



PROJECT: **Limited Remedial Excavation
Northeast Parking Lot, 321 Avenue C North
Saskatoon, Saskatchewan**

PREPARED FOR: **The City of Saskatoon**





23 February 2015

File: 15-1544-2

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The City of Saskatoon
Major Projects Division, Transportation and Utilities
Saskatoon, SK S7K 0K1

Attention: Mr. Rob Tomiyama; Project Manager

**Subject: Limited Remedial Excavation
Northeast Parking Lot, 321 Avenue C North
Saskatoon, Saskatchewan**

Please find attached one copy of the Limited Remedial Excavation report for the above mentioned property located in Saskatoon, Saskatchewan.

If you have any questions or concerns regarding our findings, please do not hesitate to contact the undersigned at: (306)-244-1710.

Yours Sincerely
PINTER & Associates Ltd.

A handwritten signature in blue ink, appearing to read "Ryan Riess", is written over the company name.

Ryan Riess, M.Sc., P.Eng.
Project Manager – Environmental Services

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**Limited Remedial Excavation
Northeast Parking Lot of 321 Avenue C North
Saskatoon, Saskatchewan**

**Prepared For:
THE CITY OF SASKATOON**

**Prepared By:
PINTER & ASSOCIATES LTD.**

**23 February 2015
File: 15-1544-2**

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Executive Summary

The City of Saskatoon retained PINTER & Associates Ltd. (PINTER) to perform confirmatory sampling for the remedial excavation of a portion of the northeast transit staff parking lot, located at 321 Avenue C North, Saskatoon, Saskatchewan (SK) (Site). The limited remedial excavation was performed in response to the Limited Phase II Environmental Site Assessment (ESA) carried out by PINTER in August of 2014.

The scope of work included PINTER observing and documenting the excavation of petroleum hydrocarbon affected soils from the Site. The excavation took place on 14 January 2015. A concrete pad was uncovered beneath the eastern portion of the excavation, approximately 0.1 m below ground surface (bgs). The western portion of the excavation was advanced to a maximum depth of 0.3 m bgs.

Confirmatory soil samples and a sample of the backfill material were collected and submitted from the excavation extents for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX) and Petroleum Hydrocarbon (PHC) Fractions F1 (C₆ to C₁₀), F2 (C₁₀ to C₁₆), F3 (C₁₆ to C₃₄), and F4 (C₃₄ to C₅₀). Submitted samples did not contain PHC concentrations above the laboratory method detection limit and/or the applicable regulatory guidelines.

In total, approximately 8 cubic metres (m³) of soil was excavated from the area. The material was transferred into impermeable soil bags that are being stored on the Site. The excavation was backfilled with clean fill.

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1.0 INTRODUCTION

The City of Saskatoon retained PINTER & Associates Ltd. (PINTER) to provide supervision and direction of a limited remedial excavation in the northeast parking lot located at 321 Avenue C North in the city of Saskatoon, SK (Site). A Phase II ESA completed by PINTER in August of 2014 identified petroleum hydrocarbon (PHC) impacted surficial soils in the southeast portion of the transit staff parking lot. Figure 1, Appendix A presents the location of the Site.

Appendix B presents a Glossary of Terms and Abbreviations to aid in the interpretation of this report.

1.1. SCOPE OF WORK

The scope of work included the following:

- Locate underground utilities and service connections.
- Observe completion of remedial excavation at the Site.
- Collect soil samples from the excavation extents and the backfill used for submission of confirmatory laboratory analysis.
- Prepare a report documenting the findings of the remedial excavation.

1.2. SITE DESCRIPTION

The Site consisted of a parking lot located south of the City of Saskatoon Transit maintenance building. Figure 2, Appendix A presents the site layout. Appendix C, presents select site photographs.

Adjacent property use includes residential and industrial. Table A presents a summary of adjacent land uses.

TABLE A: Summary of Site and Surrounding Area Land Use

Direction from Site	Present Land Use
Site	Industrial
North	Residential
South	Industrial
East	Industrial and Residential
West	Residential

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1.2.1. Surface Water and Topography

The nearest surficial water body is the South Saskatchewan River, approximately 1,000 m south of the Site. The topography of the Site is generally flat though the area north does rise in elevation toward 33rd Street. The property located at 316 Avenue C North, east of the Site, has a gentle slope to the west towards Avenue C North.

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2.0 METHODOLOGY

PINTER was on Site to supervise the limited remedial excavation on 14 January 2015. Globe Excavating 2008 (Globe) was contracted by the City of Saskatoon to provide equipment, personnel, and soil transportation services. Globe carried out all remedial excavation activities on Site.

2.1. SITE SPECIFIC HEALTH AND SAFETY

Prior to the commencement of the excavation and sampling activities on 14 January 2015, PINTER completed a Site-Specific Health and Safety Assessment to identify on-Site hazards and project health and safety requirements. A Daily Safe Work Permit was completed for each day PINTER was on Site, and was discussed with on-site personnel. Globe followed their company health and safety program for the duration of the Site work.

2.2. WATER WELL SEARCH

A water well search was conducted on 06 February 2015 by reviewing the Saskatchewan Water Security Agency (SWSA) online water well database (SWSA, 2015). The search includes all registered groundwater wells and test holes potentially located within 1,000 m of the Site; however not all well records may be included in the database. The current status of the registered wells was not field-verified under the scope of this investigation.

2.3. SOIL LOGGING AND SAMPLING

Each soil sample collected during excavation activities was characterized in detail using the Unified Soil Classification System (USCS) with respect to soil type, colour, texture, consistency, moisture and potential PHC impacts.

A portion of each soil sample collected was placed in laboratory supplied 125 mL glass jars equipped with Teflon© lined lids with zero headspace for potential laboratory analysis. The sample jars were labeled according to a pre-determined sample identification protocol and kept cool in an ice-chilled cooler until the samples were transferred to the laboratory.

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A second portion of each soil sample was placed and sealed in a polyethylene laboratory grade soil bag with equal volume headspace for combustible vapour concentration (CVC) screening. The bagged samples were warmed to ambient temperature before CVC analysis. The ambient headspace inside the bags was then measured with an RKI Eagle vapour analyzer operating in methane elimination mode and calibrated to a known hexane standard. Table 1, Appendix D presents the soil sample log with recorded CVCs.

2.4. REMEDIAL EXCAVATION

Prior to the commencement of ground disturbance activities, underground utility locates were requested by PINTER from Saskatchewan 1st Call, which included services provided by SaskTel and SaskEnergy. Saskatoon Light and Power, City of Saskatoon Sewer and Water, and Shaw Cable were also contacted to confirm they were devoid of any underground utilities on-site. Magna Electric Corporation (Magna) of Saskatoon, SK was commissioned to locate private underground utilities. The approximate extent of the excavation was identified to be clear of underground utilities. Magna however located a series of underground lines that were previously determined to be historical trolley tracks.

The excavation of PHC impacted soil was observed by PINTER personnel and was completed by the Globe on 14 January 2015. Globe utilized a John Deere 85D midsize excavator, loader, and truck to complete remedial excavation activities.

2.4.1. Soil Sampling

Representative soil samples were collected every 1.5 m horizontally across the excavation base for field screening of CVCs and possible laboratory submission. A sample of the fill used for backfilling the excavation was also collected for laboratory submission.

Figure 3, Appendix A presents the excavation extents.

2.4.2. Backfilling

Following the results of field screening, backfilling of the excavation was completed by Globe.

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The excavation extents and sample locations were surveyed horizontally and vertically with a Hemisphere S320 GNSS GPS Survey Receiver system. Major site features were also surveyed to aid in the development of site drawings.

2.6. QUALITY ASSURANCE AND QUALITY CONTROL

A QA/QC program was implemented during soil and groundwater sampling to minimize and quantify potential impacts introduced during sample collection, handling, shipping and analysis.

As part of the QA/QC program, sampling protocols included; minimizing sample handling, using dedicated clean sampling equipment, sample specific identification and labeling procedures and utilizing laboratory provided Chain-of-Custody (COC) records.

Blind duplicate samples of soil and groundwater were submitted for laboratory analysis to assess potential sampling or laboratory error. For duplicate samples, the Relative Percent Difference (RPD) is calculated to assess the closeness of the results from the two (2) samples. RPDs are calculated as follows:

$$\text{Where, } \text{RPD (\%)} = 100\% \times \text{ABS (X - Y)} / [(X + Y)/2]$$

X = the concentration of the original sample

Y = the concentration of the blind field duplicate sample

Laboratory QA/QC measures included analysis of laboratory blank, spiked blank, duplicate, matrix spike, and laboratory control samples.

Acceptable RPD values for various parameters are presented in Table B.

TABLE B: Relative Percent Difference Reference Values

Parameter Category	Acceptable Relative Percent Difference (Applicable at Concentrations > 5x MDL)
Organics in Soil and Sediment	
Polycyclic Aromatic Hydrocarbons (PAH)	75%
Volatile organics (including BTEX and VH)	60%
Extractable Petroleum Hydrocarbons (EPH)	60%
Most Other Typical Organic Parameters	60%
Organics in Water	
Volatile Organics (including BTEX and VH)	45%

CONFIDENTIAL**TABLE B: Relative Percent Difference Reference Values**

Parameter Category	Acceptable Relative Percent Difference (Applicable at Concentrations > 5x MDL)
Most other Typical organic Parameters	45%
Metals in Soil and Sediment	
High variability metals: Ag, Al, Ba, Hg, K, Mo, Na, Pb, Sn, Sr, Ti	60%
Other metals	45%
Metals in Water	30%
General Inorganics in Soil and Sediment	45%
General Inorganics in Water	30%

MDL = Method Detection Limit

2.7. LABORATORY ANALYSIS**2.7.1. Applicable Regulatory Guidelines**

Industrial guidelines are applicable to the Site, however due to the close proximity of residential properties, a 30 m residential buffer was applied to the Site. All soil samples were collected outside of the residential buffer zone and were therefore compared to industrial guidelines. The provincial regulatory guidelines used to compare the results of the laboratory analyses included the following:

- Saskatchewan Ministry of Environment (SMOE) Saskatchewan Environmental Quality Guidelines, Tier 1 Soil Guidelines for Coarse-Grained Soil, Industrial Land Uses (SMOE, 2015).

2.7.2. Soil

Based on the results of the field screening and visual observation, four soil samples, including one blind duplicate for quality assurance/quality control (QA/QC) purposes, were selected and submitted for laboratory analysis of BTEX, and PHC Fractions F1 to F4. One sample of the backfill material was submitted for laboratory analysis of BTEX, and PHC Fraction F1 to F4 and one soil sample was also submitted for particle size determination. All samples were submitted to ALS Canada Limited (ALS) Laboratories located in Saskatoon, SK. ALS's Saskatoon laboratory is accredited by the Canadian Association for Laboratory Accreditation (CALA).

