated Paste in General Soil	McKeague	* Soluble Salts in Saturation Extract, 3.21	1-Aug-05	Norwest Labs Edmonton
Saturated Paste in General Soil	McKeague	* Soluble Salts in Saturation Extract, 3.21	2-Aug-05	Norwest Labs Edmonton

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Fax: (780) 438-0396

Bill to: Devon Canada Corporation
Report to: Devon Canada Corporation
 2000, 400-3 Ave SW
 Calgary, AB, Canada
 T2P 4H2
 Attn: Pete Millman
 Sampled By: David Wells
 Company: IEG

Project
ID: License Requirements
Name: F29 - Devon Sump Assessment
Location: F29 - Mackenzie Delta
LSD:
P.O.:
Acct. Code:

NWL Lot ID: **398310**
 Control Number: E 236582
 Date Received: Jul 29, 2005
 Date Reported: Aug 18, 2005
 Report Number: 727851

Page: 37 of 37

Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	2-Aug-05	Norwest Labs Edmonton
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* Norwest method(s) is based on reference method

References:

APHA	Standard Methods for the Examination of Water and Wastewater
Carter	Soil Sampling and Methods of Analysis
Dean-Stark	ACOSA Reference Method
Environment Canada	Toxicity Test Using Luminescent Bacteria
McKeague	Manual on Soil Sampling and Methods of Analysis
SW-846	Test Methods for Evaluating Solid Waste
US EPA	US Environmental Protection Agency Test Methods

Comments:

Added MTX5 and DS1 to sample 14. due Aug. 3

- Sample 1 Sample 1 formed an emulsion during oil and grease analysis extraction. Centrifugation was required in order to complete analysis.
- 2 Sample 2 formed an emulsion during oil and grease analysis extraction. Centrifugation was required in order to complete analysis.
- 3 Sample 3 formed an emulsion during oil and grease analysis extraction. Centrifugation was required in order to complete analysis.
- 4 Sample 4 formed an emulsion during oil and grease analysis extraction. Centrifugation was required in order to complete analysis.

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted

The test report shall not be reproduced except in full, without the written approval of the laboratory

Appendix C

NORTHERN DRILLING SUMPS FIELD ASSESSMENT FORM

IEG / Komex International Ltd.

LOCATION – LAT/LONG, NAD		SITE NUMBER	F-29
SUMP OPERATOR	Devon Canada	PROJECT NUMBER	IEG - 20212
ASSESSMENT DATE	August 25/2005	ASSESSOR(S)	David Wells
LAND OWNERSHIP	Crown / <small>Private</small>		
SUMP TYPE	Drilling Mud		

RECORDS REVIEW

DRILLING DATE / WELL DEPTH	Drilled: _____ (d/m/y)	Well Depth: _____ m
SUMP LOCATION / SIZE	NE / NW / SE / SW / NC / SC / Unknown	Size: _____ m x _____ m
MUD TYPE / VOLUME	Salt / Hydrocarbon / GelChem / Water	Volume: _____ m ³
SUMP CONSTRUCTION SEASON / CLOSURE DATE	Winter / Spring / Summer / Fall / Unknown	Closed: _____ (d/m/y)
SUMP CONSTRUCTION DEPTH	< 1 m / 1 m to 3 m / > 3 m	
SUMP CAP THICKNESS	< 1 m / > 1 m	
PREVIOUS ASSESSMENT WORK	Site Visit / Geophysical Survey / Soil & Water Sampling / Historical Spills	
ORIGINAL SITE INFRASTRUCTURE	Wellhead / Sump / Construction Camp / Tankage / Pilings / Fuel Storage / Other (specify) _____	

