Northern Futures Remedial Action Plan Lot 929 & 930 Iqaluit, Nunavut

Final Report
November 30, 2000

Northern Futures Remedial Action Plan,
Lot 929 & 930
Iqaluit, Nunavut

Northern Futures Ltd.

00-7944-1000

Submitted by
Dillon Consulting Limited

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DILLON
CONSULTING

November 29, 2000

4920
47th Street
Suite 303
Yellowknife
Northwest Territories
Canada
X1A 2L8
Telephone
(867) 920-4555
Fax
(867) 873-3328

Northern Futures Ltd.
PO Box 148
Iqaluit, Nunavut X0A 0H0

Attention: Mr. Nicholas D'Aoust

Remedial Action Plan - Lot 929 and 930, Iqaluit, Nunavut.

Dear Mr. D'Aoust:

Please find enclosed two (2) copies of the Final Reports for the above mentioned report.

Approximately 3,500 m^3 of hydrocarbon contaminated soil was excavated from Lot 929 and 930, resulting in the removal of soils in excess of the selected criteria values. This soil was transported and placed into a 30 meter by 65 meter lined (20 mil geomembrane) berm. Portions of the stockpiled material will be transferred into an adjacent 30 meter by 50 meter lined (30 mil geomembrane) berm, tilled periodically (biweekly during summer months), then removed and used as cover material subsequent to analysis results being below specified criteria. The two berms are situated on a private property, in the Iqaluit Industrial Subdivision. See Figure 4.

Granular materials used to backfill the excavation left behind following the removal of hydrocarbon contaminated material, was obtained from the Town of Iqaluit Granular Source, located in the area known as North 40, see Figure 5. Although soil analysis of this material was not conducted following the backfilling, visual and olfactory evidence indicates this granular material as being free of residual contaminants.

This report was prepared by Dillon Consulting Limited ("Dillon") for the sole benefit of our Client and our Client's lending institution the Royal Bank. The material in the report reflects Dillon's best judgment in light of the information available to Dillon at the time of preparation. Any use which a third party (i.e. a party other than our Client or our Client's lending institution) makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Continued...

Should you have any questions or concerns regarding this report, please do not hesitate to call.

Yours sincerely,
DILLON CONSULTING LIMITED

Martin Suchy, G.I.T.
Project Manager

Gary Strong, P.Eng.
Managing Partner

REGISTERED PROFESSIONAL ENGINEER
G. STRONG
N.W.T.

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
P 010
M. DILLON
LIMITED

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1.0 INTRODUCTION

1.1 General

In June 2000, Northern Futures retained Dillon Consulting Limited (Dillon) to conduct a Phase I Environmental Site Assessment (ESA) at Lot 929 and 930 provisional survey, (formerly Lot 430 and half of Lot 502, Plan 764) in Iqaluit, Nunavut. As indicated in the Phase I ESA, surface staining observed on site, as well as the historical site practices suggested the probability of hydrocarbon contamination.

Upon the removal of a concrete slab present on the property, Northern Futures identified hydrocarbon contamination. In response to this and the Phase I ESA findings, Northern Futures began to excavate the impacted soils. At this time Dillon was authorized by Northern Futures to conduct a sampling program to delineate impacted soils, witness the excavation of any contaminated material, and consult on remediation options concerning contaminated material.

1.2 Objective

The objective of this investigation was to complete works on Lot 929 and 930 to allow the site to meet the site selected remediation criteria.

2.0 APPROACH

The field portion of the Phase III Assessment consisted of collecting soil and water samples at strategic locations within the areas of investigation to delineate the extent of hydrocarbon impact. Field work was completed by Martin Suchy of Dillon, between June 28th and September 22nd, 2000.

2.1 Methodology

In-situ soil screening for Hydrocarbon Vapour Emissions (HVE) was completed by collecting a soil sample in a plastic bag, then probing it when it reached ambient temperature. A Gastech® 1238 ME instrument, was used under field conditions (i.e. ambient temperature) to conduct these measurements. The instrument expresses findings in two ranges. The lower range is parts per million (ppm), which is equivalent to mg/kg. The upper range, % Lower Explosion Limit (LEL), has no exact conversion to parts per million, however, 1 % LEL can roughly be estimated as 125 ppm. Where levels of HVE are less than 100 ppm, this usually indicates a low level of volatiles present within the sample. When HVE levels are greater than 100 ppm, hydrocarbon concentrations within the soil may be above recommended guidelines.

Results from on-site visual and olfactory observations, and HVE readings were used to aid in determining sample locations needed to define the extent of hydrocarbon impact. Soil samples were collected from test pits developed using hand tools and/or an excavator. Test pits were developed to various depths in order to determine the range of vertical hydrocarbon migration. All soil samples were placed in glass jars, refrigerated (below 4°C) and shipped for laboratory analysis.

2.2 Analytical Testing

Samples were submitted for analysis to Bodycote Technitrol Inc. in Pointe-Claire Quebec, which is accredited by the Canadian Association for Environmental Analytical Laboratories (CAEAL).

The analytical test program was developed to quantify hydrocarbon impact within the areas of investigation, and to confirm the limits of estimated hydrocarbon impact.

Analytical test parameters for hydrocarbon compounds included Benzene, Toluene, Ethylbenzene, Xylene (referred to as BTEX compounds) and Total Petroleum Hydrocarbons (TPH), in the carbon C_6 - C_{32} range, which is the sum of total purgeable and extractable hydrocarbons.

2.3 Assessment Criteria

An evaluation of environmental impact to soil was facilitated by the comparison of analytical results with appropriate criteria levels. The selected recommended guidelines represent concentrations beyond which remediation is required. The following recommended soil and water guidelines have been adopted by the Department of Sustainable Development, Government of Nunavut, for the purpose of assessing hydrocarbon based contamination across Nunavut. ***See Table 2.1.***

1. Government of the Northwest Territories, Department of Renewable Resources, Wildlife and Economic Development (GNWT) "Environmental Guidelines for Site Remediation" - Industrial use criteria.

2. Canadian Council of Ministers of the Environment (CCME), 1999. "Canadian Environmental Quality Guidelines"

TABLE 2.1
Commercial/Residential Land Use Assessment Criteria

Parameter	Commercial Land Use		Freshwater Aquatic	
	Year released/revised	Soil Criteria (ppm)	Year released/revised	Water Criteria (mg/L)
Benzene	1997	5	1999	370
Toluene	1997	0.8	1999	2
Ethylbenzene	1997	20	1999	90
Xylene (Total)	1997	20	-	NC
Total Petroleum Hydrocarbon (TPH)	1998	2500[a]	-	NC

Notes: NC = No Criteria
[a]TPH are GNWT guidelines adopted by the GN

3.0 RESULTS

A total of 44 soil and three samples were collected and sent for laboratory analysis. These samples were collected during several stages as the contaminated material was being excavated. Site Photographs are provided in Appendix A, and Original Laboratory Certificates are in Appendix B. See Figures 1,2 & 3 for sample locations in Appendix C.

3.1 Chronology

The first sampling stage involved the collection of 12 soil samples and one water sample (***See Figure 1***). These samples (NF series), were collected from the initial excavation which was advanced until the permafrost layer was reached, and at several points along property perimeter. Laboratory analyses indicated hydrocarbon contamination well in excess of recommended criteria. Consequently, the excavation was left uncovered for one month in order to allow the permafrost layer to melt and then excavate contaminated materials.

When the base of the excavation had thawed, the excavation was further advanced by approximately 0.7 to 1.2 metres. The initial excavation perimeter was also enlarged. At this time, 10 more base samples and 9 perimeter samples were collected and sent for laboratory analysis. The results from this stage indicated that the extent of the vertical migration of hydrocarbons had been reached and the contaminated material, above the selected criteria levels, had been removed.

The last excavation stage involved the horizontal extension of the excavation on the north side of the excavation, and the removal of contaminated material at the north east corner of the property. Thirteen soil samples (***See Figure 2 & 3***) were collected at this stage, with laboratory results indicating that the soils above the selected criteria had been removed.

3.2 Laboratory Analysis

During the first stage of excavation, soil samples were collected at the edge of the excavation, from the base of the excavation (still frozen), and from test pits located along the property perimeter (***See Figure 1***). Samples collected from the base and edge of the excavation indicate total hydrocarbon concentrations ranging from 3,570 ppm to 13,860 ppm, while all but one of those collected from the property boundary indicate non-detectable levels of hydrocarbon concentrations. Gas chromatography indicates that for most samples, the primary contamination is in the diesel carbon range (C_{11}-C_{22}). Sample NF-6 has TPH concentrations in the C_{23}-C_{32} carbon range, which indicates heavier fuel compounds.

Two samples contained BTEX concentrations in excess of government criteria. Sample NF-3 and NF-6 contained Toluene concentrations of 2.9 ppm and 1.4 ppm respectively, which, is above the acceptable level of 0.8 ppm.

The lack of BTEX compounds, and the presence of higher carbon range petroleum hydrocarbons, indicates that the contamination was a results of diesel and/or oils spills.

Along the property perimeter, five samples are above non-detectable but below 500 ppm, while four are above 500 ppm but below 2,500 ppm. Results from sample NF-7, on the west side property boundary indicate TPH concentrations of 9,408 ppm. Although, this area was not further excavated, there is no danger of contaminants migrating back onto the property as the hydraulic gradient is from east to west.

Samples NF-4 and NF-5 were collected from soils already excavated prior to Dillon's involvement. The TPH concentrations were 13,860 and 5,330 ppm respectively. One water sample, collected from within a pit in the main excavation had TPH concentration of 20,814 ppb. See Table 3.1 and 3.2 for specific hydrocarbon ranges in soil and water samples.

During the second excavation stage, most soil sample readings were either non detectable or below Government of Nunavut commercial criteria set at 2,500 ppm. However, samples NFR-14 and NFR-21 had TPH concentrations of 3,071 ppm and 7,165 ppm respectively.

The last excavation stage involved the advancement of the pit past sample NFR-14, and excavating contaminated material at the north east corner of the lot. Samples NFR-42, 43 & 44 confirmed the closure of contaminated material past sample NFR-14. All samples at the northeast corner of the property are below Government of Nunavut selected criteria.

Water sample NFW-51 was collected from within the containment berm. The Toluene concentrations in the sample , 30 ppb are above acceptable criteria. Sample NFW-50, collected from the excavation at the northeastern cover of lot 930 did not contain BTEX or TPH concentrations above acceptable criteria.

3.3 Remediation

Through discussion with the regulatory authority, Mr Robert Eno, Sustainable Development and Mr Matthew Hough, Town of Iqaluit, Dillon recommended that the contaminated material be placed on a hydrocarbon resistant liner within a bermed area. The material placed within this lined area is to be remediated through landfarming. A second liner was installed, into which portions of contaminated material from the first liner will be transferred, and allowed to remediate through the landfarming process.

Landfarming has been used at many sites across the Northwest Territories and Nunavut. This process also relies on biological degradation and volatilization to remove hydrocarbon-based compounds. To implement a landfarming process, the soil is spread in a thin layer (0.15 - 0.20 m deep) over an area, and then tilled on a regular basis to promote aeration and stimulate microbial activity. In some instances, landfarming must be performed on an impermeable liner to prevent migration of contaminants to the native soil. Landfarming's appeal generally decreases in accordance with increasing volumes of

impacted material due to the relatively high demands on the land area needed and manpower required.

Hydrocarbon contaminated water from within the excavation was pumped into the berm and storage tanks placed within the bermed and liner area, and allowed to volatilize over time.

The Land Farm operation requires that the contaminated soil be tilled on a bi-weekly basis during the frost free seasons. Dependant on the progress in the first year, as determined by test results, the addition of nutrients (fertilizer) maybe required to accelerate the remediation process.

A monitoring program involving the testing of soils is proposed. This would involve the collection of up to six composite soil samples from within the berm on an annual basis. The results of the tests will be used to determine the requirement for the nutrient addition and to determine the acceptability of the material for future use.