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3.0 RESULTS

3.1. WATER WELL SEARCH

A total of eleven water well records were identified within the search area: one for domestic withdrawal, six for industrial withdrawal, three research test holes, and one domestic test hole. The completion dates for the wells ranged from 1929 to 1987. The water well completion depths ranged between 7.9 to 118.3 m bgs. Static water levels were reported in six wells and ranged from 1.8 to 17.4 m bgs. Table 1, Appendix D presents a summary of the water well search results. Appendix E presents copies of the water well driller reports.

3.2. SITE STRATIGRAPHY

The eastern portion of the excavation was underlain by a shallow concrete pad, located approximately 0.1 m bgs. Field observations and soil classification of samples collected from the western portion of the excavation consisted of a gravel/sand fill layer. Soil descriptions can be found in the excavation log located in Table 2, Appendix D.

3.3. REMEDIAL EXCAVATION

Excavation on the Site was advanced in an effort to remove the extent of PHC impacted soils. The western portion of the excavation was excavated to a maximum depth of 0.3 m bgs. Figure 2, Appendix A presents the actual excavation extents.

A total of approximately 8 cubic metres (m³) of fill material was removed from the excavation and transferred to impermeable soil bags. The bags are being stored on Site.

During the excavation, three pieces of trolley track were uncovered and removed from the excavation. The tracks were collected for disposal by Globe.

3.4. LABORATORY ANALYTICAL RESULTS

Appendix F presents the Certificate of Analysis (COA) from ALS for the soil samples.

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3.4.1. Petroleum Hydrocarbons

Table 3, Appendix D and Figure 3, Appendix A present laboratory analytical results for soil samples submitted for BTEX and PHC Fractions F1 to F4.

All confirmatory soil samples and backfill samples were below the laboratory detection method limits (MDL) and/or the applicable guidelines for BTEX and PHC Fractions F1 to F4.

3.4.2. Particle Size Analysis

Table 4, Appendix D presents the analytical results of the soil sample submitted for grain size analysis.

The sample submitted for grain size analysis was classified as coarse grained. Coarse grained soils will govern contaminant migration on the Site; consequently the coarse grained guidelines were applied to the Site.

3.5. QUALITY ASSURANCE/QUALITY CONTROL

3.5.1. RPDs for Soil

RPDs for soil were calculated for soil sample DUPL (duplicated of NE3) for PHC Fractions F3 and F4 where measured concentrations were greater than five times the laboratory MDL.

The RPDs for QA/QC were within acceptable limits with the exception of PHC Fraction F3 in sample DUPL (duplicate of NE3) with a result of 65.4%. The elevated RPD could be attributed to sample heterogeneity when the soil is divided into multiple jars. The results are considered reliable.

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4.0 CONCLUSIONS

The results of the limited remedial excavation completed in the northeast parking lot of 321 Avenue C North, in Saskatoon, SK are summarized below:

- The eastern portion of the excavation was underlain by a shallow concrete pad. Stratigraphy observed in the western portion of the excavation consisted of gravel and sand fill to the maximum depth of approximately 0.3 mbgs.
- Approximately 8 m³ of soil was excavated from the Site.
- Excavated soil was transferred into impermeable soil bags which are being stored on the Site.
- Confirmatory soil samples and backfill samples submitted for laboratory analysis of BTEX and PHC Fractions F1 to F4 were below the laboratory method detection limit (MDL) and/or the applicable guidelines for coarse-grained soils protective of industrial land use.
- The Site was backfilled with clean fill by the contractor on 14 January 2015.

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5.0 REFERENCES

PINTER & Associates Ltd. 2014. *Phase I Environmental Site Assessment, Caswell Transit Operations Site, Saskatoon, Saskatchewan.*

PINTER & Associates Ltd. 2014. *Phase II Environmental Site Assessment, Caswell Transit Operations Site, Saskatoon, Saskatchewan.*

Saskatchewan Ministry of Environment. 2015. Saskatchewan Environmental Quality Guidelines. Available at <http://envonline.gov.sk.ca/seqg-search/> [accessed 27 January 2015].

Saskatchewan Water Security Agency. 2015. Online Water Well Information Database. Available at: <https://gis.wsask.ca/> [accessed 06 February, 2015]

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6.0 LIMITATIONS

In conducting this investigation on Subject Property and in rendering our findings and conclusions on the presence and/or level of impacts present, PINTER & Associates Ltd. gives the benefit of its best judgment based on its experience and in accordance with generally accepted professional standards for this type of assessment. Our conclusions are limited by the following:

- The agreed scope of work requested to be undertaken;
- It was not feasible to sample or test for chemical constituents at each and every location on the site. Site-specific criteria were used during sampling and testing and are thought to be representative of present site conditions;
- Snow cover limited visual observation of exterior surfaces and the ground on the Site.
- Our conclusions are drawn from the information provided to PINTER & Associates Ltd., in whole or in part, during the course of this environmental site investigation and have been included in this report.

Performance of a standardized environmental site assessment is intended to reduce, but not wholly eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with the property, given reasonable limits of time and cost.

PINTER will not be responsible or held liable for any existing contamination or adverse impacts on the study area that have not been caused by its activities. Actions at the Subject Property without PINTER's knowledge may influence the environmental status of the property. No warranty, expressed or implied is given concerning the current environmental condition of the Subject Property following the submission of the original report dated 23 February 2015.


No warranty, expressed or implied, is given concerning chemicals of concern at the Subject Property. This report has been prepared for the exclusive use of *The City of Saskatoon*. Without any mitigation or remediation the contaminant conditions on the Subject Property can change from that described in this report. Any use that a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. PINTER & Associates Ltd. accepts no responsibility for damages, if any suffered by any third party, as a result of decisions made or actions based on this report.

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7.0 CLOSURE

This report has been prepared by PINTER & Associates Ltd. for the exclusive use of the City of Saskatoon, pursuant to the Limitations presented in Section 8.0.

PINTER & Associates Ltd.



Jessica Cutter, M.Sc.
Project Scientist



Ryan Riess, M.Sc., P. Eng.
Project Manager
Environmental Services

23 February 2015

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Association of Professional Engineers & Geoscientists of Saskatchewan		
CERTIFICATE OF AUTHORIZATION		
Pinter & Associates Ltd.		
Number C1232		
Permission to Consult held by:		
Discipline	Sk. Reg. No.	Signature
<u>Eau</u>	<u>13853</u>	<u>[Signature]</u>
_____	_____	_____

Appendix A

Figures



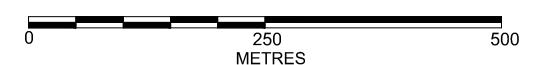
710A-48TH STREET EAST
SASKATOON SK S7K 5B4
306.244.1710
pintermain@pinter.ca

NOTES:

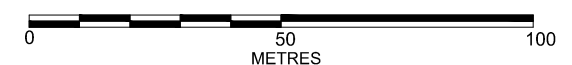
1. IMAGE SOURCE FROM CITY OF SASKATOON IMAPS, IMAGE DATED 2011 (ACCESSED FEBRUARY 2015).
2. MAP FROM NATURAL RESOURCES CANADA GEOGRATIS, PUBLISHED 19 JULY 2013.
3. THIS DRAWING IS PREPARED FOR ILLUSTRATIVE PURPOSES ONLY.

LEGEND

SUBJECT PROPERTY - APPROXIMATE LOCATION - - - -



SCALE: 1: 8,000



SCALE: 1: 1,500
FILE: H:\PROJECTS\ 1544-2 PHS II ESA, 321 AVE CN CASWELL TRANSIT SITE, SASKATOON, SK, \ 1544-2 DRAWINGS

FIGURE 1
SUBJECT PROPERTY LOCATION

03 FEBRUARY 2015
1544-2 PHS II ESA, 321 AVE CN CASWELL TRANSIT SITE, SASKATOON, SK.

DRAWN BY: NA
CHECKED BY: JC



710A-48TH STREET EAST
SASKATOON SK S7K 5B4
306.244.1710
pintermain@pinter.ca

NOTES:

1. IMAGE SOURCE FROM CITY OF SASKATOON IMAPS, IMAGE DATED 2011 (ACCESSED FEBRUARY 2015).
2. THIS DRAWING IS PREPARED FOR ILLUSTRATIVE PURPOSES ONLY.
3. THIS IS NOT A LEGAL SURVEY.
4. ALL MEASUREMENTS ARE IN METRES.
5. LOCATIONS OF ALL MARKED UTILITIES ARE APPROXIMATE.

LEGEND

- SUBJECT PROPERTY - APPROXIMATE LOCATION - - - -
- EXCAVATION SAMPLE ●
- MONITORING WELL (JUNE 2014) ⊕

- CONCRETE PAD
- EXCAVATION EXTENTS —



SCALE: 1: 500

FILE: H:\PROJECTS\ 1544-2 PHS II ESA, 321 AVE CN CASWELL TRANSIT SITE, SASKATOON, SK. \ 1544-2 DRAWINGS

FIGURE 2
SUBJECT PROPERTY LAYOUT

03 FEBRUARY 2015
1544-2 PHS II ESA, 321 AVE CN CASWELL TRANSIT SITE, SASKATOON, SK.

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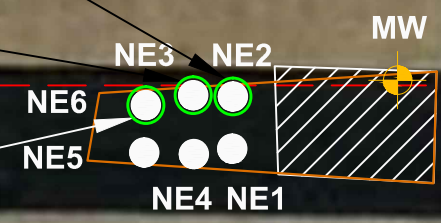
NE2										Date Sampled: 14 January 2015
Depth	CVC	B	T	E	X	F1	F2	F3	F4	
(m bgs)	ppm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
NE2 @ 0.3 m	10	<0.0050	<0.050	<0.010	<0.10	<10	<30	481	220	

NE3										Date Sampled: 14 January 2015
Depth	CVC	B	T	E	X	F1	F2	F3	F4	
(m bgs)	ppm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
NE3 @ 0.3 m	10	<0.0050	<0.050	<0.010	<0.10	<10	<30	1000	1420	

NE6										Date Sampled: 14 January 2015
Depth	CVC	B	T	E	X	F1	F2	F3	F4	
(m bgs)	ppm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
NE6 @ 0.3 m	0	<0.0050	<0.050	<0.010	<0.10	<10	<30	507	804	

30 M BUFFER - RESIDENTIAL GUIDELINES

LINES



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Applicable Guidelines	B	T	E	X	F1	F2	F3	F4
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SMOE 2015 - Industrial	0.078	0.10	0.21	28	240	320	3,400	6,600

SMOE 2015 TIER 1 GUIDELINES - COARSE GRAINED SOILS (BTEX, F1-F4)



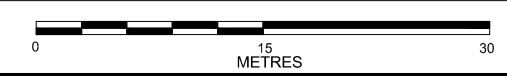
710A-48TH STREET EAST
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4. ALL MEASUREMENTS ARE IN METRES.
5. LOCATIONS OF ALL MARKED UTILITIES ARE APPROXIMATE.
6. SMOE (2015) TIER 1 - RISK-BASED CRITERIA FOR PETROLEUM HYDROCARBONS IN SUBSOILS, COARSE-GRAINED, INDUSTRIAL LAND USE.
7. BTEX: B=BENZENE, T=TOLUENE, E=ETHYLBENZENE, X=XYLENES
F1 TO F4 = PETROLEUM HYDROCARBON FRACTIONS F1 TO F4.
8. M BGS = METRES BELOW GROUND SURFACE.
9. CVC = COMBUSTIBLE VAPOUR CONCENTRATION.