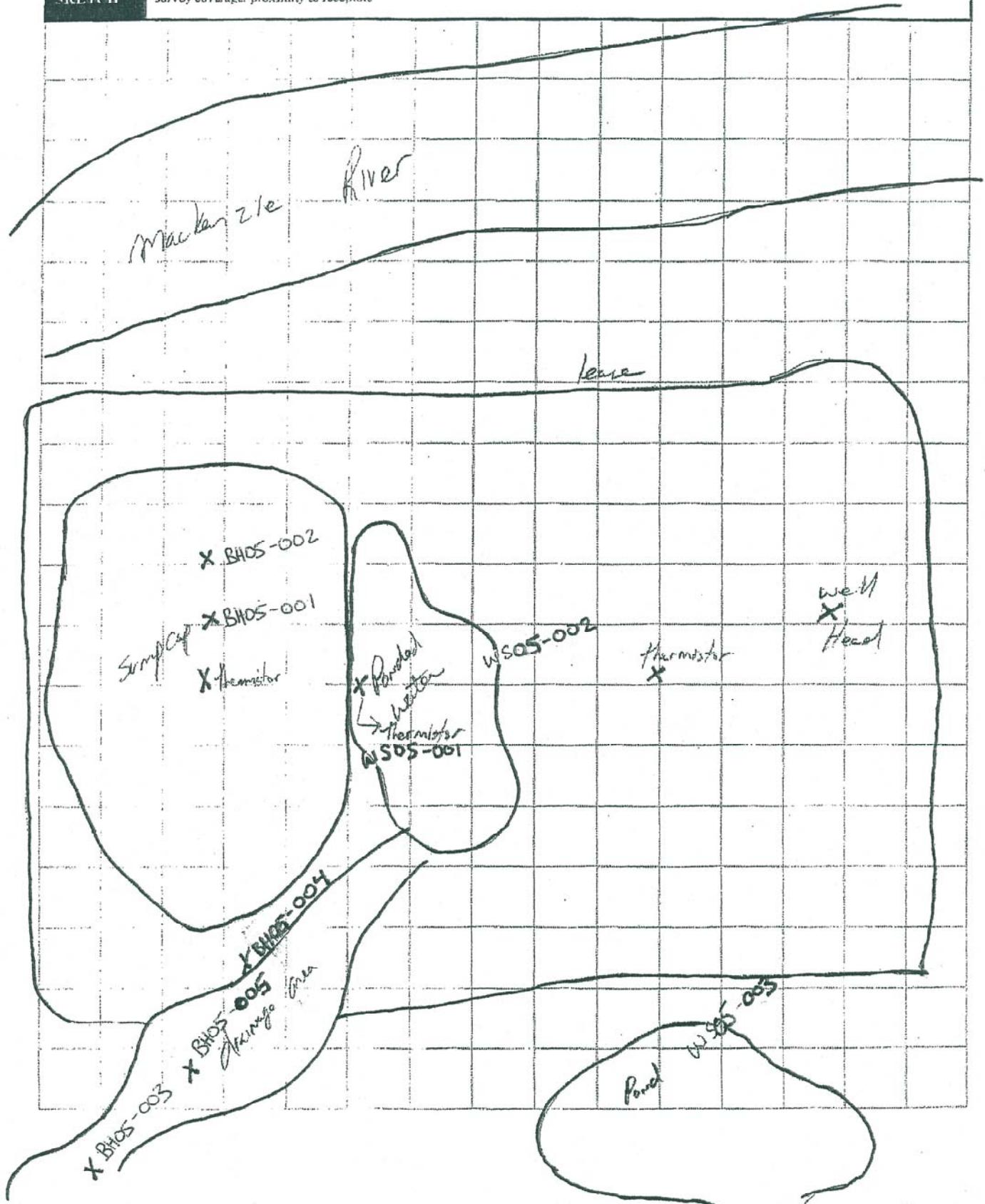
SITE DESCRIPTION

CURRENT SITE INFRASTRUCTURE	Wellhead / Debris / Gravel Pads / Berms / Pilings / Ponds
BERMED AREAS DESCRIPTION	Location: _____ Areal Extent: _____ m x _____ m
GRAVEL PADS	Location: _____ Areal Extent: _____ m x _____ m
SUMP VEGETATION TYPE / COVER	Shrubs / Forbs / Grass / Mosses & Lichens Cover: <10% / 10-25% / 25-50% / >50%
SUMP VEGETATION SPECIES	
BACKGROUND VEGETATION TYPE / COVER	Shrubs / Forbs / Grass / Mosses & Lichens Cover: <10% / 10-25% / 25-50% / >50%
BACKGROUND VEGETATION SPECIES	
VEGETATION STRESS DESCRIPTION	Species: _____ Areal Extent: _____ m x _____ m
SUMP SLUMPING / SUBSIDENCE	None observed / Minor subsidence / Collapsed with surface water ponding
SUBSIDENCE DESCRIPTION	Depth of subsidence below ground surface: _____ m Areal extent of subsidence: _____ m x _____ m
SURFACE WATER PONDING	No. of locations: _____ Land area affected: _____ m ² Depth of water: <1.5 m / >1.5 m
LEASE PONDING	No ponding / Minor (0-5%) / Moderate (5-20%) / Significant (>20%) Depth of water: <1.5 m / >1.5 m
SUMP PONDING	No ponding / Minor (0-20%) / Moderate (20-50%) / Significant (>50%) Depth of water: <1.5 m / >1.5 m
LOCAL PHYSIOGRAPHY	Flat / Hummocky / Inclined / Terraced
SUMP TOPOGRAPHIC LOCATION	Topographic high or flat terrain / Mid-slope / Depression
SURFACE DRAINAGE	N / S / E / W / NE / NW / SE / SW / RADIAL
SOIL TYPE	Fine grained / Medium grained / Coarse grained / Organic
SURFACE SOIL STAINING	Salt None observed / Observed over < 20% of site / Observed over > 20% of site
	Hydrocarbon None observed / Observed over < 20% of site / Observed over > 20% of site
	Iron None observed / Observed over < 20% of site / Observed over > 20% of site
SURFACE EROSION	None observed / Observed over < 20% of site / Observed over > 20% of site
WATER RECEPTORS	Wetland / Pond / Creek / Stream / River / Lake / None
DISTANCE & DIRECTION TO WATER RECEPCTORS (m)	
DISTANCE & DIRECTION TO RESIDENCE / CABIN (m)	