TABLE 3.1
Laboratory Soil Analysis and HVE Result

Sample ID	Parameter								
	Benzene (ppm)	Toluene (ppm)	Ethyl-Benzene (ppm)	Xylene (ppm)	C_6-C_{10} (ppm)	C_{11}-C_{22} (ppm)	C_{23}-C_{32} (ppm)	TPH (ppm)	HVE (Gastech) (ppm)
NF-1	<0.05	<0.1	<0.1	<0.1	19	4100	720	**4830**	275
NF-2	<0.05	<0.1	<0.1	<0.1	12	4600	50	**4662**	345
NF-3	<0.05	**2.9**	0.9	11	<10	3400	170	**3570**	75
NF-4	<0.05	<0.1	<0.1	0.1	<10	13000	860	**13860**	320
NF-5	<0.05	0.2	<0.1	0.8	<10	4600	730	**5330**	295
NF-6	<0.05	**1.4**	<0.1	0.2	15	570	5700	**6270**	15 % LEL
NF-7	<0.05	<0.1	<0.1	<0.1	28	8800	580	**9408**	195
NF-8	<0.05	<0.1	<0.1	<0.1	32	7700	220	**7920**	210
NF-9	<0.05	<0.1	<0.1	<0.1	10	<50	<50	ND	275
NF-10	<0.05	<0.1	<0.1	<0.1	162	<50	<50	ND	150
NF-11	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	120
NF-12	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	100
NFR-1	<0.05	<0.1	<0.1	0.1	<10	<50	<50	ND	20
NFR-2	<0.05	<0.1	<0.1	<0.1	23	280	<50	303	155
NFR-3	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	95
NFR-4	<0.05	<0.1	<0.1	<0.1	<10	280	<50	280	220
NFR-5	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	145
NFR-6	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	105
NFR-7	<0.05	<0.1	<0.1	<0.1	51	<50	<50	51	15
NFR-8	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	85
NFR-9	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	230
NFR-10	<0.05	<0.1	<0.1	<0.1	40	<50	<50	40	25
NFR-11	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	20
NFR-12	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	65
NFR-13	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	340
NFR-14	<0.05	<0.1	0.2	3.8	571	2500	<50	**3071**	330
NFR-15	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	65
NFR-16	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	415
NFR-17	<0.05	<0.1	<0.1	0.4	820	<50	<50	820	70 % LEL
NFR-18	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	35
NFR-19	<0.05	<0.1	<0.1	<0.1	230	<50	<50	230	80
NFR-20	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	145
NFR-21	<0.05	<0.1	<0.1	0.3	15	7000	150	**7165**	260
NFR-22	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	135
NFR-23	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	10
NFR-30	<0.05	<0.1	<0.1	<0.1	39	350	<50	389	25 % LEL
NFR-33	<0.05	<0.1	<0.1	<0.1	189	150	1600	1939	15 % LEL
NFR-35	<0.05	<0.1	<0.1	<0.1	<10	1300	120	1420	75 % LEL
NFR-38	<0.05	0.3	<0.1	0.3	479	<50	110	589	24 % LEL
NFR-39	<0.2	<0.2	<0.2	0.4	1702	<50	76	1778	21 % LEL
NFR-40	<0.05	0.2	<0.1	<0.1	<10	73	320	393	6 % LEL
NFR-41	<0.05	0.1	0.1	0.7	<10	<50	<50	ND	120
NFR-42	<0.05	<0.1	<0.1	<0.1	<10	130	87	217	205
NFR-43	<0.05	<0.1	<0.1	<0.1	<10	<50	<50	ND	55
NFR-44	<0.05	<0.1	<0.1	<0.1	<10	1000	110	1110	215
Commercial Soil Criteria	0.5	0.8	20	20	NS	NS	NS	2500	-

TABLE 3.2
Laboratory Results for Water Samples

Sample ID	Parameter							
	Benzene (ppb)	Toluene (ppb)	Ethyl-Benzene (ppb)	Xylene (ppb)	C_6-C_{10} (ppb)	C_{11}-C_{22} (ppb)	C_{23}-C_{32} (ppb)	TPH (ppb)
NF-W	0.6	1.9	<0.2	<0.2	214	17000	3600	20814
NFW-50	0.2	1.4	<0.1	0.1	<25	<50	<50	ND
NFW-51	4.4	**30**	4.7	130	1300	400	<50	1700
Freshwater Aquatic Life Criteria	370	2	90	NS	NS	NS	NS	NS

Notes: NT = Not Detected
NT = Not Tested
NS = Not Specified
BOLD = Above Criteria
*Some Hydrocarbon Vapour Emissions (HVE) are expressed in % LEL as opposed to ppm

4.0 SUMMARY

In June 2000, a phase I environmental assessment was completed on Lot 929 and 930 in Iqaluit, Nunavut. The ESA indicated that hydrocarbon contamination was likely. Subsequent soil sampling confirmed the presence of contamination above the selected remediation criteria.

During July and August, 2000 the land owner undertook a site remediation which included the removal of soil contaminated above the site selected criteria. Soil and excavation water sampling was completed to verify the level of contamination after closure.

An approximate total of 3,500 m^3 of hydrocarbon contaminated soils were excavated from Lot 930 and placed on a liner in a bermed area.

The work completed on Lot 929 and 930 has resulted in the removal of soils in excess of the selected criteria values.

5.0 DISCLAIMER

Dillon Consulting Limited ("Dillon") has used the degree of care and skill ordinarily exercised under similar circumstances at the time the work was performed by reputable members of the environmental consulting profession practising in Canada. Dillon assumes no responsibility for conditions it was not authorized to investigate or which were beyond its scope of work. There is no warranty express or implied by Dillon that the work will discover all potential contamination since it may not be possible, even with exhaustive sampling, testing and analysis, to document all potential contamination on the site.

This report was prepared by Dillon for the sole benefit of our Client and our Client's lending institution the Royal Bank. The material in the report reflects Dillon's best judgment in light of the information available to Dillon at the time of preparation. Any use which a third party (i.e. a party other than our Client or our Client's lending institution) makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Reviewed & Submitted by

Gary Strong, P.Eng.
Technical Review Partner

REGISTERED PROFESSIONAL ENGINEER
G. STRONG
N.W.T.

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
P 010
M. DILLON LIMITED
30/11/00

APPENDIX A

SITE PHOTOGRAPHS

APPENDIX B

LABORATORY CERTIFICATES

Bodycote TECHNITROL • ECO

BODYCOTE TECHNITROL INC.
121, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
TEL.: (514) 697-3273 • FAX: (514) 697-2090

Certificat d'analyse • Certificate of Analysis

Attention: Martin Suchy
Client: Dillon Consulting Ltd
P.O. Box 978, Building 663
Iqaluit, Nunavut, Canada
XOA OHO

Certificate No.: 22106-100
Date Printed: 00-09-20
Date Received: 00-09-18
Work Order No.: 00-89281
Purchase Order No.: 978

Identification	Nfw-50	Nfw-51
Reference	Northern Futurs Remediation	Northern Futurs Remediation
Matrix	Water	Water
Date sampled	00-09-15	00-09-15
Sampling Location	NA	NA
Sampled by	M.Suchy	M.Suchy
Laboratory No.	399676	399677
Units	µg/L	µg/L
Date prepared	00-09-18	00-09-18
Date analyzed	00-09-18	00-09-18
Petroleum Hydrocarbons (C6-C10)	<25	1300
Date prepared	00-09-19	00-09-19
Date analyzed	00-09-19	00-09-19
Petroleum Hydrocarbons (C11-C22)	< 50	400
Date prepared	00-09-19	00-09-19
Date analyzed	00-09-19	00-09-19
Petroleum Hydrocarbons (C23-C32)	< 50	< 50
Total	ND	1700
Comments:		
% Recovery		

Non-conformities:
Comments:
Note: These results only apply to the samples submitted

Chemist _____ Yves Moras

CHIMISTE
Benoit Saumure
88-080
QUÉBEC

Bodycote TECHNITROL • ECO

BODYCOTE TECHNITROL INC.
121, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
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Purchase Order No.: 978

Identification	Nfr-30	Nfr-33	Nfr-35	Nfr-38	Nfr-39
Reference	Northern Futurs Remediation	Northern Futurs Remediation	Northern Futurs Remediation	Northern Futurs Remediation	Northern Futurs Remediation
Matrix	Soil	Soil	Soil	Soil	Soil
Date sampled	00-09-13	00-09-13	00-09-15	00-09-15	00-09-15
Sampling Location	NA	NA	NA	NA	NA
Sampled by	M.Suchy	M.Suchy	M.Suchy	M.Suchy	M.Suchy
Laboratory No.	399669	399670	399671	399672	399673
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date prepared	00-09-19	00-09-19	00-09-19	00-09-19	00-09-19
Date analyzed	00-09-19	00-09-19	00-09-19	00-09-19	00-09-19
Petroleum Hydrocarbons (C6-C10)	39	189	< 10	479	1702
Date prepared	00-09-19	00-09-19	00-09-19	00-09-19	00-09-19
Date analyzed	00-09-19	00-09-19	00-09-19	00-09-19	00-09-19
Petroleum Hydrocarbons (C11-C22)	350	150	1300	< 50	< 50
Date prepared	00-09-19	00-09-19	00-09-19	00-09-19	00-09-19
Date analyzed	00-09-19	00-09-19	00-09-19	00-09-19	00-09-19
Petroleum Hydrocarbons (C23-C32)	< 50	1600	120	110	76
Total	389	1939	1420	589	1778
Comments:					
% Recovery					

Non-conformities:
Comments:
Note: These results only apply to the samples submitted

Chemist _____ Yves Moras

CHIMISTE
Benoit Saumure
88-080
QUÉBEC

Bodycote TECHNITROL • ECO

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XOA OHO

Certificate No.: 22106-100
Date Printed: 00-09-20
Date Received: 00-09-18
Work Order No.: 00-89281
Purchase Order No.: 978

Identification	Nfr-40	Nfr-41
Reference	Northern Futurs Remediation	Northern Futurs Remediation
Matrix	Soil	Soil
Date sampled	00-09-15	00-09-15
Sampling Location	NA	NA
Sampled by	M.Suchy	M.Suchy
Laboratory No.	399674	399675
Units	mg/kg	mg/kg
Date prepared	00-09-19	00-09-19
Date analyzed	00-09-19	00-09-19
Petroleum Hydrocarbons (C6-C10)	< 10	< 10
Date prepared	00-09-19	00-09-19
Date analyzed	00-09-19	00-09-19
Petroleum Hydrocarbons (C11-C22)	73	< 50
Date prepared	00-09-19	00-09-19
Date analyzed	00-09-19	00-09-19
Petroleum Hydrocarbons (C23-C32)	320	< 50
Total	393	ND
Comments:		
% Recovery		

Non-conformities:
Comments:
Note: These results only apply to the samples submitted

Chemist Yves Moras

CHIMISTE Benoit Saumure 88-080 QUÉBEC

Bodycote TECHNITROL • ECO

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Identification	Nfw-50	Nfw-51
Reference	Northern Futurs Remediation	Northern Futurs Remediation
Matrix	Water	Water
Date sampled	00-09-15	00-09-15
Sampling Location	NA	NA
Sampled by	M.Suchy	M.Suchy
Laboratory No.	399676	399677
Date prepared	00-09-18	00-09-19
Date analyzed	00-09-18	00-09-19
BTEX-L-13	µg/L	µg/L
Benzene	0.2	4.4
Toluene	1.4	30
Ethylbenzene	< 0.1	4.7
Xylenes	0.1	130
Total	1.7	169
% Recovery		
Dibromofluoromethane	100	95
D8-Toluene	109	90
1-Bromo-4-fluorobenzene	106	88

Non-conformities:
Comments:
Note: These results only apply to the samples submitted

Chemist _____ Yves Moras

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Benoit Saumure
88-080
QUÉBEC

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Certificat d'analyse • Certificate of Analysis

Attention: Martin Suchy
Client: Dillon Consulting Ltd
P.O. Box 978, Building 663
Iqaluit, Nunavut, Canada
XOA OHO

Certificate No.: 22106-100
Date Printed: 00-09-20
Date Received: 00-09-18
Work Order No.: 00-89281
Purchase Order No.: 978