LEGEND

- SUBJECT PROPERTY - APPROXIMATE LOCATION ---
- EXCAVATION SAMPLE ●
- MONITORING WELL (JUNE 2014) ★
- CONCRETE PAD
- EXCAVATION EXTENTS



SCALE: 1: 500
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FIGURE 3
DETAILED SOIL ANALYTICAL RESULTS

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1544-2 PHS II ESA, 321 AVE CN CASWELL TRANSIT SITE, SASKATOON, SK.

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CHECKED BY: JC



PINTER
& ASSOCIATES LTD

Appendix B

Glossary of Terms and Abbreviations

CONFIDENTIAL**GLOSSARY OF TERMS AND ABBREVIATIONS**

%LEL	Percent of lower explosive limit – the lowest percent mixture of explosive gases mixed in air that will ignite – these values are read with an explosive gas meter
°C	Degrees Celsius
µg	microgram
Asbestos	Thin fibrous silicate minerals used that have been used historically in building materials such as insulation and ceiling and floor tiles
ACM	Asbestos containing materials
AST	Above ground fuel storage tank
BTEX	Abbreviation that represents the petroleum hydrocarbon contaminants benzene (B), toluene (T), ethylbenzene (E) and xylenes (X). Higher concentrations of BTEX exist in gasoline and light hydrocarbons, and lower concentrations exist in diesel fuel. BTEX concentrations are not present in oils and heavier hydrocarbons
Contaminants	Identified or suspected materials, compounds, chemicals, metals, and other products (usually man made) that may be present in concentrations that exceed the applicable regulatory criteria or guidelines
CCME	Canadian Council of Ministers of the Environment
CVC	Combustible vapour concentration – readings collected using an explosive gas meter on the gases that accumulate in the headspace above a soil sample contained in a plastic bag. The readings are in ppm or %LEL
EC	Electrical conductivity. The ability of a material to conduct an electrical current. For soils, EC provides data on the concentration of various ions and on the soil type
Environmental Borehole	A hole drilled into the ground as part of a Phase II Environmental Site Assessment to collect soil samples, determine soil stratigraphy, and to install groundwater monitoring wells
g	gram
GPR	Ground penetrating radar. A non-destructive method that uses electromagnetic radiation to detect reflected signals from subsurface structures
Groundwater Monitoring Well	A well constructed to provide access to groundwater for collecting groundwater data and samples. The well is carefully constructed in such a manner as to avoid cross contamination between zones of contamination and to avoid interconnecting groundwater from different elevations
ESA	Environmental Site Assessment
F1	The fraction or part of the PHC mixture that contains compounds with the numbers of carbons ranging between C6 and C10
F2	The fraction or part of the PHC mixture that contains compounds with

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	the numbers of carbons ranging between C10 and C16
F3	The fraction or part of the PHC mixture that contains compounds with the numbers of carbons ranging between C16 and C34
F4	The fraction or part of the PHC mixture that contains compounds with the numbers of carbons ranging between C34 and C50
LNAPL	Light non-aqueous phase liquid. A contaminant (for example, gasoline) that is not soluble in water and floats on top of water due to its lower density
Limited Phase II ESA	A Phase II ESA that confirms the presence of contamination but does not determine the vertical or horizontal extent of contamination
NCSCS	The Canadian Council of Ministers of the Environment's (CCME) National Classification System for Contaminated Sites is a method for evaluating contaminated sites according to current or potential adverse impact on human health and the environment. The NCSCS was developed to establish a rational and scientifically defensible system for comparable assessment of contaminated sites across Canada. The NCSCS is an important management tool for prioritizing the investigation and remediation of contaminated sites
m	metres
m bgs	metres below ground surface
MDL	Method detection limit. Refers to the minimum concentration of a contaminant that laboratory equipment can detect.
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
MHz	megahertz
mL	millilitre
Petroleum Hydrocarbons	PHC (see below)
Phase II Delineation	A Phase II ESA that determines the vertical and horizontal extent of contamination
PHC	Petroleum hydrocarbons (hydrocarbons) - compounds that result from the refining of crude oil. Typically these compounds include gasoline, diesel fuel, fuel oil, jet fuels, kerosene, non-synthetic motor and hydraulic oils
PPM	Parts per million - used to communicate the concentration of certain contaminants in soil or water. Milligrams per kilogram, milligrams per litre, and micrograms per gram can be interpreted as ppm
QA/QC	Quality Assurance/Quality Control
SMOE	Saskatchewan Ministry of the Environment
UST	Underground fuel storage tank
WVCR	Well headspace vapour concentration readings. Readings collected using an explosive gas meter on the gases that accumulate in the headspace within a groundwater monitoring well. The readings can be in ppm or %LEL



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Appendix C

Selected Site Photographs



Photo 1: View of the excavation site, looking south. Note the lines indicating the location of historical trolley tracks.



Photo 2: The excavation site. Note the concrete slab uncovered on the eastern portion of the excavation.



Photo 3: The excavation site, looking south.



Photo 4: The monitoring well located on the excavation site.



Photo 5: Soil from the excavation being loaded into soil bags for onsite storage.



Photo 6: Onsite storage of soil bags.



Photo 7: Historical trolley tracks removed from the excavation site.



Photo 8: Backfilled excavation site, looking southwest.



Appendix D

Tables

TABLE 1: Summary of Saskatchewan Water Security Agency Water Well Information Database Search

Record No.	Well Location	Intended Use	Well Properties			Stratigraphic Description
			Water Struck Depth	Screen Interval	Date Installed	
031974	NW-28-036-05-W3M	Research	NA	NA	17 May 1972	Till to 2.4 m, Sand to 8.8 m, Till to 69.5 m, Sand to 76.2 m
031975	NE-29-036-05-W3M	Domestic	9.1 m	NA	07 January 1929	NA
031976	NW-29-036-05-W3M	Industrial	1.8 m	58.9 m to 61.9 m	NA	Sand from 41.5m to 58.8 m
031980	SE-32-036-05-W3M	Research	NA	NA	15 May 1972	Sand to 1.8 m, Till to 40.9 m
031981	SE-32-036-05-W3M	Industrial	15.9 m	54.6 m to 57.6 m	07 January 1960	Till to 17.1 m, Sand @ 17.1 m, Till to 57.6 m
031983	NW-33-036-05-W3M	Industrial	6.1 m	67.1 m to 73.2 m	NA	Clay @ 67.1 m, Sand @ 73.2 m
031985	SW-33-036-05-W3M	Research	NA	NA	14 May 2014	Till to 13.4 m, Gravel @ 14.3m, Till to 71.3 m, Sand & Silt layers to 118 m
031986	SW-33-036-05-W3M	Industrial	4.9 m	71.3 m to 75 m	NA	Alternating Clay and Sand @ 65.9 m
045665	SW-32-036-05-W3M	Domestic	NA	NA	29 November 1975	Till to 41.1 m, Clay to 43.1, Till to 46.9 m, Till @ 84.1 m, Shale @ 91.5 m
052937	SW-33-036-05-W3M	Industrial	17.4 m	79.3 m to 85.4 m	01 January 1957	NA
085026	NW-33-036-05-W3M	Domestic	NA	NA	06 June 1987	Sand to 5.5 m, Silt @ 7.9 m

TABLE 2: Excavation Log

Sample ID	Sample Date (dd mmm yy)	Sample Location (wall/base)	Depth (m)	CVCs (ppm)	Description	Sample Type ^a	Submit	Comments
NE1	13-Jan-15	Base	0.3	0	Sand and gravel fill, light brown, damp	C		Southeast extent of excavation
NE2	13-Jan-15	Base	0.3	10	Sand and gravel fill, light brown, damp	C	Yes	Northeast extent of excavation
NE3	13-Jan-15	Base	0.3	10	Sand and gravel fill, light brown, damp	C	Yes	South center portion of excavation
DUPL	13-Jan-15	Duplicate of NE3	0.3	-	Sand and gravel fill, light brown, damp	C	Yes	
NE4	13-Jan-15	Base	0.3	0	Sand and gravel fill, light brown, damp	C		North center portion of excavation
NE5	13-Jan-15	Base	0.3	0	Sand and gravel fill, light brown, damp	C		Southwest extent of excavation
NE6	13-Jan-15	Base	0.3	0	Sand and gravel fill, light brown, damp	C	Yes	Northwest extent of excavation
FILL	12-Feb-15	-	0.1	0	Sand and gravel fill, light brown, damp	BF	Yes	

^a C = Confirmatory B = Base BF= Backfill

All terms defined in body of PINTER report.