SITE
SKETCH

Show site infrastructure, areas of water ponding, erosion, soil staining, vegetation stress, sampling locations, geophysical survey coverage, proximity to receptors

↑N



FIELD SAMPLING					
Type	Location	Sample ID	Depth (m)	EC (uS/m)	Analytical Parameters
EM 38					
EM 31					
ERT					
SOIL	Control / Background	BH05-008	0, 0.47, 0.65	-	HC / SALINITY / METALS / TEXTURE / MOISTURE
	Sump Cap	BH05-001	0, 0.75, 1.1	-	HC / SALINITY / METALS / TEXTURE / MOISTURE
	Sump Cap	BH05-002	0, 0.65, 1.05	-	HC / SALINITY / METALS / TEXTURE / MOISTURE
	Off Lease Spill Area	BH05-003	0, 0.50, 0.78	-	HC / SALINITY / METALS / TEXTURE / MOISTURE
	Off Lease Spill Area	BH05-004	0, 0.30, 0.65	-	HC / SALINITY / METALS / TEXTURE / MOISTURE
	Off Lease Spill Area	BH05-005	0, 0.5, 0.78	-	HC / SALINITY / METALS / TEXTURE / MOISTURE
	Off Lease Spill Area	BH05-006	0, 0.43	-	HC / SALINITY / METALS / TEXTURE / MOISTURE
	Off Lease Spill Area	BH05-007	0, 0.63	-	HC / SALINITY / METALS / TEXTURE / MOISTURE
WATER	Control / Background				POTABILITY / TSS / METALS / HC
	Pooled Water	WS05-001	0.05	1274 µS/m pH 7.01	POTABILITY / TSS / METALS / HC
	Pooled Water	WS05-002	0.05	1306 µS/m pH 7.54	POTABILITY / TSS / METALS / HC
	Background	WS05-003	0.05	315 µS/m pH 7.87	POTABILITY / TSS / METALS / HC
	Background	WS05-004	0.05	-	POTABILITY / TSS / METALS / HC
					POTABILITY / TSS / METALS / HC
VEGETATION	Control / Background				
	Sump Cap Area				

ACTIVE LAYER MEASUREMENTS (m)		5 points on sump cap 20 points around sump cap perimeter (5 on each side) 15 points on lease 15 points in undisturbed terrain (background)						
	SUMP CAP	CAP PERIMETER NORTH	CAP PERIMETER SOUTH	CAP PERIMETER EAST	CAP PERIMETER WEST	LEASE AREA	BACKGROUND	
1	0.98	0.64	0.76	0.50	0.67	0.57	0.32	
2	1.0	0.63	0.77	0.79	0.76	0.61	0.37	
3	0.84	0.53	0.73	0.79	0.63	0.33	0.38	
4	0.92	0.86	0.70	0.86	0.64	0.31	0.31	
5	0.87	0.67	0.60	0.77	0.71	0.36	0.33	
6						0.49	0.52	
7						0.35	0.45	
8						0.43	0.75	
9						0.43	0.34	
10						0.38	0.62	
11						0.37	0.39	
12						0.39	0.51	
13						0.34	0.31	
14						0.32	0.33	
15						0.41	0.27	

PHOTOS		NOTE: Aerial view of the Site and all Issues must have a representative photo.
AERIAL PHOTOGRAPHS		DIGITAL OR FILM / FRAME#/ANNOTATION
Elevation ____ m	GPS _____	NAD ____
Elevation ____ m	GPS _____	NAD ____
Elevation ____ m	GPS _____	NAD ____
Elevation ____ m	GPS _____	NAD ____
Elevation ____ m	GPS _____	NAD ____
Elevation ____ m	GPS _____	NAD ____
Elevation ____ m	GPS _____	NAD ____
GROUND PHOTOGRAPHS		DIGITAL OR FILM / FRAME#/ANNOTATION
GPS _____	NAD ____	

COMMENTS

Sump crusting and staining on sump cap and near perimeter of sump. Dead vegetation (willows) present on drainage to the SW. Lease area is revegetated with low shrubs and grasses.