PARACEL LABORATORIES LTD.

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Certificate of Analysis

Nunatta Environmental Services Inc.
P.O. Box 267
Iqaluit, NU X0A 0H0
Attn: Jason Taylor

Phone: (867) 979-1488
Fax: (867) 979-1478

Client PO:
Project: Land Farm
Custody: 61081

Report Date: 27-Aug-2010
Order Date: 23-Aug-2010
Order #: 1035089

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1035089-01	Pile 1 East
1035089-02	Pile 1 West
1035089-03	Pile 2
1035089-04	Pile 3
1035089-05	Cell 3 North
1035089-06	Cell 3 South

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 27-Aug-2010

Client: **Nunatta Environmental Services Inc.**

Order Date:23-Aug-2010

Client PO:

Project Description: Land Farm

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
BTEX	EPA 8260 - P&T GC-MS	26-Aug-10	27-Aug-10
CCME PHC F1	CWS Tier 1 - P&T GC-FID	26-Aug-10	27-Aug-10
CCME PHC F2 - F4	CWS Tier 1 - GC-FID, extraction	25-Aug-10	26-Aug-10
Solids, %	Gravimetric, calculation	26-Aug-10	26-Aug-10

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Order #: 1035089

Certificate of Analysis

Report Date: 27-Aug-2010

Client: **Nunatta Environmental Services Inc.**

Order Date:23-Aug-2010

Client PO:

Project Description: Land Farm

	Client ID:	Pile 1 East	Pile 1 West	Pile 2	Pile 3
	Sample Date:	23-Aug-10	23-Aug-10	23-Aug-10	23-Aug-10
	Sample ID:	1035089-01	1035089-02	1035089-03	1035089-04
	MDL/Units	Soil	Soil	Soil	Soil
Physical Characteristics					
% Solids	0.1 % by Wt.	89.6	91.1	89.1	86.6
Volatiles					
Benzene	0.03 ug/g dry	<0.03	<0.03	<0.03	<0.03
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.10 ug/g dry	<0.10	<0.10	<0.10	<0.10
Toluene-d8	Surrogate	103%	103%	102%	101%
Hydrocarbons					
F1 PHCs (C6-C10)	10 ug/g dry	<10	<10	<10	<10
F2 PHCs (C10-C16)	10 ug/g dry	155	163	243	826
F3 PHCs (C16-C34)	10 ug/g dry	384	353	487	658
F4 PHCs (C34-C50)	10 ug/g dry	74	57	81	150

	Client ID:	Cell 3 North	Cell 3 South	-	-
	Sample Date:	23-Aug-10	23-Aug-10	-	-
	Sample ID:	1035089-05	1035089-06	-	-
	MDL/Units	Soil	Soil	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	89.2	87.3	-	-
Volatiles					
Benzene	0.03 ug/g dry	<0.03	<0.03	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	-	-
Toluene	0.05 ug/g dry	<0.05	<0.05	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	-	-
o-Xylene	0.05 ug/g dry	<0.05	<0.05	-	-
Xylenes, total	0.10 ug/g dry	<0.10	<0.10	-	-
Toluene-d8	Surrogate	101%	102%	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	10 ug/g dry	<10	<10	-	-
F2 PHCs (C10-C16)	10 ug/g dry	945	1330	-	-
F3 PHCs (C16-C34)	10 ug/g dry	1060	1480	-	-
F4 PHCs (C34-C50)	10 ug/g dry	195	268	-	-

Certificate of Analysis

Report Date: 27-Aug-2010

Client: **Nunatta Environmental Services Inc.**

Order Date:23-Aug-2010

Client PO: Project Description: Land Farm

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g						
F2 PHCs (C10-C16)	ND	10	ug/g						
F3 PHCs (C16-C34)	ND	10	ug/g						
F4 PHCs (C34-C50)	ND	10	ug/g						
Volatiles									
Benzene	ND	0.03	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.10	ug/g						
Surrogate: Toluene-d8	*8.06*		*ug/g*		*101*	*76-118*			