TABLE 3: Summary of Soil Analytical Results - Hydrocarbons

Sample Location	Sample ID	ALS Sample ID	Date Sampled (dd mm yyyy)	Depth Interval (m)	Combustible	Monocyclic Hydrocarbons				Petroleum Hydrocarbon Fractions			
					Vapour Concentration ^a (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	F1-BTEX (C6-C10) (mg/kg)	F2 (>C10-C16) (mg/kg)	F3 (>C16-C34) (mg/kg)	F4 (>C34-C50) (mg/kg)
Method Detection Limit						0.005	0.0500	0.010	0.10	10	30	50	50
NE2	NE2	L1568012-1	14/01/2015	0.30	10	<0.0050	<0.050	<0.010	<0.10	<10	<30	481	220
NE3	NE3	L1568012-2	14/01/2015	0.30	10	<0.0050	<0.050	<0.010	<0.10	<10	<30	1000	1420
DUPL	Duplicate of NE3	L1568012-4	14/01/2015	0.30	-	<0.0050	<0.050	<0.010	<0.10	<10	<30	507	804
NE6	NE6	L1568012-3	14/01/2015	0.30	0	<0.0050	<0.050	<0.010	<0.10	<10	<30	442	612
Backfill	FILL	L1577158-1	12/02/2015	0.10	0	<0.0050	<0.050	<0.010	<0.10	<10	<30	<50	<50

Applicable Guidelines

SMOE - Tier 1 Industrial Coarse-Grained Soils Guidelines ^b	0.078	0.49	0.21	28	240	260	1,700	3,300
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Associated ALS Files L1568012 and L1577158

All terms defined in body of PINTER report.

^a Field screening results are measured using a combustible gas meter calibrated to a hexane standard.

^b Saskatchewan Ministry of Environment (SMOE) Saskatchewan Environmental Quality Guidelines, Tier 1 Guidelines for Coarse Grained Surface Soils, Industrial Land Use (SMOE, 2015)

< Denotes concentrations less than indicated detection limit.

BOLD	Concentration greater than or equal to applicable industrial guidelines.
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TABLE 4: Summary of Soil Analytical Results - Grain Size

Sample Location	Sample ID	ALS Sample ID	Sample Date (mm dd yyyy)	Depth Interval (m)	Field Screen (ppm)	PSA MUST %>75um	Texture
Method Detection Limit						0.1	
NE3	NE3	L1568012-2	20/11/2014	0.3	10	83.4	Coarse

Associated ALS files: L1568012

All terms defined within the body of PINTER's report.



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Appendix E

Water Well Driller Records

SASK RESEARCH COUNCI		Completion	05/17/1972
			RM 344
			Major Basin 06
			SubBasin 30
			NTS Map 73B02
WWDR#	031974		

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	NW	28	036	05	3		
							Location of Well (in Quarter)
							0.00 ft from N/S Boundary
Zone	Easting	Northing	Source	Accuracy			
							0.00 ft from E/W Boundary

Well Information							
Driller #	HAYTER DRILLING LTD						
Water Use	Research						
Hole #				Well Casings			
Well Use	Water Test Hole			Length (ft)	Btm (ft)	Dia (in)	Description
Installation Method	Drilled			0.00	0.00	0.00	
Depth	388.00			0.00	0.00	0.00	
Water Level	0.00			0.00	0.00	0.00	
Bit	0.00			Screens			
Flowing Head	0.00			Length (ft)	Btm (ft)	Dia (in)	Slot (in) Description
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
Pump Test							
Draw Down	0.00 ft						
Duration	0.00 hrs	Elevation	1,590.00 ft		Aquifer		
Pumping Rate	0.00 igpm	Rec. Pumping Rate	0.00		E-Log	SCANNED	
Temp	0.00 deg. F	Intake	0.00		Phys	E03	

Lithology List

Depth (ft)	Material	Colour	Description
5.00	Till	Unknown	Unknown
8.00	Sand	Unknown	Unknown
29.00	Till	Unknown	Unoxidized
182.00	Till	Unknown	Oxidized
228.00	Sand	Unknown	Unknown
250.00	Silt	Grey	Noncalcareous
273.00	Sand	Grey	Noncalcareous
315.00	Silt	Grey	Noncalcareous
356.00	Sand	Unknown	Noncalcareous
388.00	Sand	Grey	Noncalcareous

ROXY THEATRE		Completion	07/01/1929
		RM	344
		Major Basin	06
		SubBasin	30
		NTS Map	73B02
WWDR#	031975		

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	NE	29	036	05	3		
Zone	Easting	Northing	Source	Accuracy	Location of Well (in Quarter)		
					0.00 ft from N/S Boundary		
					0.00 ft from E/W Boundary		

Well Information							
Driller #	UNKNOWN						
Water Use	Domestic						
Hole #							
Well Use	Withdrawal						
Installation Method	Drilled						
Depth	160.00						
Water Level	30.00						
Bit	0.00						
Flowing Head	0.00						
	Well Casings						
	Length (ft)	Btm (ft)	Dia (in)	Description			
	0.00	0.00	0.00	Steel			
	0.00	0.00	0.00	0.00			
	0.00	0.00	0.00	0.00			
	Screens						
	Length (ft)	Btm (ft)	Dia (in)	Slot (in)	Description		
	0.00	0.00	0.00	0.00	Other		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
Pump Test							
Draw Down	50.00 ft						
Duration	12.00 hrs	Elevation	1,600.00 ft	Aquifer			
Pumping Rate	40.00 igpm	Rec. Pumping Rate	0.00	E-Log	No		
Temp	0.00 deg. F	Intake	0.00	Phys	E03		

Lithology List

Depth (ft)	Material	Colour	Description
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QUAKER OATS MILL		Completion	
WWDR# 031976		RM 344	
		Major Basin 06	
		SubBasin 30	
		NTS Map 73B02	

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	NW	29	036	05	3		
							Location of Well (in Quarter)
							0.00 ft from N/S Boundary
Zone	Easting	Northing	Source	Accuracy			
							0.00 ft from E/W Boundary

Well Information							
Driller #	UNKNOWN						
Water Use	Industrial						
Hole #							
Well Use	Withdrawal						
Installation Method	Drilled						
Depth	203.00						
Water Level	6.00						
Bit	0.00						
Flowing Head	0.00						
				Well Casings			
				Length (ft)	Btm (ft)	Dia (in)	Description
				0.00	0.00	0.00	Steel
				0.00	0.00	0.00	
				0.00	0.00	0.00	
				Screens			
				Length (ft)	Btm (ft)	Dia (in)	Slot (in) Description
				6.00	136.00	0.00	30.00 Other
				10.00	203.00	0.00	30.00 Other
				0.00	0.00	0.00	0.00
Pump Test							
Draw Down	0.00 ft						
Duration	0.00 hrs	Elevation	1,600.00 ft		Aquifer		
Pumping Rate	0.00 igpm	Rec. Pumping Rate	0.00		E-Log	No	
Temp	0.00 deg. F	Intake	0.00		Phys	E03	

Lithology List

Depth (ft)	Material	Colour	Description
130.00	Unknown	Unknown	Unknown
136.00	Sand	Unknown	Coarse
193.00	Unknown	Unknown	Unknown
203.00	Sand	Unknown	Coarse

SASK RESEARCH COUNCI		Completion	05/16/1972
			RM 344
			Major Basin 06
			SubBasin 30
			NTS Map 73B02
WWDR#	031980		

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	SE	32	036	05	3		
							Location of Well (in Quarter)
							0.00 ft from N/S Boundary
Zone	Easting	Northing	Source	Accuracy			
							0.00 ft from E/W Boundary

Well Information							
Driller #	HAYTER DRILLING LTD						
Water Use	Research						
Hole #							
Well Use	Water Test Hole		Well Casings				
Installation Method	Drilled		Length (ft)	Btm (ft)	Dia (in)	Description	
Depth	252.00		0.00	0.00	0.00		
Water Level	0.00		0.00	0.00	0.00		
Bit	0.00	Screens					
Flowing Head	0.00		Length (ft)	Btm (ft)	Dia (in)	Slot (in)	Description
			0.00	0.00	0.00	0.00	
			0.00	0.00	0.00	0.00	
			0.00	0.00	0.00	0.00	
Pump Test							
Draw Down	0.00 ft						
Duration	0.00 hrs	Elevation	1,600.00 ft	Aquifer			
Pumping Rate	0.00 igpm	Rec. Pumping Rate	0.00	E-Log		SCANNED	
Temp	0.00 deg. F	Intake	0.00	Phys		E03	

Lithology List

Depth (ft)	Material	Colour	Description
6.00	Sand	Brown	Fine
8.00	Till	Brown	Unknown
16.00	Till	Grey	Calcareous
46.00	Till	Unknown	Oxidized
134.00	Till	Grey	Calcareous
153.00	Silt	Unknown	Unknown
186.00	Sand	Grey	Noncalcareous
202.00	Silt	Grey	Noncalcareous
206.00	Sand	Grey	Noncalcareous
252.00	Silt	Grey	Noncalcareous

DAIRY POOL	Completion 07/01/1960
	RM 344
	Major Basin 06
	SubBasin 30
	NTS Map 73B02
WWDR# 031981	

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	SE	32	036	05	3		
Zone	Easting	Northing	Source	Accuracy	Location of Well (in Quarter)		
					0.00 ft from N/S Boundary		
					0.00 ft from E/W Boundary		

Well Information							
Driller #	CREELMAN & SONS DRILLING						
Water Use	Industrial						
Hole #		Well Casings					
Well Use	Withdrawal	Length (ft)	Btm (ft)	Dia (in)	Description		
Installation Method	Drilled	0.00	154.00	12.00	Steel		
Depth	189.00	0.00	0.00	0.00			
Water Level	52.00	0.00	0.00	0.00			
Bit	12.00	Screens					
Flowing Head	0.00	Length (ft)	Btm (ft)	Dia (in)	Slot (in)	Description	
		10.00	189.00	6.00	20.00	Unknown	
		0.00	0.00	0.00	0.00		
		0.00	0.00	0.00	0.00		
Pump Test							
Draw Down	108.00 ft	Elevation		1,600.00 ft	Aquifer		
Duration	24.00 hrs	Rec. Pumping Rate		0.00	E-Log No		
Pumping Rate	25.00 igpm	Intake		0.00	Phys E03		
Temp	43.00 deg. F						

Lithology List

Depth (ft)	Material	Colour	Description
10.00	Till	Yellow	Unknown
48.00	Till	Blue	Unknown
56.00	Sand	Unknown	Unknown
152.00	Till	Blue	Unknown
189.00	Sandy Clay	Blue	Unknown

SASK W P FLOUR MILL		Completion	
WWDR# 031983		RM 344	
		Major Basin 06	
		SubBasin 30	
		NTS Map 73B02	

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	NW	33	036	05	3		
Zone	Easting	Northing	Source	Accuracy	Location of Well (in Quarter)		
					0.00 ft from N/S Boundary		
					0.00 ft from E/W Boundary		