Identification	Nfr-30 Northern Futurs Remediation	Nfr-33 Northern Futurs Remediation	Nfr-35 Northern Futurs Remediation	Nfr-38 Northern Futurs Remediation	Nfr-39 Northern Futurs Remediation
Reference	Soil	Soil	Soil	Soil	Soil
Matrix	00-09-13	00-09-13	00-09-15	00-09-15	00-09-15
Date sampled	NA	NA	NA	NA	NA
Sampling Location	M.Suchy	M.Suchy	M.Suchy	M.Suchy	M.Suchy
Sampled by	399669	399670	399671	399672	399673
Laboratory No.	00-09-19	00-09-19	00-09-19	00-09-19	00-09-19
Date prepared	00-09-19	00-09-19	00-09-19	00-09-19	00-09-19
Date analyzed					
BTEX-S-13	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Benzene	< 0.05	< 0.05	< 0.05	< 0.05	< 0.2
Toluene	< 0.1	< 0.1	< 0.1	0.3	< 0.2
Ethylbenzene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2
Xylenes	< 0.1	< 0.1	< 0.1	0.3	0.4
Total	ND	ND	ND	0.6	0.4
% Recovery					
Dibromofluoromethane	88	81	110	71	46*
D8-Toluene	80	83	83	80	77
1-Bromo-4-fluorobenzene	97	98	98	90	86

Non-conformities:
Comments: (*) Matrix effect.
Note: These results only apply to the samples submitted

Chemist _____ Yves Moras

CHIMISTE
Benoit Saumure
38-030
QUÉBEC

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Date Printed: 00-09-20
Date Received: 00-09-18
Work Order No.: 00-89281
Purchase Order No.: 978

Identification	Nfr-40	Nfr-41
Reference	Northern Futurs Remediation	Northern Futurs Remediation
Matrix	Soil	Soil
Date sampled	00-09-15	00-09-15
Sampling Location	NA	NA
Sampled by	M.Suchy	M.Suchy
Laboratory No.	399674	399675
Date prepared	00-09-19	00-09-19
Date analyzed	00-09-19	00-09-19
BTEX-S-13	mg/kg	mg/kg
Benzene	< 0.05	< 0.05
Toluene	0.2	0.1
Ethylbenzene	< 0.1	0.1
Xylenes	< 0.1	0.7
Total	0.2	0.9
% Recovery		
Dibromofluoromethane	125	88
D8-Toluene	96	76
1-Bromo-4-fluorobenzene	110	86

Non-conformities:
Comments:
Note: These results only apply to the samples submitted

Chemist _____ Yves Moras

CHIMISTE
Benoit Saumure
98-080
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Date Printed: 00-09-20
Date Received: 00-09-18
Work Order No.: 00-89281
Purchase Order No.: 978

Laboratory No.	399765	399766	
Control Type	Blank	Reference materials	
Matrix			
Date Sampled			
Sampling Location			
Sampled by			
Reference		Obtained	Range
Date Prepared	00-09-18	00-09-18	
Date Analyzed	00-09-18	00-09-18	
BTEX-L-13	µg/L	µg/L	µg/L
Benzene	< 0.1	16	(13.9 - 22.4)
Toluene	< 0.1	15	(13.5 - 21.1)
Ethylbenzene	< 0.1	18	(14.7 - 23)
Xylenes	< 0.1	57	(41.2 - 80.2)
Total	ND		
% Recovery			
Dibromofluoromethane	99	101	
D8-Toluene	107	110	
1-Bromo-4-fluorobenzene	109	109	

Non-conformities:
Comments:
Note: These results only apply to the samples submitted

~ Yves Moras

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88-080
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121, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
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P.O. Box 978, Building 663
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Date Printed: 00-09-20
Date Received: 00-09-18
Work Order No.: 00-89281
Purchase Order No.: 978

Laboratory No.	400373	400374	
Control Type	Blank	Reference materials	
Matrix			
Date Sampled			
Sampling Location			
Sampled by			
Reference		Obtained	Range
Date Prepared	00-09-19	00-09-19	
Date Analyzed	00-09-19	00-09-19	
BTEX-L-13	µg/L	µg/L	µg/L
Benzene	< 0.1	17	(13.9 - 22.4)
Toluene	< 0.1	16	(13.5 - 21.1)
Ethylbenzene	< 0.1	18	(14.7 - 23)
Xylenes	< 0.1	59	(41.2 - 80.2)
Total	ND		
% Recovery			
Dibromofluoromethane	101	99	
D8-Toluene	103	99	
1-Bromo-4-fluorobenzene	102	99	

Non-conformities:
Comments:
Note: These results only apply to the samples submitted

Yves Moras

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Benoit Saumure
88-080
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121, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
TÉL.: (514) 697-3273 • FAX: (514) 697-2090

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Client: Dillon Consulting Ltd
P.O. Box 978, Building 663
Iqaluit, Nunavut, Canada
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Date Printed: 00-09-20
Date Received: 00-09-18
Work Order No.: 00-89281
Purchase Order No.: 978

Laboratory No.	400338	399669	400447	400339	
Control Type	Blank	Sample	Duplicate	Reference materials	
Matrix	Soil	Soil	Soil		
Date Sampled		00-09-13	00-09-13		
Sampling Location		NA	NA		
Sampled by		M.Suchy	M.Suchy		
Reference				Obtained	Range
Date Prepared	00-09-19	00-09-19	00-09-19	00-09-19	
Date Analyzed	00-09-19	00-09-19	00-09-19	00-09-19	
BTEX-L-13	mg/kg	mg/kg	mg/kg	ng	ng
Benzene	< 0.05	< 0.05	< 0.05	680	(445 - 850)
Toluene	< 0.1	< 0.1	0.2	1000	(895 - 1625)
Ethylbenzene	< 0.1	< 0.1	< 0.1	340	(302 - 550)
Xylenes	< 0.1	< 0.1	< 0.1	2000	(1898 - 3354)
Total	ND	ND	0.2		
% Recovery					
Dibromofluoromethane	90	88	97	105	
D8-Toluene	72	80	69	84	
1-Bromo-4-fluorobenzene	80	97	80	95	

Non-conformities:
Comments:
Note: These results only apply to the samples submitted

Yves Moras

CHIMISTE
Benoit Saumure
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TÉL.: (514) 697-3273 • FAX: (514) 697-2090

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Client: Dillon Consulting Ltd
P.O. Box 978, Building 663
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Work Order No.: 00-89281
Purchase Order No.: 978

Laboratory No.	380768	380788	
Control Type	Blank	Reference materials	
Matrix			
Date Sampled			
Sampling Location			
Sampled by			
Reference		Obtained	Range
Units	µg/L	µg/L	µg/L
Date prepared	00-09-18	00-09-18	
Date analyzed	00-09-18	00-09-18	
Petroleum Hydrocarbons (C6-C10)	< 25	3700	(3500 - 6500)
Date prepared	00-09-19	00-09-19	
Date analyzed	00-09-19	00-09-19	
Petroleum Hydrocarbons (C11-C22)	< 50	1400	(1100 - 2800)
Date prepared	00-09-19		
Date analyzed	00-09-19		
Petroleum Hydrocarbons (C23-C32)	< 50		
Total	ND		
Comments			
% Recovery			

Non-conformities:
Comments:
Note: These results only apply to the samples submitted

Yves Moras

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88-080
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121, BOUL. HYMUS, POINTE-CLAIRE, QUÉBEC H9R 1E6
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Iqaluit, Nunavut, Canada
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Certificate No.: 22106-100
Date Printed: 00-09-20
Date Received: 00-09-18
Work Order No.: 00-89281
Purchase Order No.: 978

Laboratory No.	399431	399671	399487	399457	
Control Type	Blank	Sample	Duplicate	Reference materials	
Matrix	Soil	Soil	Soil		
Date Sampled		00-09-13	00-09-13		
Sampling Location		NA	NA		
Sampled by		M.Suchy	M.Suchy		
Reference				Obtained	Range
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date prepared	00-09-19	00-09-19		00-09-19	
Date analyzed	00-09-19	00-09-19		00-09-19	
Petroleum Hydrocarbons (C6-C10)	< 10	< 10	(*)	45	(35 - 65)
Date prepared	00-09-19	00-09-19	00-09-19	00-09-19	
Date analyzed	00-09-19	00-09-19	00-09-19	00-09-19	
Petroleum Hydrocarbons (C11-C22)	< 50	1300	1600	1100	(710 - 1900)
Date prepared	00-09-19	00-09-19	00-09-19		
Date analyzed	00-09-19	00-09-19	00-09-19		
Petroleum Hydrocarbons (C23-C32)	< 50	120	< 50		
Total	ND	1420			
Comments:			(*) Not done in duplicate		
% Recovery					

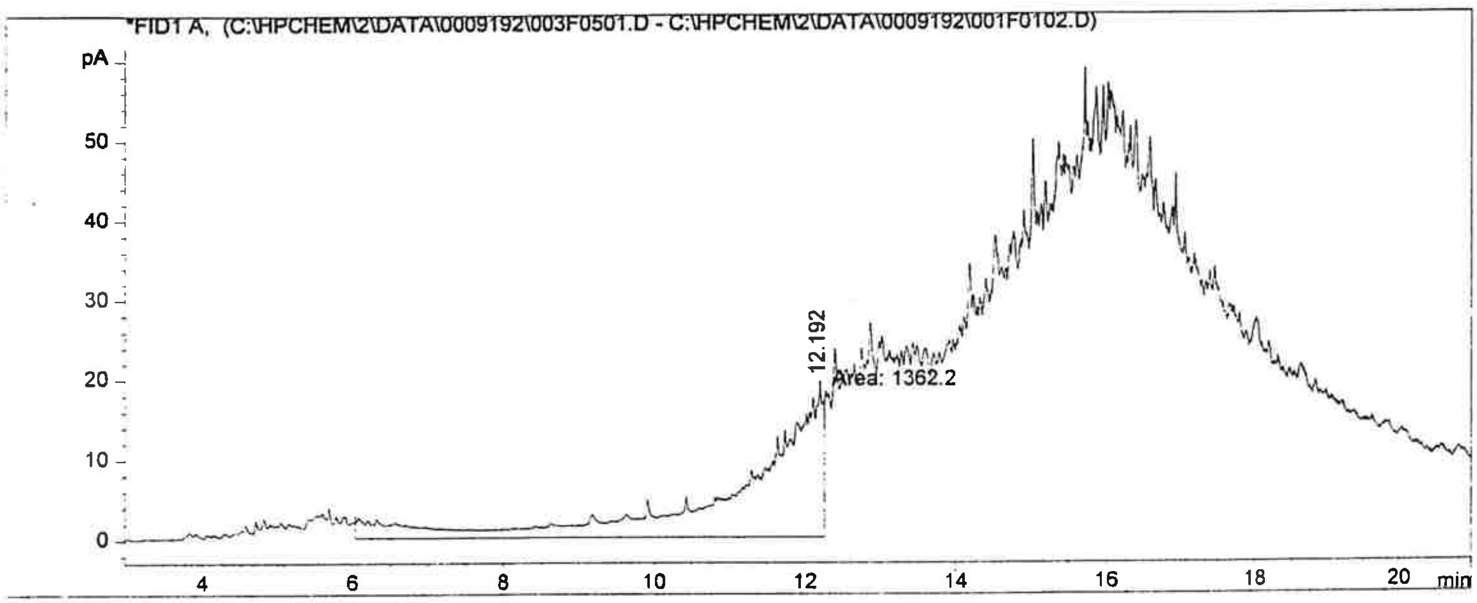
Non-conformities:
Comments:
Note: These results only apply to the samples submitted

CHIMISTE
Benoit Saumure
88-080
QUÉBEC

Yves Moras

Injection Date	: 00-09-19 17:05:16	Seq. Line :	5
Sample Name	: 399670	Vial :	3
Acq. Operator	: Frédéric Saura	Inj :	1
Acq. Instrument	: Instrument 2	Inj Volume :	1 µl
Acq. Method	: C:\HPCHEM\2\METHODS\MUST001.M		
Last changed	: 00-06-07 11:43:03 by dave comtois		
Analysis Method	: C:\HPCHEM\2\METHODS\MU002DF.M		
Last changed	: 00-08-11 09:47:52 by Frédéric Saura		

ALBERTA C11C36 150698



External Standard Report (Sample Amount is 0!)