Certificate of Analysis

Report Date: 27-Aug-2010

Client: **Nunatta Environmental Services Inc.**

Order Date:23-Aug-2010

Client PO:

Project Description: Land Farm

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	10	ug/g dry	ND				32	
F2 PHCs (C10-C16)	915	10	ug/g dry	679			29.5	50	
F3 PHCs (C16-C34)	77	10	ug/g dry	69			10.2	50	
F4 PHCs (C34-C50)	ND	10	ug/g dry	ND				50	
Physical Characteristics									
% Solids	100	0.1	% by Wt.	88.7			12.0	25	
Volatiles									
Benzene	ND	0.03	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				34	
Toluene	ND	0.05	ug/g dry	ND				32	
m,p-Xylenes	ND	0.05	ug/g dry	ND				35	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: Toluene-d8	*10.1*		*ug/g dry*	*ND*	*103*	*76-118*			

Certificate of Analysis

Report Date: 27-Aug-2010

Client: **Nunatta Environmental Services Inc.**

Order Date:23-Aug-2010

Client PO: Project Description: Land Farm

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	98	10	ug/g	ND	98.5	80-120			
F2 PHCs (C10-C16)	69	10	ug/g	ND	85.7	61-129			
F3 PHCs (C16-C34)	188	10	ug/g	ND	94.0	61-129			
F4 PHCs (C34-C50)	150	10	ug/g	ND	125	61-129			
Volatiles									
Benzene	0.804	0.03	ug/g	ND	86.1	55-141			
Ethylbenzene	2.35	0.05	ug/g	ND	106	61-139			
Toluene	9.76	0.05	ug/g	ND	90.4	54-136			
m,p-Xylenes	6.72	0.05	ug/g	ND	99.9	61-139			
o-Xylene	2.91	0.05	ug/g	ND	108	60-142			
Surrogate: Toluene-d8	*8.01*		*ug/g*		*100*	*76-118*			

Sample and QC Qualifiers Notes

None

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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Chain of Custody Record
Nº 61081

Pg. __ of __

Company Name: N.G.S.I.
Contact Name: Jason Taylor
Address: P.O Box 267 Iqaluit, NU X0A 0H0
Tel: (867) 979-1488 Cell:
Email: nunatta@northwestel.net

Project Ref: Landfarm
PO#
Quote # ☐Not Quoted

Preservative to be added by Paracel? ☐Yes ☐No

Date Required:
Turn Around Time: [ ] 1-day [ ] 2-day [ ] Regular
Regulatory/Guideline Requirements

Matrix Types: S–Soil/Sed GW–Ground Water SW–Surface Water SS–Storm/Sanitary Sewer A-Air O-Other RDW-Regulated Drinking Water