Well Information							
Driller #	UNKNOWN						
Water Use	Industrial						
Hole #							
Well Use	Withdrawal		Well Casings				
Installation Method	Drilled		Length (ft)	Btm (ft)	Dia (in)	Description	
Depth	240.00		0.00	0.00	0.00	Steel	
Water Level	20.00		0.00	0.00	0.00	0.00	
Bit	0.00		Screens				
Flowing Head	0.00		Length (ft)	Btm (ft)	Dia (in)	Slot (in)	Description
			20.00	240.00	0.00	20.00	Unknown
			0.00	0.00	0.00	0.00	
			0.00	0.00	0.00	0.00	
Pump Test							
Draw Down	0.00 ft		Elevation		1,600.00 ft	Aquifer	
Duration	48.00 hrs		Rec. Pumping Rate		60.00	E-Log No	
Pumping Rate	150.00 igpm		Intake		0.00	Phys E03	
Temp	0.00 deg. F						

Lithology List

Depth (ft)	Material	Colour	Description
220.00	Clay	Blue	Unknown
240.00	Sand	Unknown	Unknown

SASK RESEARCH COUNCI		Completion	05/14/1972
			RM 344
			Major Basin 06
			SubBasin 30
			NTS Map 73B02
WWDR#	031985		

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	SW	33	036	05	3		
							Location of Well (in Quarter)
							0.00 ft from N/S Boundary
Zone	Easting	Northing	Source	Accuracy			
							0.00 ft from E/W Boundary

Well Information							
Driller #	HAYTER DRILLING LTD						
Water Use	Research						
Hole #				Well Casings			
Well Use	Water Test Hole			Length (ft)	Btm (ft)	Dia (in)	Description
Installation Method	Drilled			0.00	0.00	0.00	
Depth	387.00			0.00	0.00	0.00	
Water Level	0.00			0.00	0.00	0.00	
Bit	0.00			Screens			
Flowing Head	0.00			Length (ft)	Btm (ft)	Dia (in)	Slot (in) Description
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
Pump Test							
Draw Down	0.00 ft						
Duration	0.00 hrs	Elevation	1,585.00 ft		Aquifer		
Pumping Rate	0.00 igpm	Rec. Pumping Rate	0.00		E-Log	SCANNED	
Temp	0.00 deg. F	Intake	0.00		Phys	E03	

Lithology List

Depth (ft)	Material	Colour	Description
4.00	Gravel	Unknown	Unknown
15.00	Till	Unknown	Oxidized
28.00	Till	Unknown	Unoxidized
40.00	Till	Unknown	Oxidized
44.00	Gravel	Unknown	Unknown
60.00	Till	Unknown	Oxidized
63.00	Sand	Unknown	Unknown
158.00	Till	Unknown	Unoxidized
234.00	Silt	Grey	Noncalcareous
260.00	Sand	Grey	Noncalcareous
292.00	Silt	Grey	Noncalcareous
336.00	Sand	Grey	Noncalcareous

387.00 Silt

Grey

Noncalcareous

CO-OP COLD STORAGE		Completion	
		RM 344	
		Major Basin 06	
		SubBasin 30	
		NTS Map 73B02	
WWDR#	031986		

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	SW	33	036	05	3		
							Location of Well (in Quarter)
							0.00 ft from N/S Boundary
Zone	Easting	Northing	Source	Accuracy			
							0.00 ft from E/W Boundary

Well Information							
Driller #	UNKNOWN						
Water Use	Industrial						
Hole #							
Well Use	Withdrawal						
Installation Method	Drilled						
Depth	246.00						
Water Level	16.00						
Bit	0.00						
Flowing Head	0.00						
		Well Casings					
		Length (ft)	Btm (ft)	Dia (in)	Description		
		0.00	0.00	0.00	Steel		
		0.00	0.00	0.00			
		0.00	0.00	0.00			
		Screens					
		Length (ft)	Btm (ft)	Dia (in)	Slot (in)	Description	
		8.00	224.00	0.00	6.00	Unknown	
		12.00	246.00	0.00	30.00	Unknown	
		0.00	0.00	0.00	0.00		
Pump Test							
Draw Down	59.00 ft						
Duration	0.00 hrs	Elevation	1,588.00 ft		Aquifer		
Pumping Rate	100.00 igpm	Rec. Pumping Rate	0.00		E-Log	No	
Temp	0.00 deg. F	Intake	0.00		Phys	E03	

Lithology List

Depth (ft)	Material	Colour	Description
216.00	Clay	Blue	Boulders
224.00	Sand	Unknown	Fine
234.00	Clay	Blue	Unknown
246.00	Sand	Unknown	Coarse

SASK POWER	Completion 11/29/1975
	RM 344
	Major Basin 06
	SubBasin 30
	NTS Map 73B02
WWDR# 045665	

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	SW	32	036	05	3		
Zone	Easting	Northing	Source	Accuracy	Location of Well (in Quarter)		
					0.00 ft from N/S Boundary		
					0.00 ft from E/W Boundary		

Well Information							
Driller #	PEDERSON DRILLING						
Water Use	Domestic						
Hole #	00000001			Well Casings			
Well Use	Water Test Hole			Length (ft)	Btm (ft)	Dia (in)	Description
Installation Method	Drilled			0.00	0.00	0.00	
Depth	300.00			0.00	0.00	0.00	
Water Level	0.00			0.00	0.00	0.00	
Bit	0.00			Screens			
Flowing Head	0.00			Length (ft)	Btm (ft)	Dia (in)	Slot (in) Description
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00
Pump Test							
Draw Down	0.00 ft						
Duration	0.00 hrs	Elevation	1,625.00 ft		Aquifer		
Pumping Rate	0.00 igpm	Rec. Pumping Rate	0.00		E-Log	No	
Temp	0.00 deg. F	Intake	0.00		Phys	E03	

Lithology List

Depth (ft)	Material	Colour	Description
17.00	Clay	Brown	Soft
43.00	Till	Grey	Unknown
52.00	Till	Unknown	Sandy
130.00	Till	Grey	Unknown
135.00	Clay	Unknown	Unknown
139.00	Till	Unknown	Unknown
154.00	Sand	Unknown	Silty
276.00	Till	Grey	Unknown
300.00	Shale	Unknown	Unknown

DAIRY PRODUCERS COOP	Completion 07/01/1957
	RM 344
	Major Basin 06
	SubBasin 30
	NTS Map 73B02
WWDR# 052937	

Well Location							
LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot
00	SW	33	036	05	3		
Zone	Easting	Northing	Source	Accuracy	Location of Well (in Quarter)		
					0.00 ft from N/S Boundary		
					0.00 ft from E/W Boundary		

Well Information							
Driller #	CREELMAN & SONS DRILLING						
Water Use	Industrial						
Hole #		Well Casings					
Well Use	Withdrawal	Length (ft)	Btm (ft)	Dia (in)	Description		
Installation Method	Drilled	0.00	0.00	12.00	Steel		
Depth	280.00	0.00	0.00	0.00			
Water Level	57.00	0.00	0.00	0.00			
Bit	12.00	Screens					
Flowing Head	0.00	Length (ft)	Btm (ft)	Dia (in)	Slot (in)	Description	
		20.00	280.00	6.00	0.00	Unknown	
		0.00	0.00	0.00	0.00		
		0.00	0.00	0.00	0.00		
Pump Test							
Draw Down	0.00 ft	Elevation		1,620.00 ft	Aquifer		
Duration	0.00 hrs	Rec. Pumping Rate		50.00	E-Log No		
Pumping Rate	0.00 igpm	Intake		0.00	Phys E03		
Temp	0.00 deg. F						

Lithology List

Depth (ft)	Material	Colour	Description
280.00	Unknown	Unknown	Unknown

KATSIRIS, NICK

 Completion **06/08/1987**

 WWDR# **085026**

 RM **344**
 Major Basin **06**
 SubBasin **30**
 NTS Map **73B02**
Well Location

LSD	Quarter	Section	Township	Range	Meridian	Reserve	Riverlot	
00	NW	33	036	05	3			Location of Well (in Quarter)
Zone	Easting	Northing	Source	Accuracy				0.00 ft from N/S Boundary
								0.00 ft from E/W Boundary

Well Information

Driller #	PRAIRIE WATER LTD							
Water Use	Domestic							
Hole #	00000001							
Well Use	Withdrawal							
Installation Method	Bored	Well Casings Length (ft)	26.00	Btm (ft)	26.00	Dia (in)	36.00	Description
Depth	26.00		0.00		0.00		0.00	Porous Concrete
Water Level	0.00		0.00		0.00		0.00	
Bit	36.00	Screens						
Flowing Head	0.00	Length (ft)	0.00	Btm (ft)	0.00	Dia (in)	0.00	Slot (in) Description
			0.00		0.00		0.00	0.00
			0.00		0.00		0.00	0.00
			0.00		0.00		0.00	0.00

Pump Test

Draw Down	0.00 ft				
Duration	0.00 hrs	Elevation	1,650.00 ft	Aquifer	
Pumping Rate	0.00 igpm	Rec. Pumping Rate	0.00	E-Log	No
Temp	0.00 deg. F	Intake	0.00	Phys	E03

Lithology List

Depth (ft)	Material	Colour	Description
1.00	Topsoil	Unknown	Unknown
18.00	Sand	Brown	Unknown
26.00	Silt	Grey	Unknown



PINTER
& ASSOCIATES LTD

Appendix F

Laboratory Analytical Reports



Pinter and Associates Ltd.
ATTN: Jessica Cutter
710A 48 Street East
Saskatoon SK S7K 5B4

Date Received: 16-JAN-15
Report Date: 23-JAN-15 09:47 (MT)
Version: FINAL

Client Phone: 306-244-1710

Certificate of Analysis

Lab Work Order #: L1568012
Project P.O. #: NOT SUBMITTED
Job Reference: 1544-2
C of C Numbers:
Legal Site Desc: SASKATOON, SK