Sorted By	:	Signal
Calib. Data Modified	:	12 June, 1900 12:16:46
Multiplier	:	1.0000
Dilution	:	1.0000
Uncalibrated Peaks	:	not reported

Signal 1: FID1 A,
Signal has been modified after loading from rawdata file!
Results obtained with enhanced integrator!

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ng/ul]	Grp	Name
12.192	FM	1362.19995	5.19160e-2	70.71997		c11-c22
Totals :				70.71997		

hp3

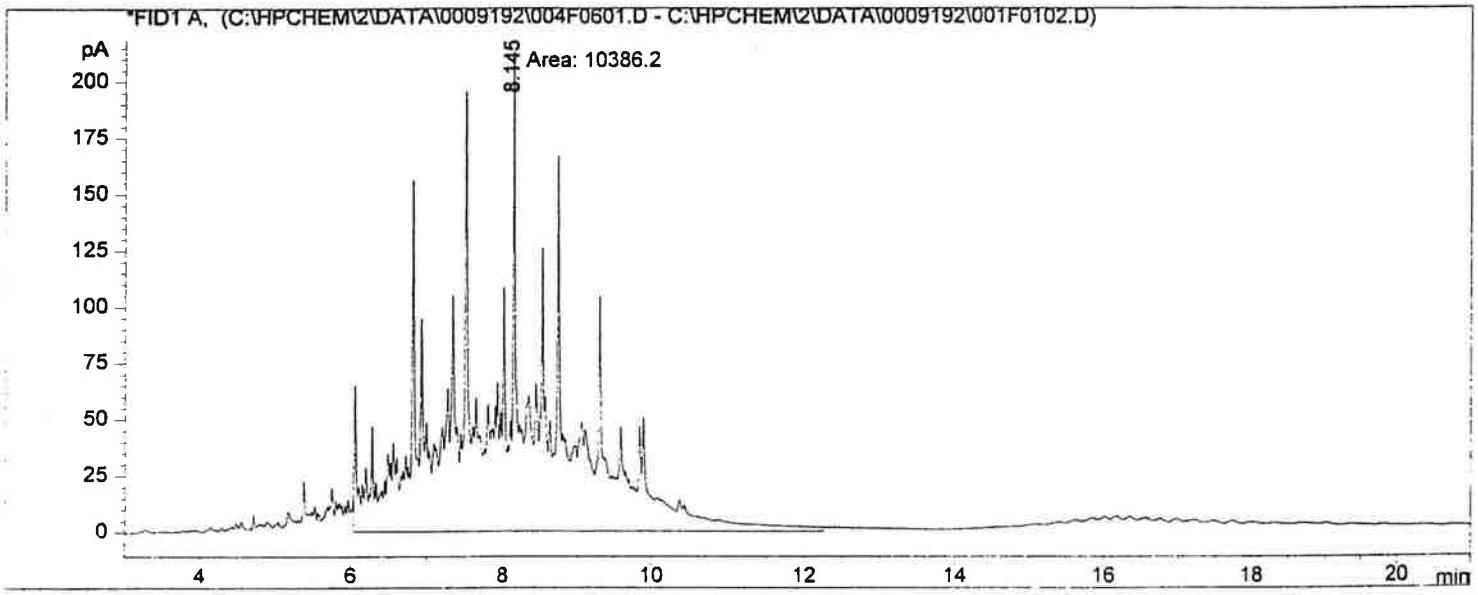
X20ml / 9.18g 154mg/Kg

1 Warnings or Errors :

Warning : Sample amount is zero. Absolute amounts calculated

Data File C:\HPCHEM\2\DATA\0009192\004F0601.D Sample Name: 399671
89281 000919 01 10.04

```
==========================================================================
Injection Date  : 00-09-19 17:37:59              Seq. Line :   6
Sample Name     : 399671                            Vial :   4
Acq. Operator   : Frédéric Saura                     Inj :   1
Acq. Instrument : Instrument 2                 Inj Volume : 1 µl
Acq. Method     : C:\HPCHEM\2\METHODS\MUST001.M
Last changed    : 00-06-07 11:43:03  by dave comtois
Analysis Method : C:\HPCHEM\2\METHODS\MU002DF.M
Last changed    : 00-08-11 09:47:52  by Frédéric Saura
ALBERTA C11C36 150698
==========================================================================
```




```
==========================================================================
           External Standard Report (Sample Amount is 0!)
==========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      12 June, 1900 12:16:46
Multiplier            :      1.0000
Dilution              :      1.0000
Uncalibrated Peaks    :      not reported

Signal 1: FID1 A,
 Signal has been modified after loading from rawdata file!
 Results obtained with enhanced integrator!

RetTime  Type     Area      Amt/Area    Amount    Grp   Name
 [min]          [pA*s]                 [ng/ul]
-------|------|----------|----------|----------|--|-----------------
  8.145 FM     1.03862e4  5.26624e-2  546.96357    c11-c22          hp3

Totals :                              546.96357

1 Warnings or Errors :

Warning : Sample amount is zero. Absolute amounts calculated

==========================================================================
```

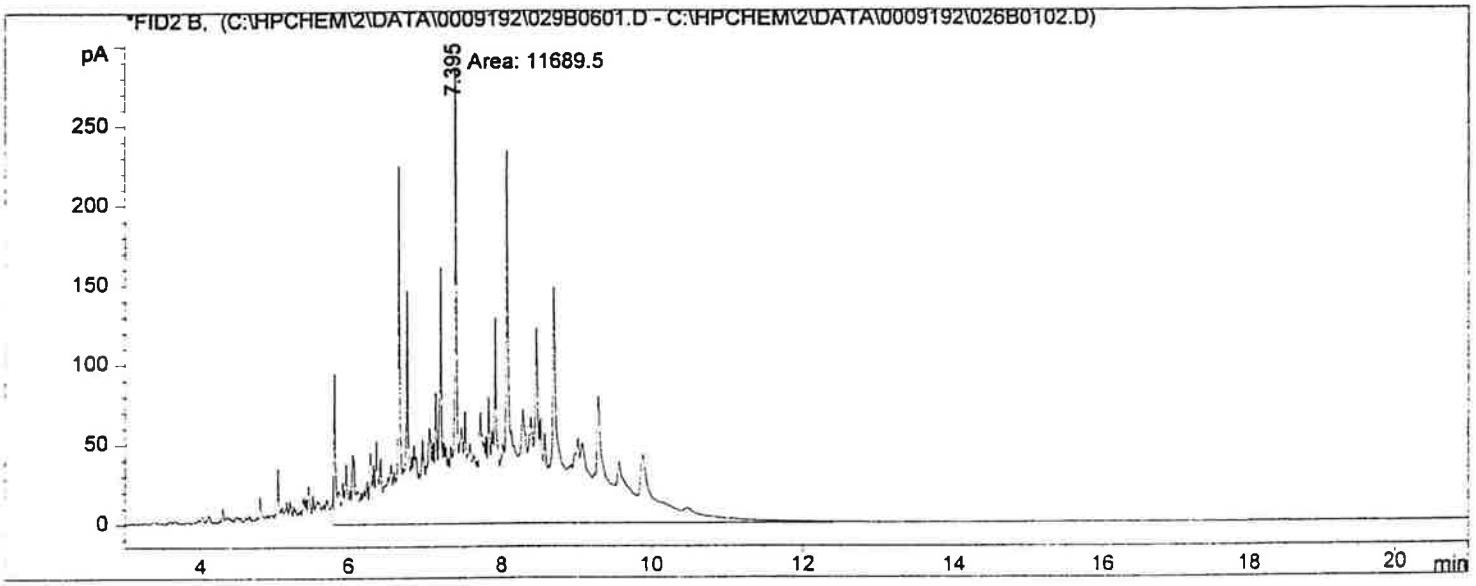
X20 mL / 8.63 g 1268 mg/kg

Data File C:\HPCHEM\2\DATA\0009192\029B0601.D Sample Name: 399671d

89281 000919 01 10.94

[redacted] ; 399487 400450

```
==========================================================================
Injection Date  : 00-09-19 17:37:59              Seq. Line :   6
Sample Name     : 399671d                           Vial :  29
Acq. Operator   : Frédéric Saura                     Inj :   1
Acq. Instrument : Instrument 2                 Inj Volume : 1 µl
Acq. Method     : C:\HPCHEM\2\METHODS\MUST001.M
Last changed    : 00-06-07 11:43:03  by dave comtois
Analysis Method : C:\HPCHEM\2\METHODS\MU002DB.M
Last changed    : 00-08-30 12:30:25  by Frédéric Saura
ALBERTA C11C36 150698
==========================================================================
```




```
==========================================================================
            External Standard Report (Sample Amount is 0!)
==========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      31 May, 1900 13:26:06
Multiplier            :      1.0000
Dilution              :      1.0000
Uncalibrated Peaks    :      not reported

Signal 1: FID2 B,
 Signal has been modified after loading from rawdata file!
 Results obtained with enhanced integrator!

RetTime  Type     Area      Amt/Area    Amount    Grp   Name
 [min]          [pA*s]                 [ng/ul]
-------|------|----------|----------|----------|--|-----------------
  7.395 FM     1.16895e4  6.16259e-2  720.37451     c11-c22          hp3

Totals :                               720.37451

1 Warnings or Errors :

Warning : Sample amount is zero. Absolute amounts calculated
```

X20~1 / 9.06g = 1590 mg/kg

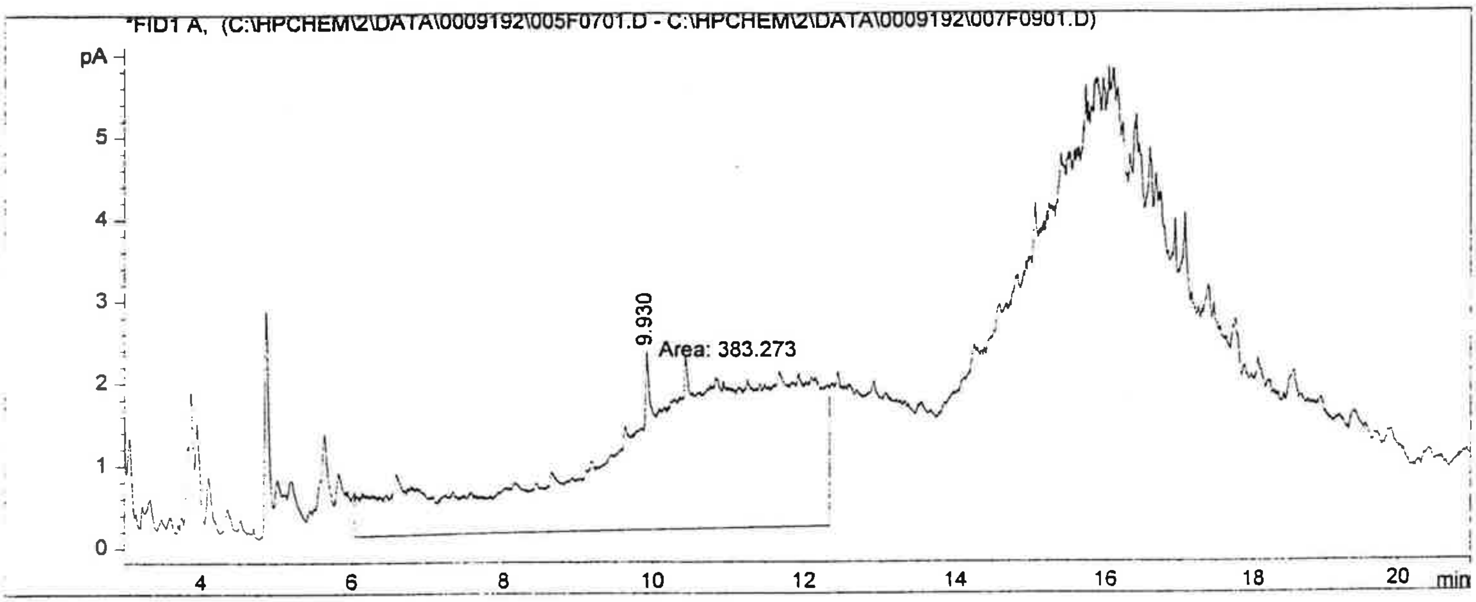
Data File C:\HPCHEM\2\DATA\0009192\005F0701.D Sample Name: 399672
89281 000919 01 10.26

===

Injection Date	: 00-09-19 18:10:43	Seq. Line :	7
Sample Name	: 399672	Vial :	5
Acq. Operator	: Frédéric Saura	Inj :	1
Acq. Instrument	: Instrument 2	Inj Volume :	1 µl
Acq. Method	: C:\HPCHEM\2\METHODS\MUST001.M		
Last changed	: 00-06-07 11:43:03 by dave comtois		
Analysis Method	: C:\HPCHEM\2\METHODS\MU002DF.M		
Last changed	: 00-08-11 09:47:52 by Frédéric Saura		

ALBERTA C11C36 150698

===



===

External Standard Report (Sample Amount is 0!)