Paracel Order # 1035089

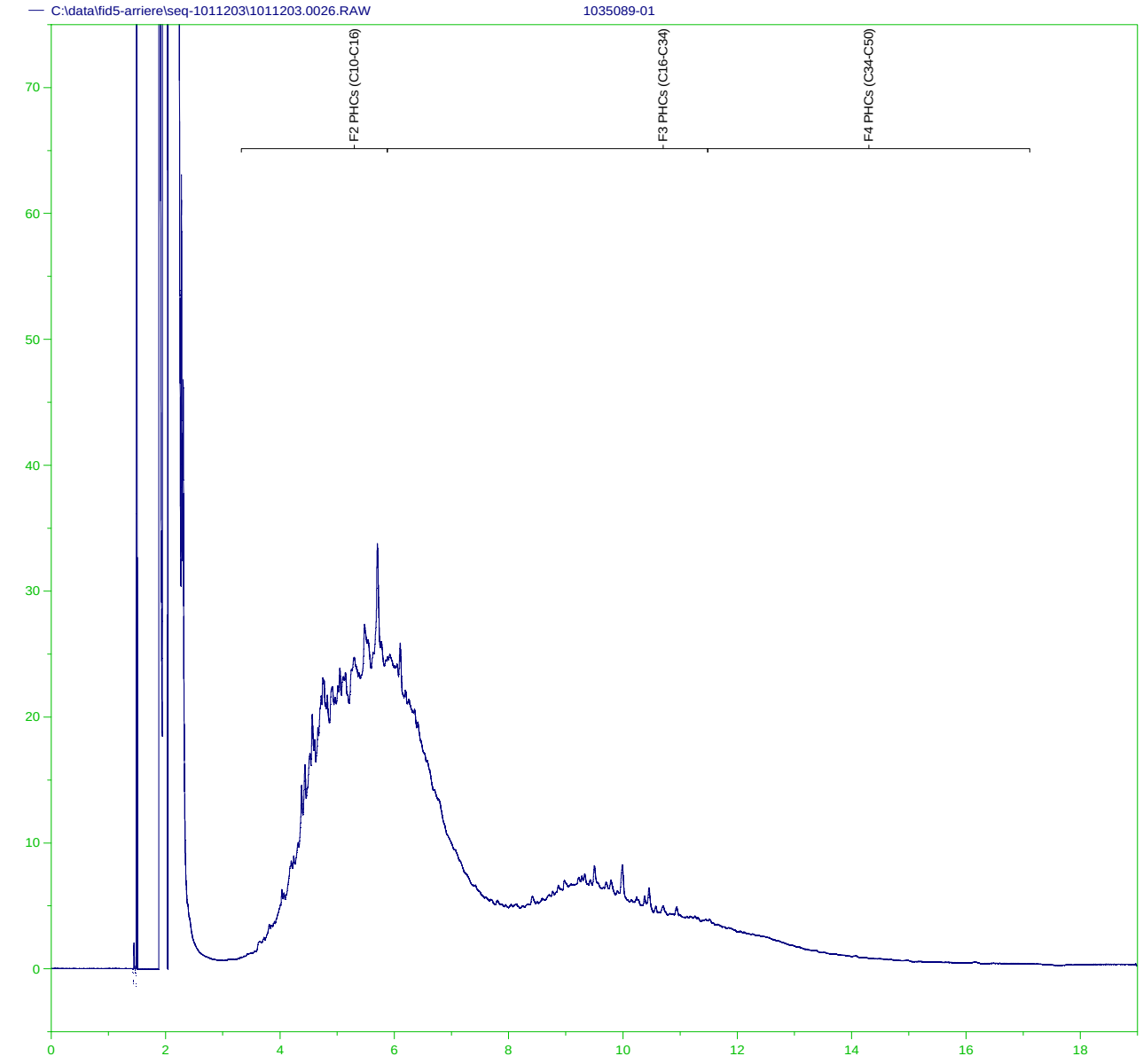
	Sample Identification	Matrix	Air Volume	# Containers	Date Sampled dd/mm/yy	F1 - F4	BTEX (reg.)	Chromatograph			120mL								Hazardous? (Y/N)
1	Pile 1 East	S		1	Aug 23/10	x	x	x			120mL								N
2	Pile 1 West	S		1	↓	|	|	|			↓								|
3	Pile 2	S		1	↓	|	|	|			↓								|
4	Pile 3	S		1	↓	|	|	|			↓								|
5	cell 3 North	S		1	↓	|	|	|			↓								|
6	cell 3 South	S		1	Aug 23/10	x	x	x			✓								N
7																			
8																			
9																			
10																			

Comments: normal turn around time

Relinquished By: Jason Taylor	Received at Depot:	Received at Lab: [signature]	Verified By: [signature]
Date: Aug 23, 2010 Time: 10:30pm	Date: Time:	Date: Aug 24/10 Time: 12:00pm	Date: Aug 24/10 Time: 1:10pm