Brian Morgan
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: #819-58th St E., Saskatoon, SK S7K 6X5 Canada | Phone: +1 306 668 8370 | Fax: +1 306 668 8383
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	MU	Qualifier*	D.L.	Units	Bias	Extracted	Analyzed	Batch
L1568012-1 NE2									
Sampled By: JC on 14-JAN-15									
Matrix: SOIL									
BTEX, F1-F4 and SK Reg. PHC's.									
CCME BTEX									
Benzene	<0.0050	-		0.0050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Toluene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Ethylbenzene	<0.010	-		0.010	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Xylenes	<0.10	-		0.10	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
o-Xylene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
m+p-Xylene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Styrene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Surr: 1,4-Difluorobenzene	108.3	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
Surr: 4-Bromofluorobenzene	92.5	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
Surr: 3,4-Dichlorotoluene	66.8	-	SOL:MI	1	%	-	19-JAN-15	20-JAN-15	R3134144
CCME Total Hydrocarbons									
F1 (C6-C10)	<10	-		10	mg/kg	-		20-JAN-15	
F1-BTEX	<10	-		10	mg/kg	-		20-JAN-15	
F2 (C10-C16)	<30	-		30	mg/kg	-		20-JAN-15	
F3 (C16-C34)	481	+/-150		50	mg/kg	-		20-JAN-15	
F4 (C34-C50)	220	+/-71		50	mg/kg	-		20-JAN-15	
Total Hydrocarbons (C6-C50)	701	-		50	mg/kg	-		20-JAN-15	
Extractable Hydrocarbons. Tumbler/GC-FID									
TEH (C11-C22)	74	+/-30		50	mg/kg	0	19-JAN-15	20-JAN-15	R3133822
TEH (C23-C60)	730	+/-240		100	mg/kg	0	19-JAN-15	20-JAN-15	R3133822
Chrom. to baseline at nC50	YES	-		0		-	19-JAN-15	20-JAN-15	R3133822
Surr: 2-Bromobenzotrifluoride	106.6	-		N/A	%	-	19-JAN-15	20-JAN-15	R3133822
Miscellaneous Parameters									
% Moisture	5.6	+/-0.5		1.0	%	0	19-JAN-15	20-JAN-15	R3133773
L1568012-2 NE3									
Sampled By: JC on 14-JAN-15									
Matrix: SOIL									
BTEX, F1-F4 and SK Reg. PHC's.									
CCME BTEX									
Benzene	<0.0050	-		0.0050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Toluene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Ethylbenzene	<0.010	-		0.010	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Xylenes	<0.10	-		0.10	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
o-Xylene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
m+p-Xylene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Styrene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Surr: 1,4-Difluorobenzene	105.9	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
Surr: 4-Bromofluorobenzene	86.1	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
Surr: 3,4-Dichlorotoluene	83.6	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
CCME Total Hydrocarbons									
F1 (C6-C10)	<10	-		10	mg/kg	-		20-JAN-15	
F1-BTEX	<10	-		10	mg/kg	-		20-JAN-15	
F2 (C10-C16)	<30	-		30	mg/kg	-		20-JAN-15	
F3 (C16-C34)	1000	+/-320		50	mg/kg	-		20-JAN-15	
F4 (C34-C50)	1420	+/-450		50	mg/kg	-		20-JAN-15	
Total Hydrocarbons (C6-C50)	2420	-		50	mg/kg	-		20-JAN-15	
Extractable Hydrocarbons. Tumbler/GC-FID									
TEH (C11-C22)	146	+/-51		50	mg/kg	0	19-JAN-15	20-JAN-15	R3133822
TEH (C23-C60)	2900	+/-950		100	mg/kg	0	19-JAN-15	20-JAN-15	R3133822
Chrom. to baseline at nC50	NO	-		0		-	19-JAN-15	20-JAN-15	R3133822

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	MU	Qualifier*	D.L.	Units	Bias	Extracted	Analyzed	Batch
L1568012-2 NE3 Sampled By: JC on 14-JAN-15 Matrix: SOIL									
Extractable Hydrocarbons. Tumbler/GC-FID									
Surr: 2-Bromobenzotrifluoride	167.3	-	SOL:MI	N/A	%	-	19-JAN-15	20-JAN-15	R3133822
Miscellaneous Parameters									
% Moisture	9.3	+/-0.8		1.0	%	0	19-JAN-15	20-JAN-15	R3133773
MUST PSA % > 75um	83.4	+/-2.2		0.10	%	0	21-JAN-15	21-JAN-15	R3135192
L1568012-3 NE6 Sampled By: JC on 14-JAN-15 Matrix: SOIL									
BTEX, F1-F4 and SK Reg. PHC's.									
CCME BTEX									
Benzene	<0.0050	-		0.0050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Toluene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Ethylbenzene	<0.010	-		0.010	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Xylenes	<0.10	-		0.10	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
o-Xylene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
m+p-Xylene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Styrene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Surr: 1,4-Difluorobenzene	109.3	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
Surr: 4-Bromofluorobenzene	100.4	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
Surr: 3,4-Dichlorotoluene	80.6	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
CCME Total Hydrocarbons									
F1 (C6-C10)	<10	-		10	mg/kg	-		20-JAN-15	
F1-BTEX	<10	-		10	mg/kg	-		20-JAN-15	
F2 (C10-C16)	<30	-		30	mg/kg	-		20-JAN-15	
F3 (C16-C34)	442	+/-140		50	mg/kg	-		20-JAN-15	
F4 (C34-C50)	612	+/-190		50	mg/kg	-		20-JAN-15	
Total Hydrocarbons (C6-C50)	1050	-		50	mg/kg	-		20-JAN-15	
Extractable Hydrocarbons. Tumbler/GC-FID									
TEH (C11-C22)	<50	-		50	mg/kg	-	19-JAN-15	20-JAN-15	R3133822
TEH (C23-C60)	1380	+/-450		100	mg/kg	0	19-JAN-15	20-JAN-15	R3133822
Chrom. to baseline at nC50	NO	-		0		-	19-JAN-15	20-JAN-15	R3133822
Surr: 2-Bromobenzotrifluoride	101.6	-		N/A	%	-	19-JAN-15	20-JAN-15	R3133822
Miscellaneous Parameters									
% Moisture	11.1	+/-1.0		1.0	%	0	19-JAN-15	20-JAN-15	R3133773
L1568012-4 DUP Sampled By: JC on 14-JAN-15 Matrix: SOIL									
BTEX, F1-F4 and SK Reg. PHC's.									
CCME BTEX									
Benzene	<0.0050	-		0.0050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Toluene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Ethylbenzene	<0.010	-		0.010	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Xylenes	<0.10	-		0.10	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
o-Xylene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
m+p-Xylene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Styrene	<0.050	-		0.050	mg/kg	-	19-JAN-15	20-JAN-15	R3134144
Surr: 1,4-Difluorobenzene	113.6	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
Surr: 4-Bromofluorobenzene	95.6	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
Surr: 3,4-Dichlorotoluene	71.7	-		1	%	-	19-JAN-15	20-JAN-15	R3134144
CCME Total Hydrocarbons									
F1 (C6-C10)	<10	-		10	mg/kg	-		20-JAN-15	
F1-BTEX	<10	-		10	mg/kg	-		20-JAN-15	

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	MU	Qualifier*	D.L.	Units	Bias	Extracted	Analyzed	Batch
L1568012-4 DUP									
Sampled By: JC on 14-JAN-15									
Matrix: SOIL									
CCME Total Hydrocarbons									
F2 (C10-C16)	<30	-		30	mg/kg	-		20-JAN-15	
F3 (C16-C34)	507	+/-160		50	mg/kg	-		20-JAN-15	
F4 (C34-C50)	804	+/-250		50	mg/kg	-		20-JAN-15	
Total Hydrocarbons (C6-C50)	1310	-		50	mg/kg	-		20-JAN-15	
Extractable Hydrocarbons. Tumbler/GC-FID									
TEH (C11-C22)	<50	-		50	mg/kg	-	19-JAN-15	20-JAN-15	R3133822
TEH (C23-C60)	1700	+/-560		100	mg/kg	0	19-JAN-15	20-JAN-15	R3133822
Chrom. to baseline at nC50	NO	-		0		-	19-JAN-15	20-JAN-15	R3133822
Surr: 2-Bromobenzotrifluoride	103.3	-		N/A	%	-	19-JAN-15	20-JAN-15	R3133822
Miscellaneous Parameters									
% Moisture	10.7	+/-0.9		1.0	%	0	19-JAN-15	20-JAN-15	R3133773
* Refer to Referenced Information for Qualifiers (if any) and Methodology.									

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

Test Method References:

ALS Test Code	Matrix	Test Description	Preparation Method Reference	Method Reference**
ETL-BTX,TVH-CCME-SK	Soil	CCME BTEX		CCME CWS-PHC DEC-2000 - PUB 1310

Fraction F1, C6 - C10 Hydrocarbons, is determined by extracting a 5 gram soil sample with methanol, separating the methanol from the soil, then adding the methanol extract to a purge-and-trap unit for release of volatile organics. The volatile organics are separated by gas chromatography using a 100% poly(dimethylsiloxane)column, with BTEX components quantified by MSD and the F1 range quantified using a flame ionization detector.

Note: The result of a BTEX analysis is subtracted to give the final result.

Reference: Modified EPA SW846 Methods 5030/ 8260, CCME CSW PHC Dec 2000

ETL-TVH,TEH-CCME-SK	Soil	CCME Total Hydrocarbons		CCME CWS-PHC DEC-2000 - PUB 1310
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Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

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

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

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

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

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

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

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

PREP-MOISTURE-SK	Soil	% Moisture		Oven dry 105C-Gravimetric
------------------	------	------------	--	---------------------------

The weighed portion of soil is placed in a 105°C oven overnight. The dried soil is allowed to cooled to room temperature, weighed and the % moisture is calculated.

Reference: ASTM D2216-80

PSA-MUST-SK	Soil	% Particles > 75um (Coarse/Fine)		ASTM D422-63-SIEVE
-------------	------	----------------------------------	--	--------------------

An air-dried sample is reduced to < 2 mm size and mixed with a dispersing agent (Calgon solution). The sample is washed through a 200 mesh (75 µm) sieve. The retained mass of sample is used to determine % sand fraction.

Reference: ASTM D422-63

TEH-TMB-SK	Soil	Extractable Hydrocarbons. Tumbler/GC-FID		CWS-PHC DEC 2000 (SOIL)
------------	------	---	--	-------------------------

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For C10 to C50 hydrocarbons (F2, F3, F4) and gravimetric heavy hydrocarbons (F4G-sg), a subsample of the sediment/soil is extracted with 1:1 hexane:acetone using a rotary extractor. The extract undergoes a silica-gel clean-up to remove polar compounds. F2, F3 & F4 are analyzed by on-column GC/FID, and F4G-sg is analyzed gravimetrically.

** The indicated Method Reference is the closest nationally or internationally recognized reference for the applicable ALS test method. ALS methods may incorporate modifications from the specified reference 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
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA

Chain of Custody Numbers:

Reference Information

GLOSSARY OF REPORT TERMS

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

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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

MU: Measurement Uncertainty. The reported uncertainty is an expanded uncertainty calculated using a coverage factor of 2 which gives a level of confidence of approximately 95%.

Bias: The reported method bias is the average long term deviation from the target value for a long term reference or control sample, measured in percent.

Zero values indicate no detectable method bias.

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.