===

Sorted By	:	Signal
Calib. Data Modified	:	12 June, 1900 12:16:46
Multiplier	:	1.0000
Dilution	:	1.0000
Uncalibrated Peaks	:	not reported

Signal 1: FID1 A,
Signal has been modified after loading from rawdata file!
Results obtained with enhanced integrator!

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ng/ul]	Grp	Name
9.930	FM	383.27289	4.97217e-2	19.05698		c11-c22

hp3

Totals : 19.05698

X 20 ml / 9.03 g < 50 mg/kg

1 Warnings or Errors :

Warning : Sample amount is zero. Absolute amounts calculated

===

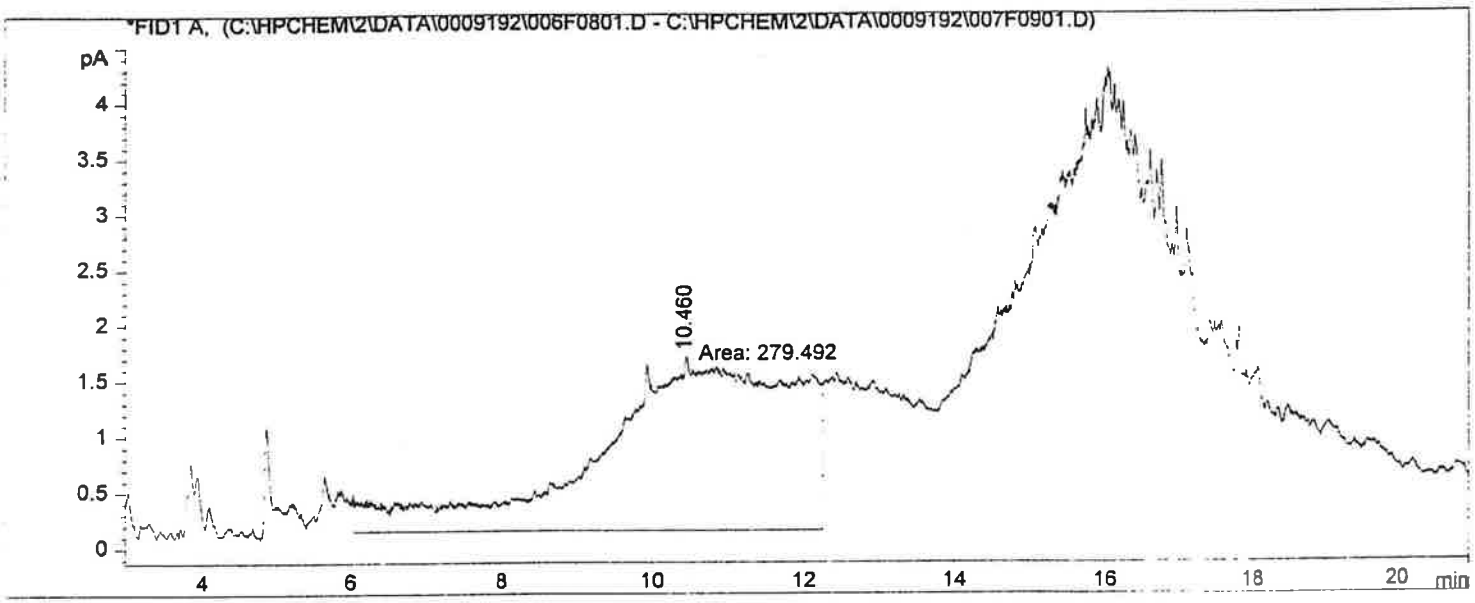
Data File C:\HPCHEM\2\DATA\0009192\006F0801.D Sample Name: 399673
89281 000919 01 10.41

==========

Injection Date	: 00-09-19 18:43:31	Seq. Line	: 8
Sample Name	: 399673	Vial	: 6
Acq. Operator	: Frédéric Saura	Inj	: 1
Acq. Instrument	: Instrument 2	Inj Volume	: 1 µl

Acq. Method : C:\HPCHEM\2\METHODS\MUST001.M
Last changed : 00-06-07 11:43:03 by dave comtois
Analysis Method : C:\HPCHEM\2\METHODS\MU002DF.M
Last changed : 00-08-11 09:47:52 by Frédéric Saura
ALBERTA C11C36 150698

==========



==========

External Standard Report (Sample Amount is 0!)

==========

Sorted By : Signal
Calib. Data Modified : 12 June, 1900 12:16:46
Multiplier : 1.0000
Dilution : 1.0000
Uncalibrated Peaks : not reported

Signal 1: FID1 A,
Signal has been modified after loading from rawdata file!
Results obtained with enhanced integrator!

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ng/ul]	Grp	Name	
10.460	FM	279.49161	4.85879e-2	13.57991		c11-c22	hp3
Totals :				13.57991			

1 Warnings or Errors :

Warning : Sample amount is zero. Absolute amounts calculated

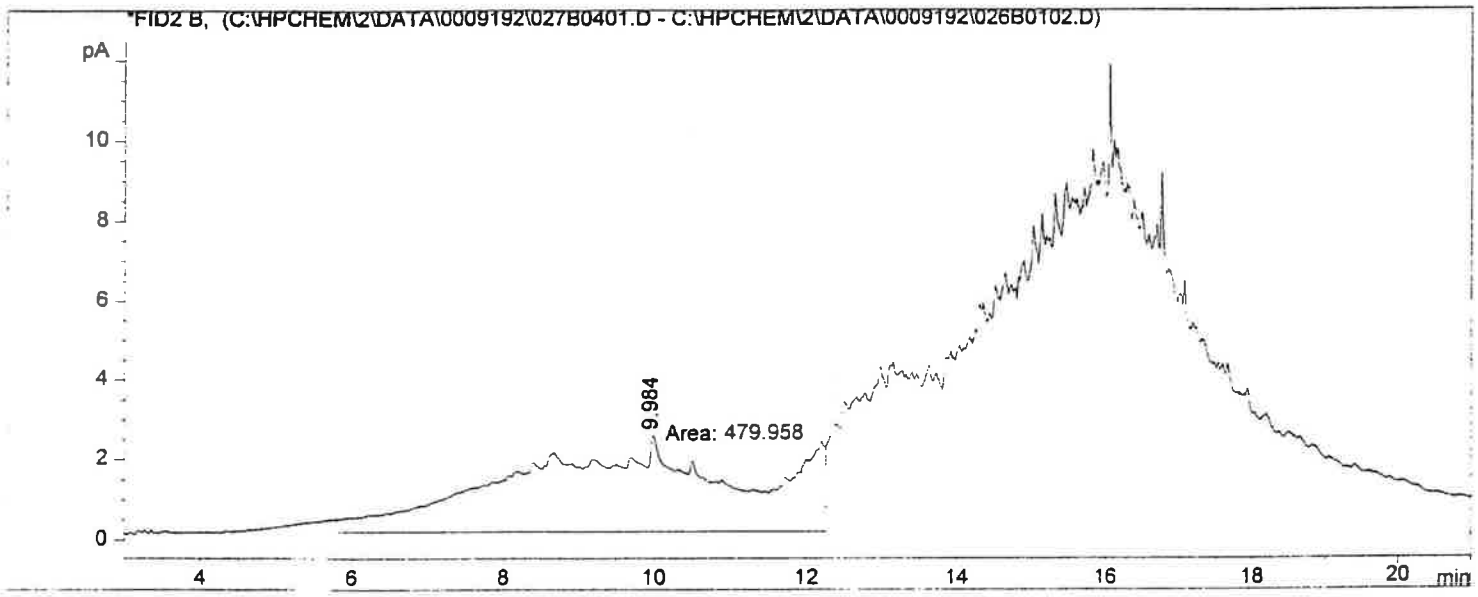
==========

$\frac{\times 20 \text{ mL}}{8.95 \text{ g}} < 50 \text{ mg/kg}$

Data File C:\HPCHEM\2\DATA\0009192\027B0401.D Sample Name: 399674 89281

89281 000919 01 10:44

```
==========================================================================
Injection Date  : 00-09-19 16:32:22              Seq. Line :   4
Sample Name     : 399674     89281                   Vial :  27
Acq. Operator   : Frédéric Saura                     Inj :   1
Acq. Instrument : Instrument 2                 Inj Volume : 1 µl
Acq. Method     : C:\HPCHEM\2\METHODS\MUST001.M
Last changed    : 00-06-07 11:43:03  by dave comtois
Analysis Method : C:\HPCHEM\2\METHODS\MU002DB.M
Last changed    : 00-08-30 12:30:25  by Frédéric Saura
ALBERTA C11C36 150698
==========================================================================
```




```
==========================================================================
           External Standard Report (Sample Amount is 0!)
==========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      31 May, 1900 13:26:06
Multiplier            :      1.0000
Dilution              :      1.0000
Uncalibrated Peaks    :      not reported

Signal 1: FID2 B,
 Signal has been modified after loading from rawdata file!
 Results obtained with enhanced integrator!

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [pA*s]                [ng/ul]
-------|------|----------|----------|----------|--|-----------------
  9.984 FM      479.95807 6.16259e-2   29.57787   c11-c22          hp3

Totals :                                29.57787

1 Warnings or Errors :

Warning : Sample amount is zero. Absolute amounts calculated

==========================================================================
```

X 20 mL = 73 mg/kg

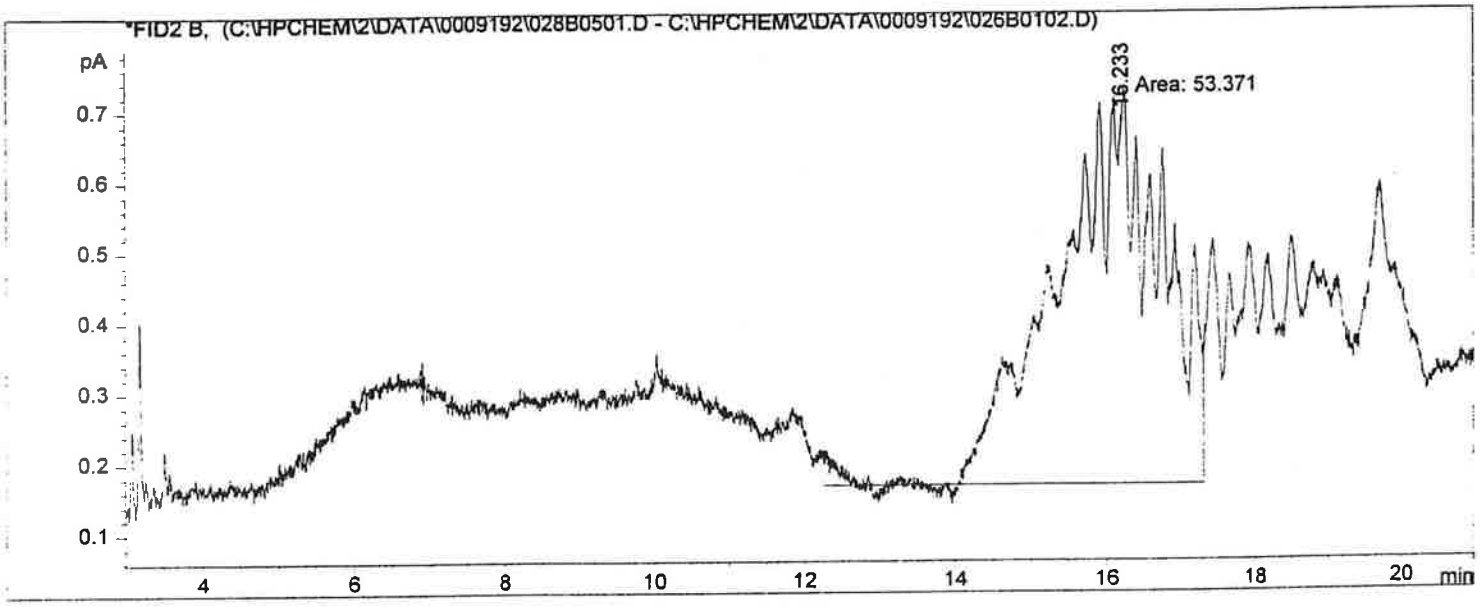
8.14 g

Data File C:\HPCHEM\2\DATA\0009192\028B0501.D Sample Name: 399675
89281 000919 01 10:28

==========

Injection Date : 00-09-19 17:05:16 Seq. Line : 5
Sample Name : 399675 Vial : 28
Acq. Operator : Frédéric Saura Inj : 1
Acq. Instrument : Instrument 2 Inj Volume : 1 µl
Acq. Method : C:\HPCHEM\2\METHODS\MUST001.M
Last changed : 00-06-07 11:43:03 by dave comtois
Analysis Method : C:\HPCHEM\2\METHODS\MU002WB.M
Last changed : 00-08-30 12:33:30 by Frédéric Saura
ALBERTA C11C36 150698

==========



==========

External Standard Report (Sample Amount is 0!)