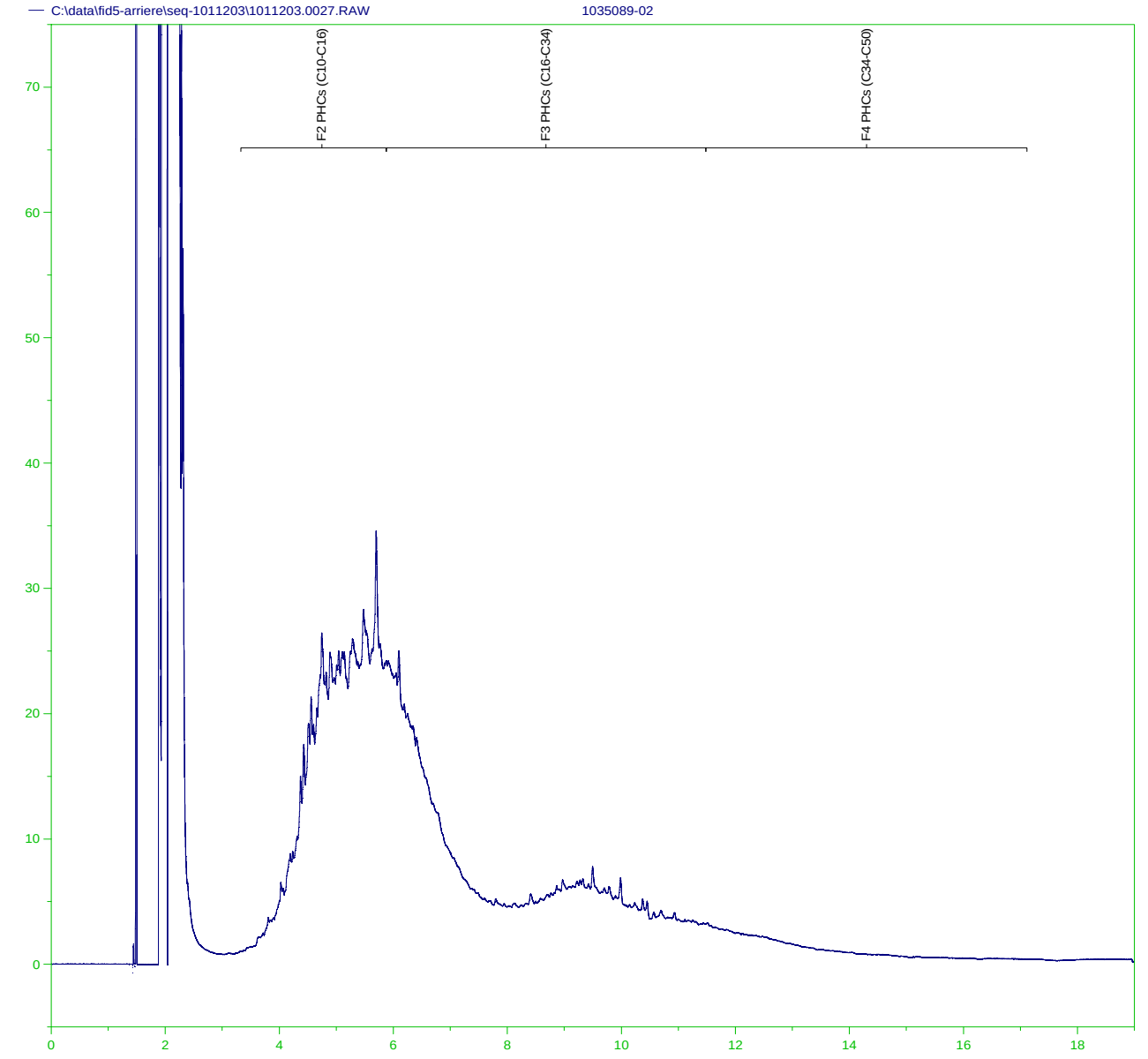
Please refer to the back page for Locations and Sample Preservation, Container and Hold Time Requirements. Janis (first air) WHITE - Lab Copy, PINK - Client Copy

Figure 1: GC-FID Chromatogram for the Sample 'Pile 1 East'; Paracel ID: 1035089-01