Quality Control Report

Workorder: L1568012

Report Date: 23-JAN-15

Page 1 of 3

Client: Pinter and Associates Ltd.
710A 48 Street East
Saskatoon SK S7K 5B4

Contact: Jessica Cutter

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ETL-BTX,TVH-CCME-SK Soil								
Batch R3134144								
WG2028424-1 DUP		L1568085-11						
Benzene		<0.0050	<0.0050	RPD-NA	mg/kg	N/A	40	20-JAN-15
Toluene		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	20-JAN-15
Ethylbenzene		<0.010	<0.010	RPD-NA	mg/kg	N/A	40	20-JAN-15
Xylenes		<0.10	<0.10	RPD-NA	mg/kg	N/A	40	20-JAN-15
o-Xylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	20-JAN-15
m+p-Xylene		<0.050	<0.050	RPD-NA	mg/kg	N/A	40	20-JAN-15
Styrene		<0.050	<0.050	RPD-NA	mg/kg	N/A	50	20-JAN-15
TVH: (C6-C10 / No BTEX Correction)		<10	<10	RPD-NA	mg/kg	N/A	40	20-JAN-15
WG2028424-3 LCS								
Benzene			106.2		%		70-130	20-JAN-15
Toluene			107.9		%		70-130	20-JAN-15
Ethylbenzene			97.7		%		70-130	20-JAN-15
Xylenes			96.5		%		70-130	20-JAN-15
o-Xylene			99.1		%		70-130	20-JAN-15
m+p-Xylene			93.9		%		70-130	20-JAN-15
Styrene			90.7		%		50-150	20-JAN-15
TVH: (C6-C10 / No BTEX Correction)			102.9		%		70-130	20-JAN-15
WG2028424-2 MB								
Benzene			<0.0050		mg/kg		0.005	20-JAN-15
Toluene			<0.050		mg/kg		0.05	20-JAN-15
Ethylbenzene			<0.010		mg/kg		0.01	20-JAN-15
Xylenes			<0.10		mg/kg		0.1	20-JAN-15
o-Xylene			<0.050		mg/kg		0.05	20-JAN-15
m+p-Xylene			<0.050		mg/kg		0.05	20-JAN-15
Styrene			<0.050		mg/kg		0.05	20-JAN-15
TVH: (C6-C10 / No BTEX Correction)			<10		mg/kg		10	20-JAN-15
PREP-MOISTURE-SK Soil								
Batch R3133773								
WG2028421-1 DUP		L1568085-11						
% Moisture		20.8	20.8		%	0.0	20	20-JAN-15
PSA-MUST-SK Soil								



Quality Control Report

Workorder: L1568012

Report Date: 23-JAN-15

Page 2 of 3

Client: Pinter and Associates Ltd.
710A 48 Street East
Saskatoon SK S7K 5B4

Contact: Jessica Cutter

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PSA-MUST-SK								
	Soil							
Batch	R3135192							
WG2027758-1	DUP	L1568085-6						
MUST PSA % > 75um		1.12	1.04	J	%	0.08	5	21-JAN-15
TEH-TMB-SK								
	Soil							
Batch	R3133822							
WG2028428-1	DUP	L1568085-11						
TEH (C11-C22)		<50	<50	RPD-NA	mg/kg	N/A	40	20-JAN-15
TEH (C23-C60)		<100	<100	RPD-NA	mg/kg	N/A	40	20-JAN-15
WG2028428-4	IRM	ALS PHC2 RM						
TEH (C11-C22)			103.8		%		70-130	20-JAN-15
TEH (C23-C60)			113.4		%		70-130	20-JAN-15
WG2028428-3	LCS							
TEH (C11-C22)			94.3		%		70-130	20-JAN-15
TEH (C23-C60)			103.1		%		70-130	20-JAN-15
WG2028428-2	MB							
TEH (C11-C22)			<50		mg/kg		50	20-JAN-15
TEH (C23-C60)			<100		mg/kg		100	20-JAN-15

Quality Control Report

Workorder: L1568012

Report Date: 23-JAN-15

Client: Pinter and Associates Ltd.
710A 48 Street East
Saskatoon SK S7K 5B4

Page 3 of 3

Contact: Jessica Cutter

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

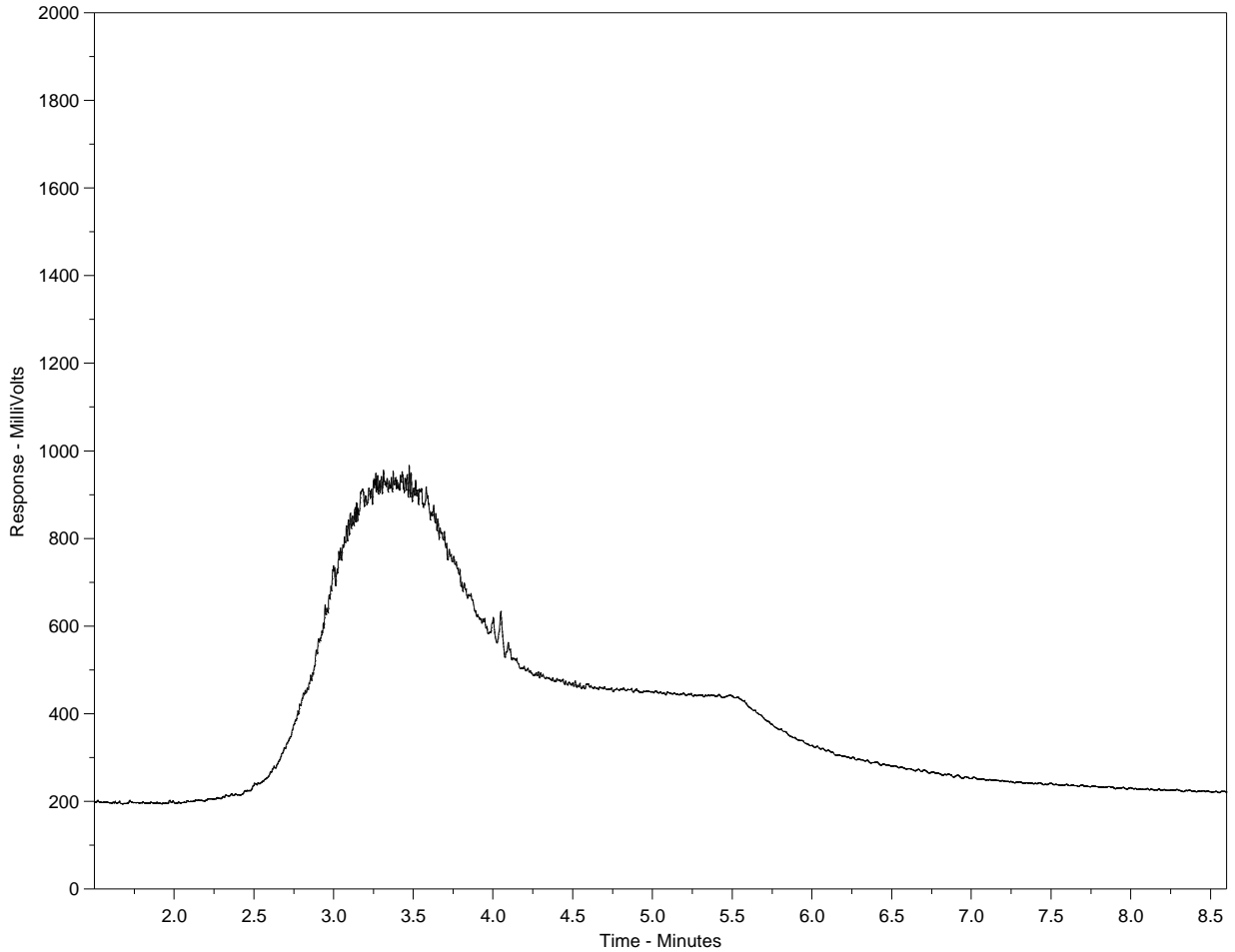
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L1568012-1
Client ID: NE2



← F2 →		← F3 →		← F4 →	
nC10	nC16			nC34	nC50
174°C	287°C			481°C	575°C
346°F	549°F			898°F	1067°F
← Gasoline →			← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

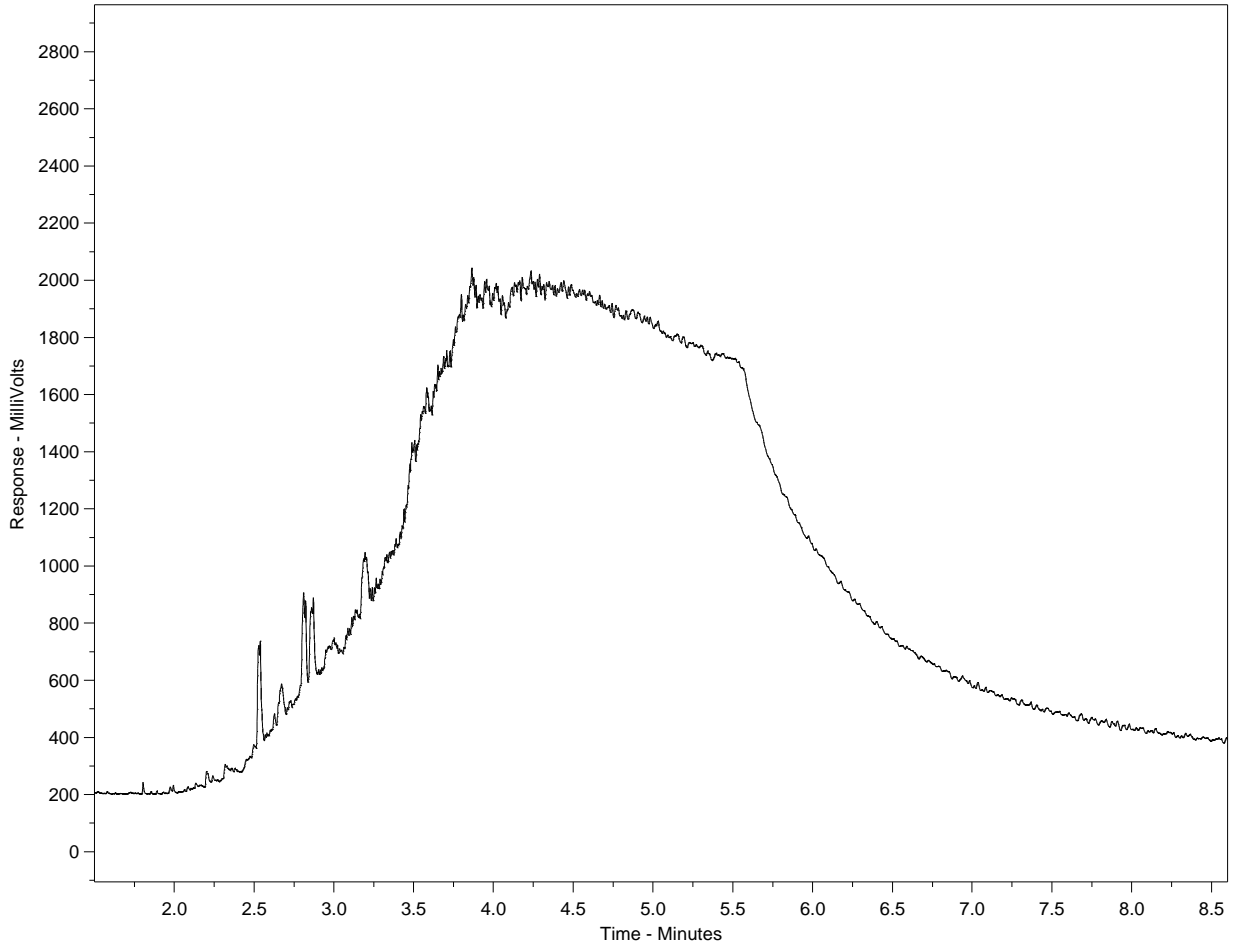
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L1568012-2
Client ID: NE3