==========

Sorted By : Signal
Calib. Data Modified : 31 May, 1900 13:41:37
Multiplier : 1.0000
Dilution : 1.0000
Uncalibrated Peaks : not reported

Signal 1: FID2 B,
Signal has been modified after loading from rawdata file!
Results obtained with enhanced integrator!

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ng/ul]	Grp	Name	
16.233	MF	53.37098	7.37621e-2	3.93675		c22-c32	hp3
Totals :				3.93675			

1 Warnings or Errors :

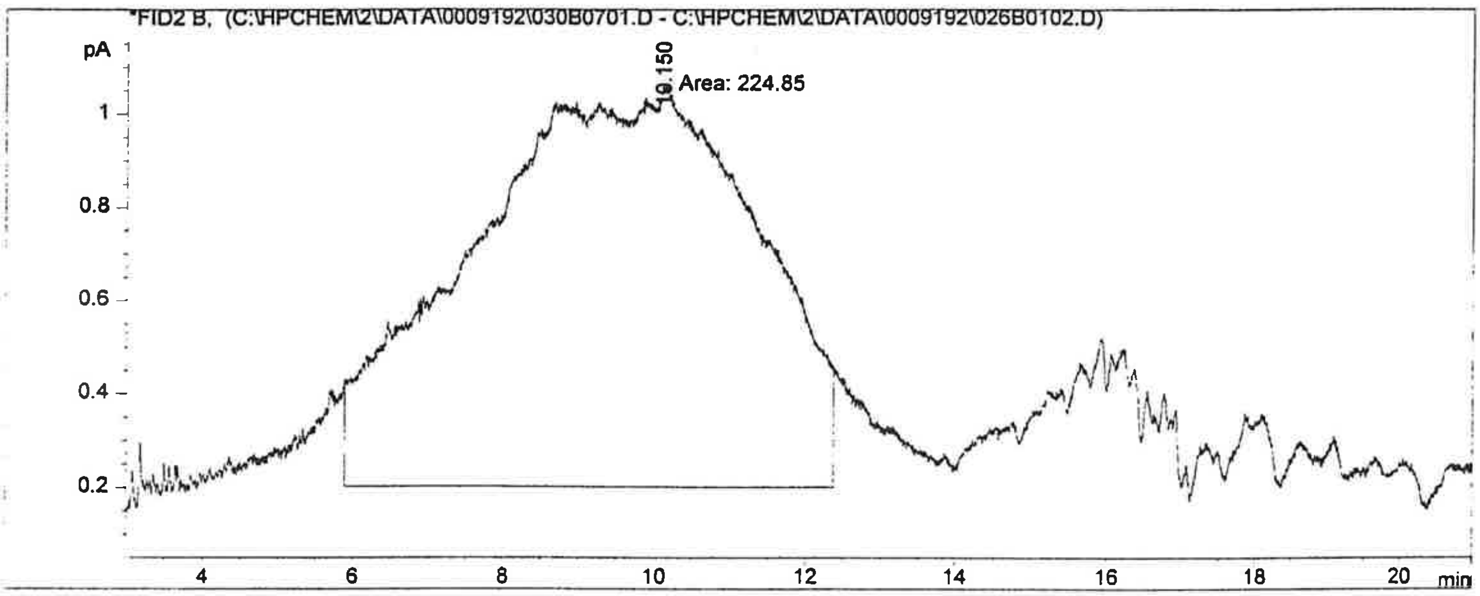
Warning : Sample amount is zero. Absolute amounts calculated

==========

X 20 ml / 8.74 g ~~300~~ 50 ml/g

Data File C:\HPCHEM\2\DATA\0009192\030B0701.D Sample Name: 399676
000919 01 89281 vi 840ml

```
=====================================================================
Injection Date  : 00-09-19 18:10:43              Seq. Line :   7
Sample Name     : 399676                              Vial :  30
Acq. Operator   : Frédéric Saura                       Inj :   1
Acq. Instrument : Instrument 2                  Inj Volume : 1 µl
Acq. Method     : C:\HPCHEM\2\METHODS\MUST001.M
Last changed    : 00-06-07 11:43:03  by dave comtois
Analysis Method : C:\HPCHEM\2\METHODS\MU002DB.M
Last changed    : 00-08-30 12:30:25  by Frédéric Saura
ALBERTA C11C36 150698
=====================================================================
```



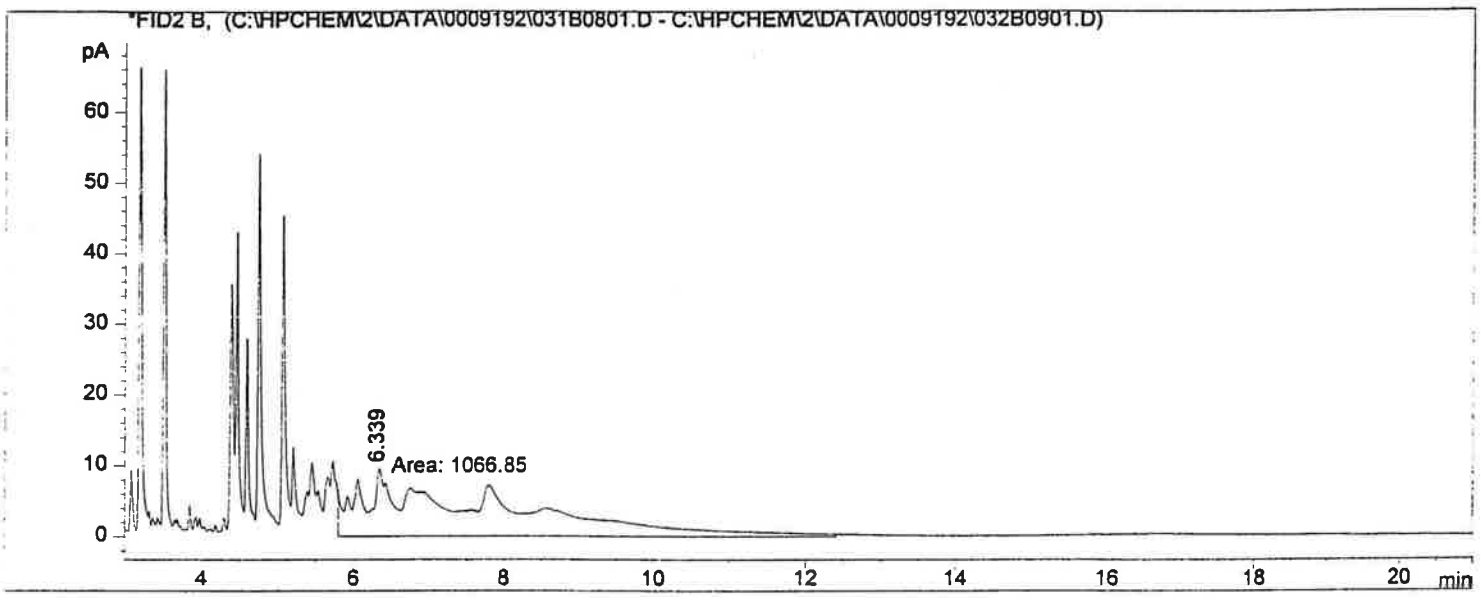

```
=====================================================================
          External Standard Report (Sample Amount is 0!)
=====================================================================

Sorted By              :     Signal
Calib. Data Modified   :     31 May, 1900 13:26:06
Multiplier             :     1.0000
Dilution               :     1.0000
Uncalibrated Peaks     :     not reported

Signal 1: FID2 B,
 Signal has been modified after loading from rawdata file!
 Results obtained with enhanced integrator!

RetTime  Type     Area     Amt/Area     Amount    Grp   Name
 [min]          [pA*s]                 [ng/ul]
-------|------|----------|----------|----------|--|------------------
 10.150 MF     224.84978 6.16259e-2   13.85658     c11-c22

Totals :                              13.85658

1 Warnings or Errors :

Warning : Sample amount is zero. Absolute amounts calculated

=====================================================================
```

hp3

X 2.5 ml / 840 ml (50 ul)

Data File C:\HPCHEM\2\DATA\0009192\031B0801.D Sample Name: 399677
000919 01 89281 vi 820ml

```
==========================================================================
Injection Date  : 00-09-19 18:43:31              Seq. Line :   8
Sample Name     : 399677                            Vial :  31
Acq. Operator   : Frédéric Saura                     Inj :   1
Acq. Instrument : Instrument 2                 Inj Volume : 1 µl
Acq. Method     : C:\HPCHEM\2\METHODS\MUST001.M
Last changed    : 00-06-07 11:43:03  by dave comtois
Analysis Method : C:\HPCHEM\2\METHODS\MU002DB.M
Last changed    : 00-08-30 12:30:25  by Frédéric Saura
ALBERTA C11C36 150698
==========================================================================
```