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
← Gasoline →			← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

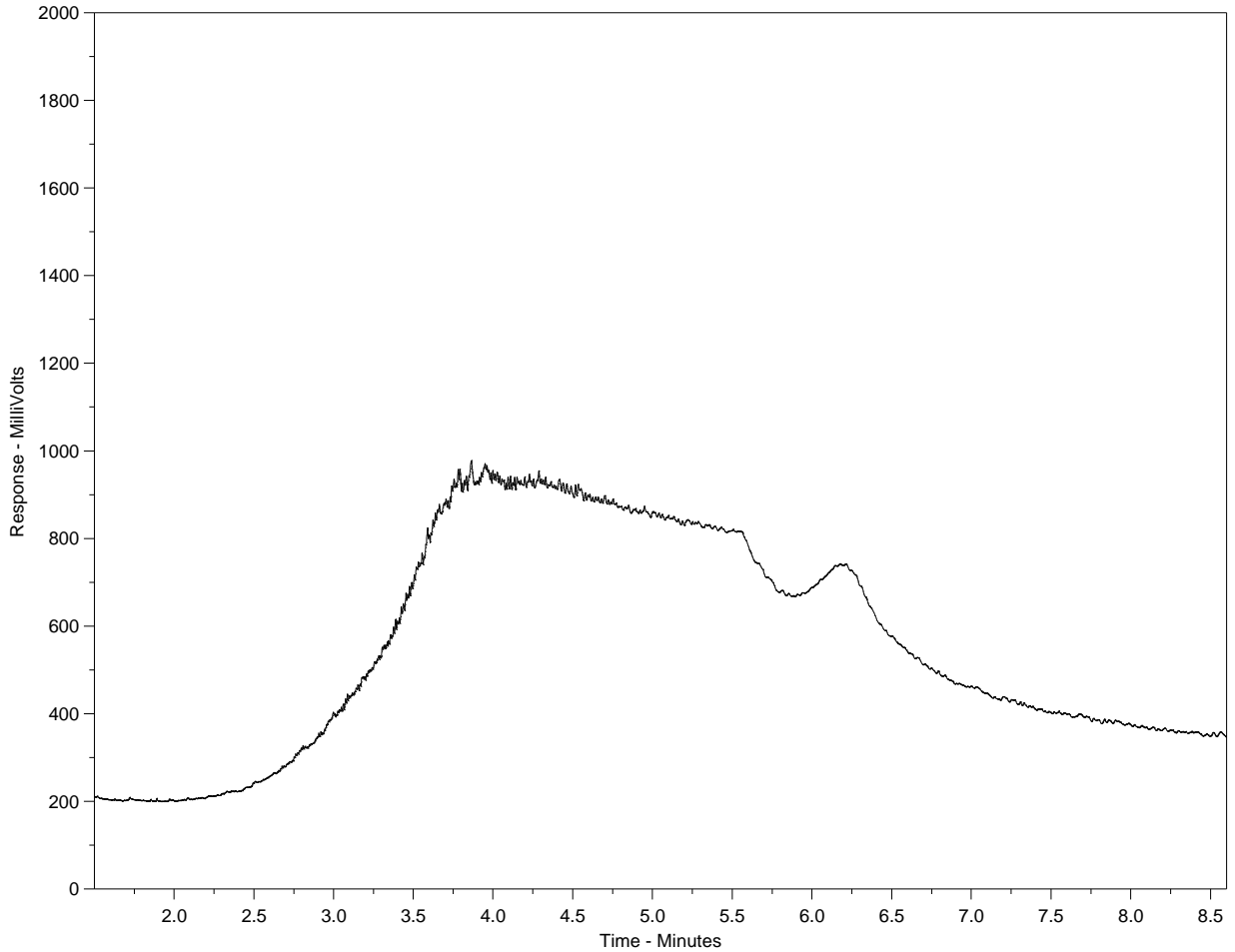
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L1568012-3
Client ID: NE6



← F2 →		← F3 →		← F4 →	
nC10	nC16			nC34	nC50
174°C	287°C			481°C	575°C
346°F	549°F			898°F	1067°F
← Gasoline →			← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

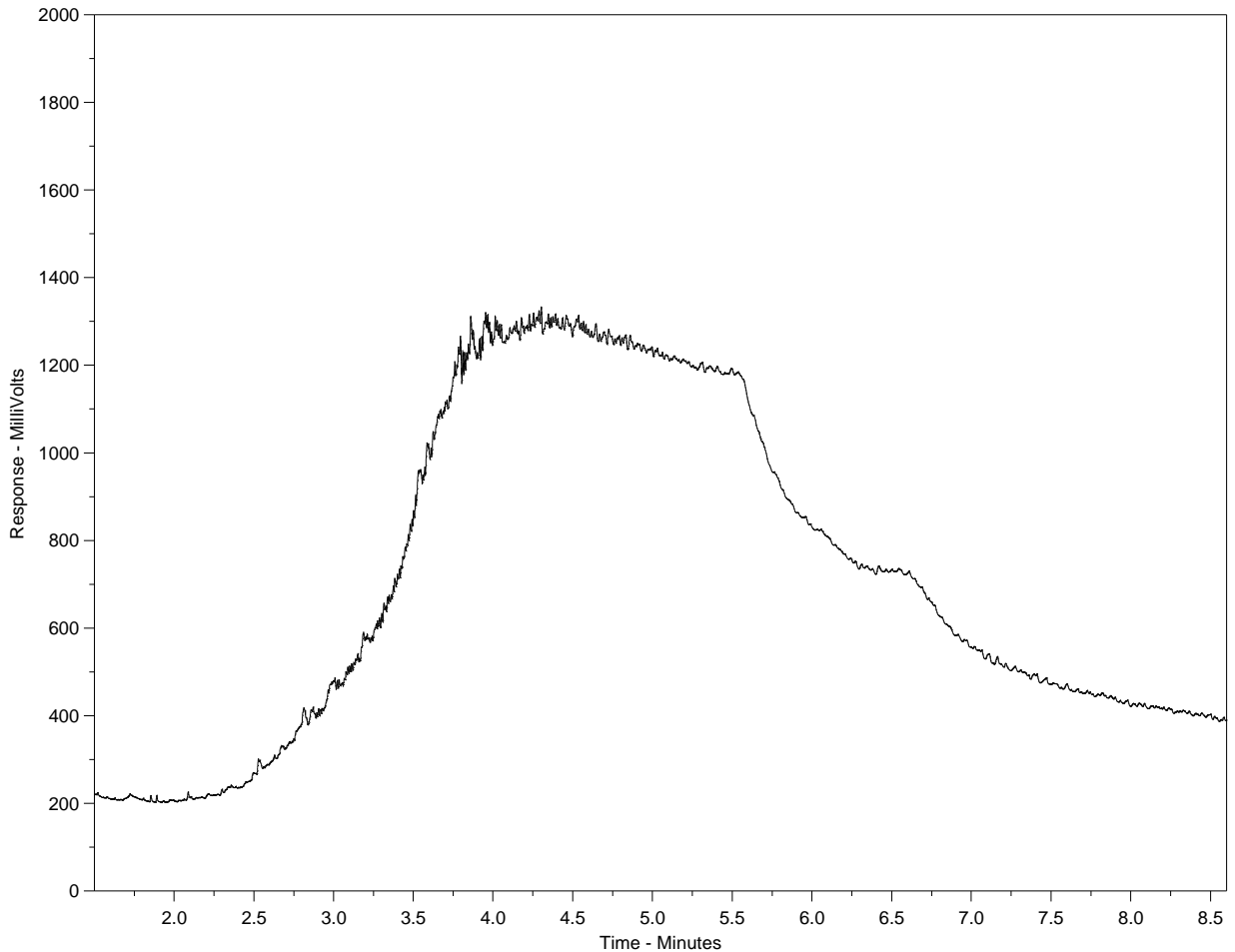
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L1568012-4
Client ID: DUP



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
← Gasoline →			← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.



L1568012-COFC

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC #

Page 1 of 1

Report To: PINTER & Associates Ltd.
Contact: Jessica Cutter
Address: 710A 48th Street East
Saskatoon, SK S7K 5B4
Phone: 306.244.1710 Fax: 306.933.4986
Report Format / Distribution: [X] Standard [] Other
[X] PDF [X] Excel [] Digital [] Fax
Service Requested: [X] Regular (Standard Turnaround Times - Business Days)

Invoice To: Same as Report? [X] Yes [] No
Hardcopy of Invoice with Report? [] Yes [X] No
Company: SAME
Contact:
Address:
Phone: Fax:
Client / Project Information:
Job #: 1544-2
PO / AFE:
LSD: Saskatoon, SK
Quote #: Q37502

Lab Work Order # (lab use only)
ALS Contact: Brian Morgan
Sampler: JC

Table with columns: Sample #, Sample Identification, Date, Time, Sample Type, BTEX, PHC, F1, F4, Grain Size, Number of Containers. Rows include NE2, NE3, NE6, DUP.

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

W.W.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use) / SHIPMENT RECEPTION (lab use only) / SHIPMENT VERIFICATION (lab use only)
Released by: Jessica Cutter
Date: 16-Jan-15 Time: 14:30
Received by: AR Date: 16/1/15 Time: 3:00 Temperature: 2 °C