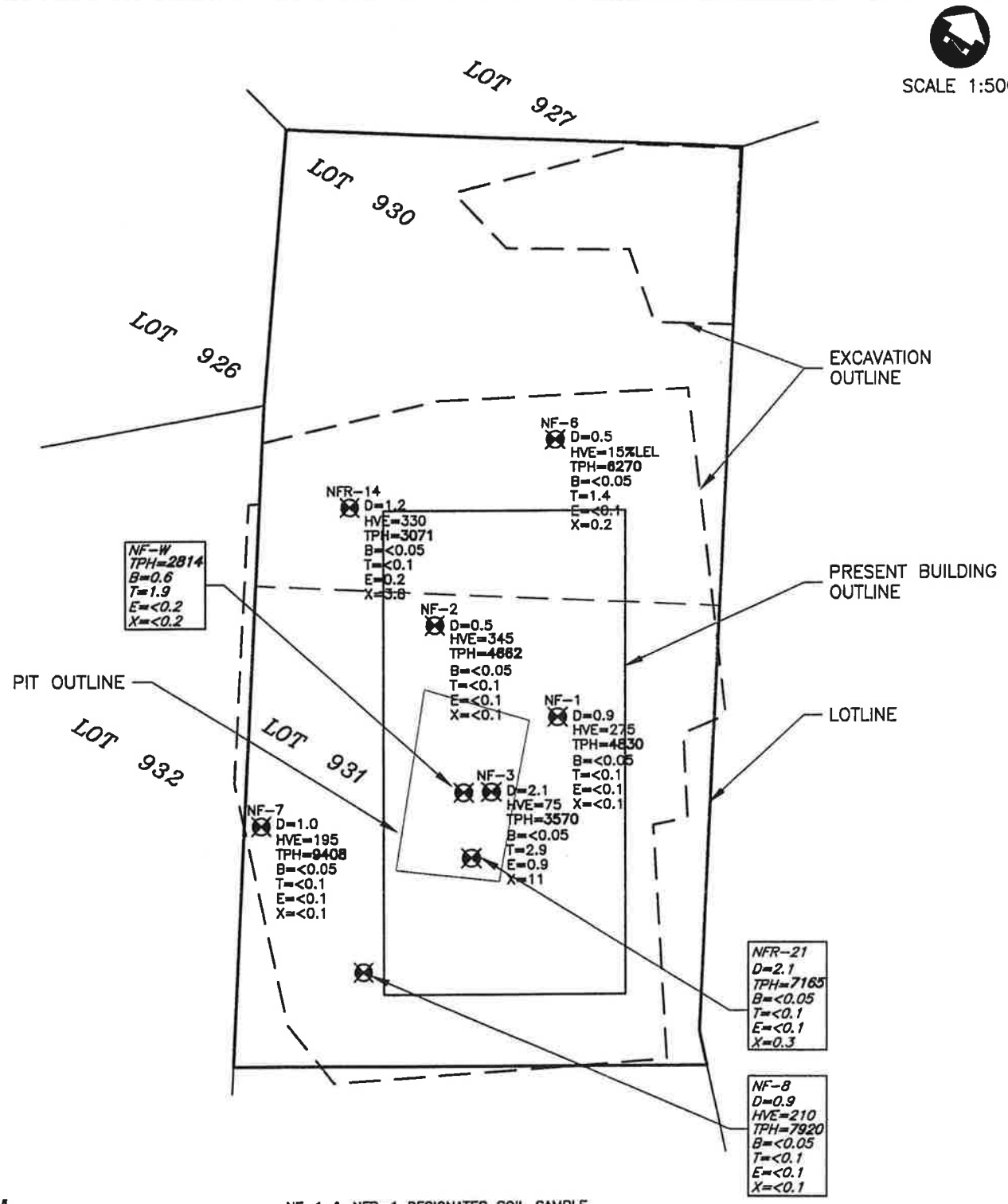



```
==========================================================================
           External Standard Report (Sample Amount is 0!)
==========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      31 May, 1900 13:26:06
Multiplier            :      1.0000
Dilution              :      1.0000
Uncalibrated Peaks    :      not reported

Signal 1: FID2 B,
 Signal has been modified after loading from rawdata file!
 Results obtained with enhanced integrator!

RetTime  Type     Area      Amt/Area    Amount    Grp   Name
 [min]          [pA*s]                 [ng/ul]
-------|------|----------|----------|----------|--|-----------------
  6.339 MF     1066.85254 6.16259e-2   65.74579    c11-c22          hp3

Totals :                               65.74579

1 Warnings or Errors :

Warning : Sample amount is zero. Absolute amounts calculated

==========================================================================
```

$\frac{65.74579 \times 5\,ml}{820\,ml} = 401\,\mu g/l$

APPENDIX C

FIGURES



NOTES

SAMPLE ID #
D=DEPTH (METERS)
HVE=HYDROCARBON VAPOUR EMISSIONS
TPH=TOTAL PETROLEUM HYDROCARBONS
B=BENZNE
T=TOLUENE
E=ETHYLBENZENE
X=TOTAL XYLENES

NF-1 & NFR-1 DESIGNATES SOIL SAMPLE
NF-W & NFW-50 DESIGNATES WATER SAMPLE
ALL SOIL CONCENTRATIONS ARE REPORTED IN PARTS PER MILLION (ppm) AND ALL WATER CONCENTRATIONS ARE REPORTED IN PARTS PER BILLION (ppb) UNLESS OTHERWISE NOTED.
nt = NOT TESTED
nd = NOT DETECTED
BOLD = ABOVE CRITERIA

EDIT DATE: 10/17/00 ACAD FILE: 41tpw g:\cad\007944\nf_figs\nf-final_1.dwg
BASE NAME: a.dwg LOG FILE: na

DILLON CONSULTING

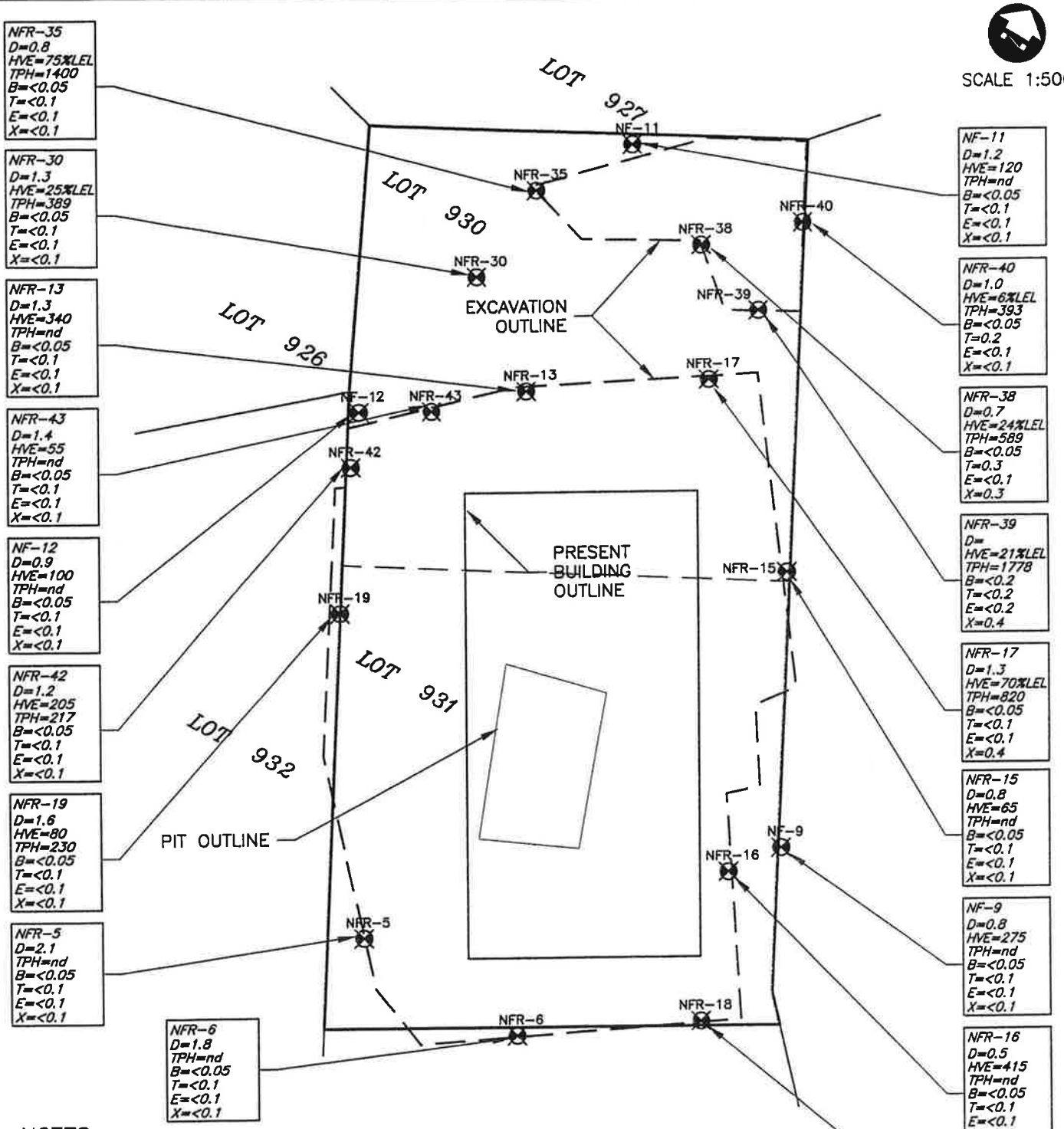
PROJECT: NORTHERN FUTURES REMEDIAL ACTION PLAN

TITLE: HYDROCARBON CONTAMINATION ON LOT 930 ABOVE CRITERIA SAMPLE LOCATIONS

PROJECT NUMBER: 00-7944

DATE: OCT 00

FIGURE NUMBER: FIG 1



NOTES

SAMPLE ID #
D=DEPTH (METERS)
HVE=HYDROCARBON VAPOUR EMISSIONS
TPH=TOTAL PETROLEUM HYDROCARBONS
B=BENZNE
T=TOLUENE
E=ETHYLBENZENE
X=TOTAL XYLENES

NF-1 & NFR-1 DESIGNATES SOIL SAMPLE
NF-W & NFW-50 DESIGNATES WATER SAMPLE
ALL SOIL CONCENTRATIONS ARE REPORTED IN PARTS PER MILLION (ppm) AND ALL WATER CONCENTRATIONS ARE REPORTED IN PARTS PER BILLION (ppb) UNLESS OTHERWISE NOTED.
nt = NOT TESTED
nd = NOT DETECTED
BOLD = ABOVE CRITERIA

EDIT DATE: 10/17/00 ACAD FILE: 41tpw g:\cad\007944\nf_figs\nf-final_2.dwg
BASE NAME: a.dwg LOG FILE: na

DILLON CONSULTING

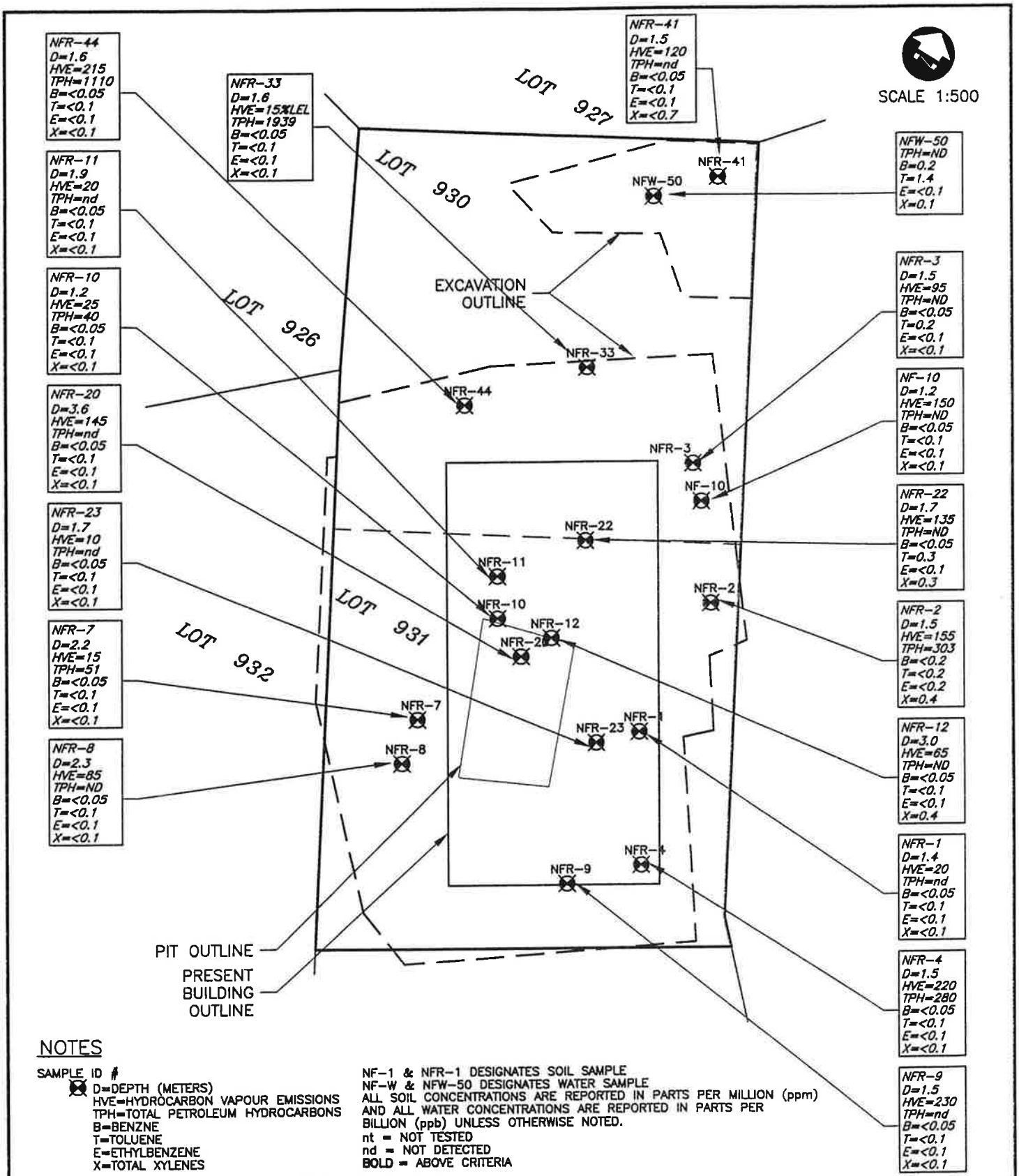
PROJECT: NORTHERN FUTURES REMEDIAL ACTION PLAN

TITLE: HYDROCARBON CONTAMINATION ON LOT 930 CLOSURE SAMPLES – SIDE OF EXCAVATION

PROJECT NUMBER: 00-7944

DATE: OCT 00

FIGURE NUMBER: FIG 2



NOTES

SAMPLE ID #
- D=DEPTH (METERS)
- HVE=HYDROCARBON VAPOUR EMISSIONS
- TPH=TOTAL PETROLEUM HYDROCARBONS
- B=BENZNE
- T=TOLUENE
- E=ETHYLBENZENE
- X=TOTAL XYLENES

NF-1 & NFR-1 DESIGNATES SOIL SAMPLE
NF-W & NFW-50 DESIGNATES WATER SAMPLE
ALL SOIL CONCENTRATIONS ARE REPORTED IN PARTS PER MILLION (ppm) AND ALL WATER CONCENTRATIONS ARE REPORTED IN PARTS PER BILLION (ppb) UNLESS OTHERWISE NOTED.
nt = NOT TESTED
nd = NOT DETECTED
BOLD = ABOVE CRITERIA

EDIT DATE: 10/17/00 ACAD FILE: 41tpw g:\cad\007944\nf_figs\nf-final_3.dwg
BASE NAME: a.dwg LOG FILE: na

DILLON CONSULTING

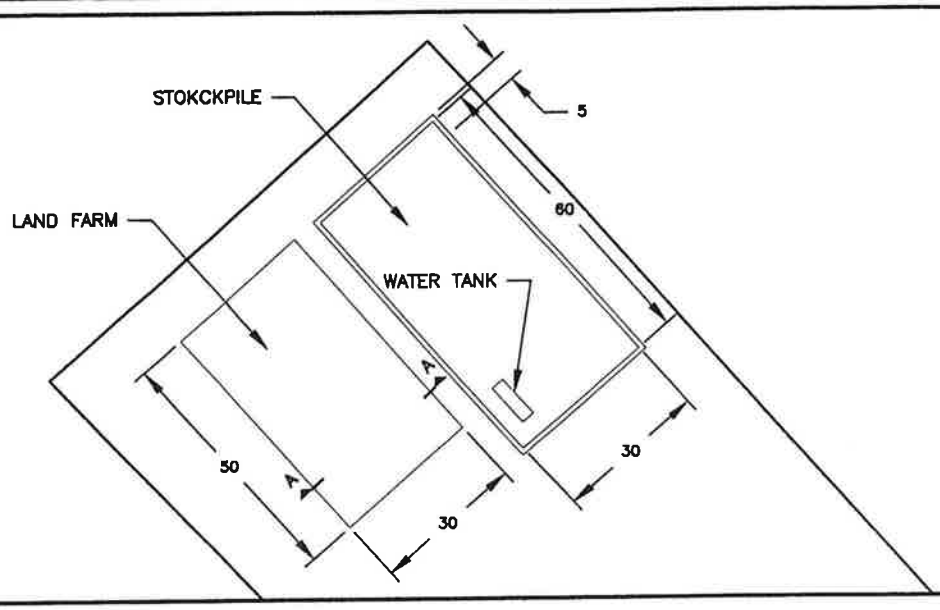
PROJECT: NORTHERN FUTURES REMEDIAL ACTION PLAN

TITLE: HYDROCARBON CONTAMINATION ON LOT 930 CLOSURE SAMPLES – BASE OF EXCAVATION

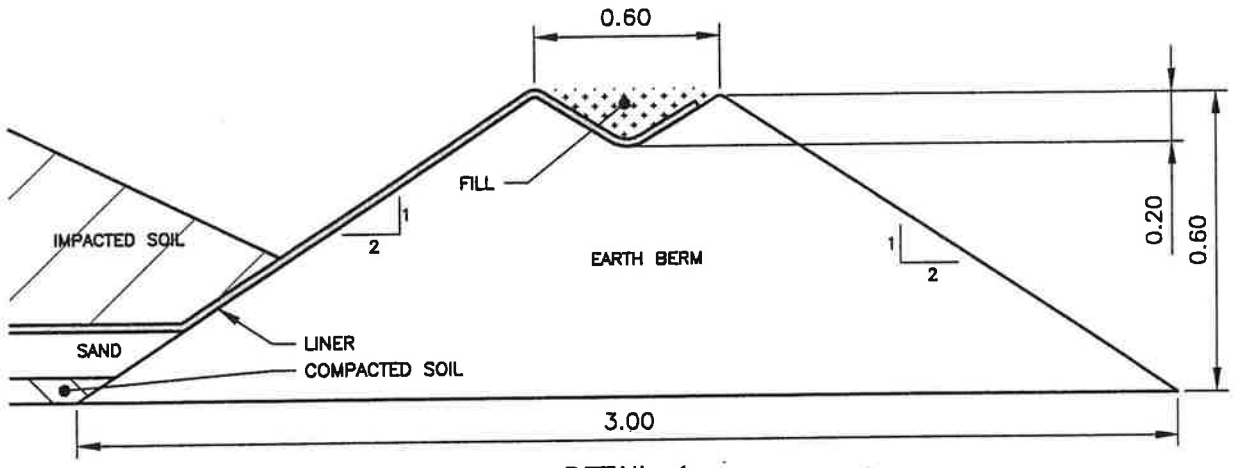
PROJECT NUMBER: 00-7944

DATE: OCT 00

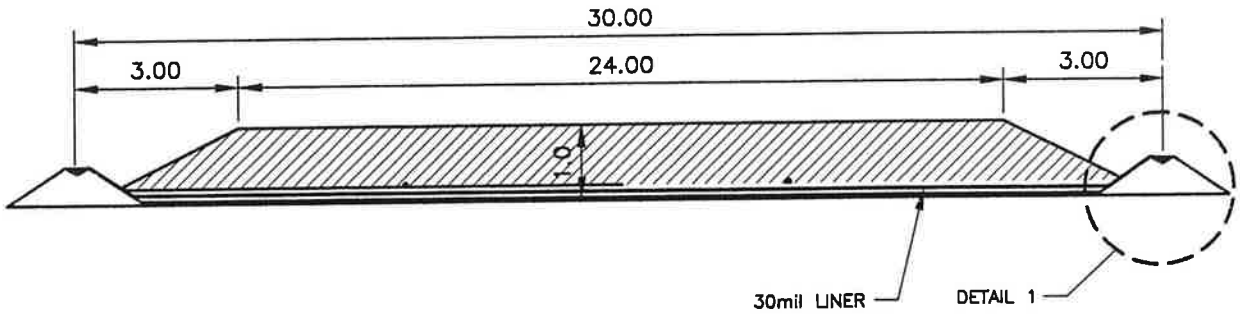
FIGURE NUMBER: FIG 3



SCALE 1:1500



DETAIL 1
SCALE 1:25

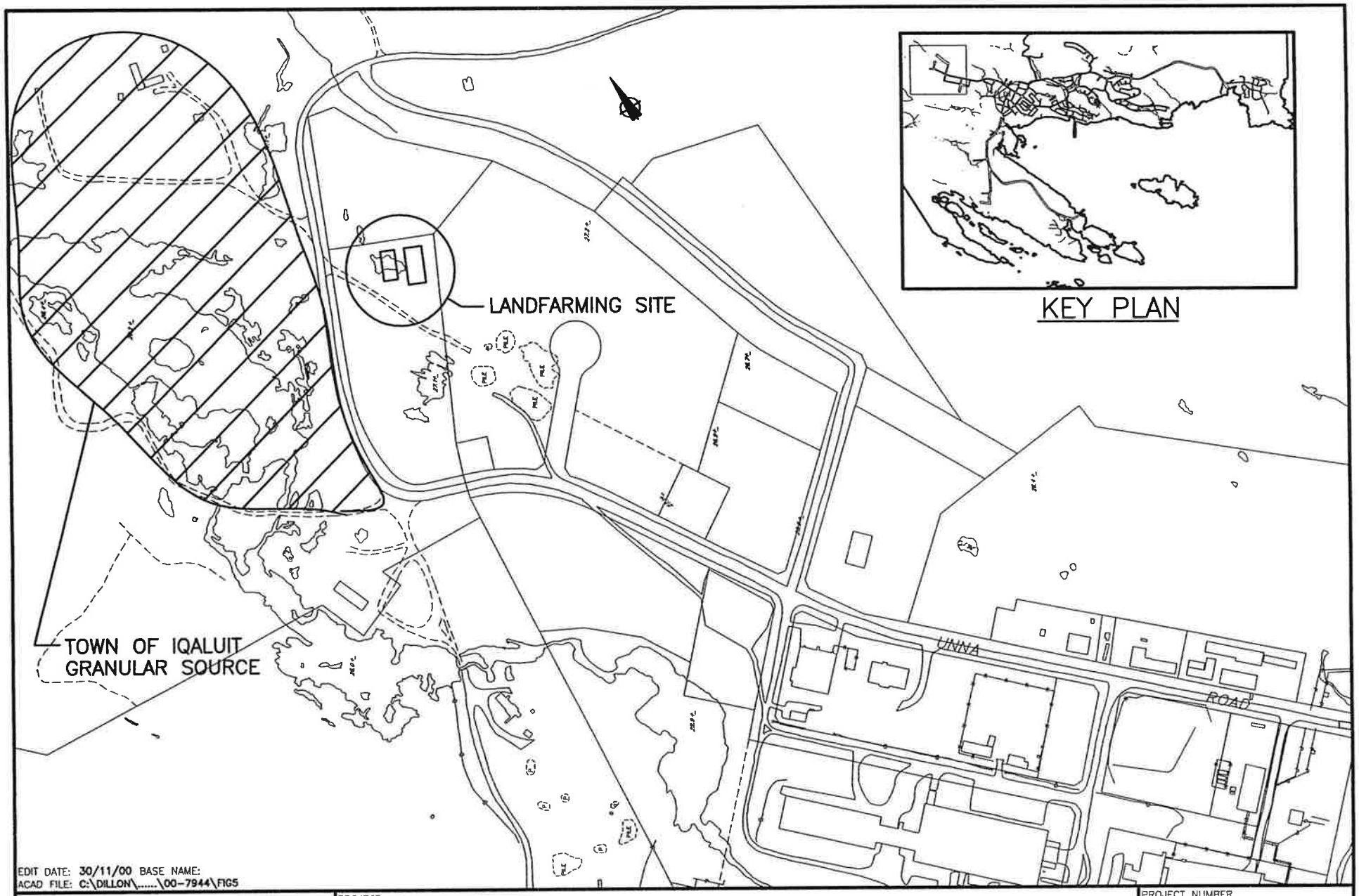


SECTION A–A'
NTS

EDIT DATE: 29/11/00 ACAD FILE: g:\cad\007944\fig2
BASE NAME: a.dwg LOG FILE: na

DILLON CONSULTING

PROJECT: NORTHERN FUTURES REMEDIAL ACTION PLAN	PROJECT NUMBER: 00–7944
	DATE: NOV 2000
TITLE: SITE PLAN, SECTION & DETAIL FOR LAND FARM	FIGURE NUMBER: FIG 4



EDIT DATE: 30/11/00 BASE NAME:
ACAD FILE: C:\DILLON\.....\00-7944\FIG5

DILLON CONSULTING

PROJECT
NORTHERN FUTURES
REMEDIAL ACTION PLAN

TITLE
TOWN OF IQALUIT
PLAN

PROJECT NUMBER
007944

DATE
NOV 2000

FIGURE NUMBER
FIG 5