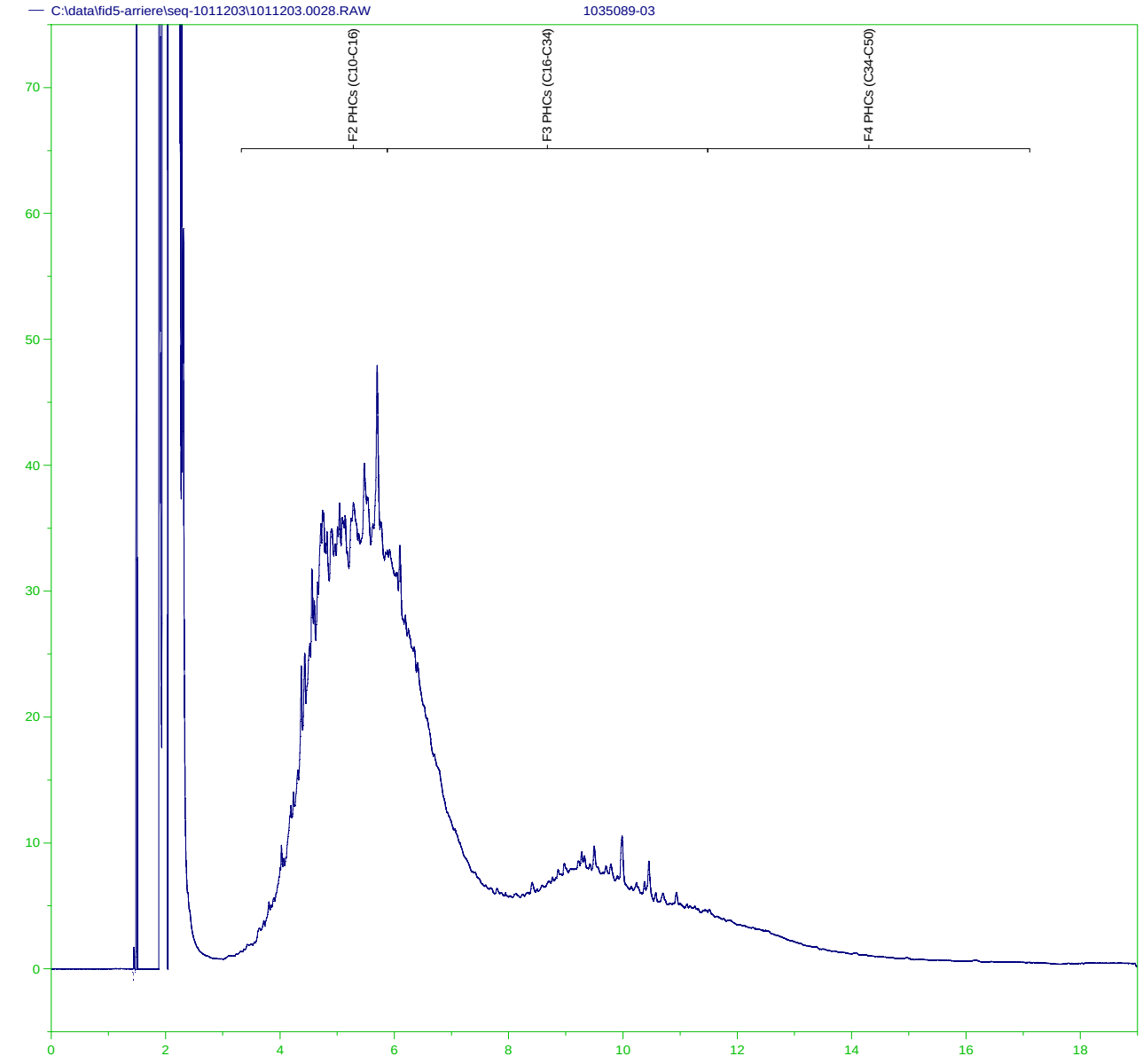
Characterization: The GC-FID chromatogram shows 2 distinct ranges of hydrocarbon distillates. The first range is from approximately <C10 to C24, typical of fuel oil and diesel fuel. The fingerprint pattern suggests that the product has been severely weathered. The second product is visible in the range from approximately C24 to C40. This range is typical of lube and motor oils. Estimating the degree of weathering is not possible for products in this range.

Figure 2: GC-FID Chromatogram for the Sample 'Pile 1 West'; Paracel ID: 1035089-02



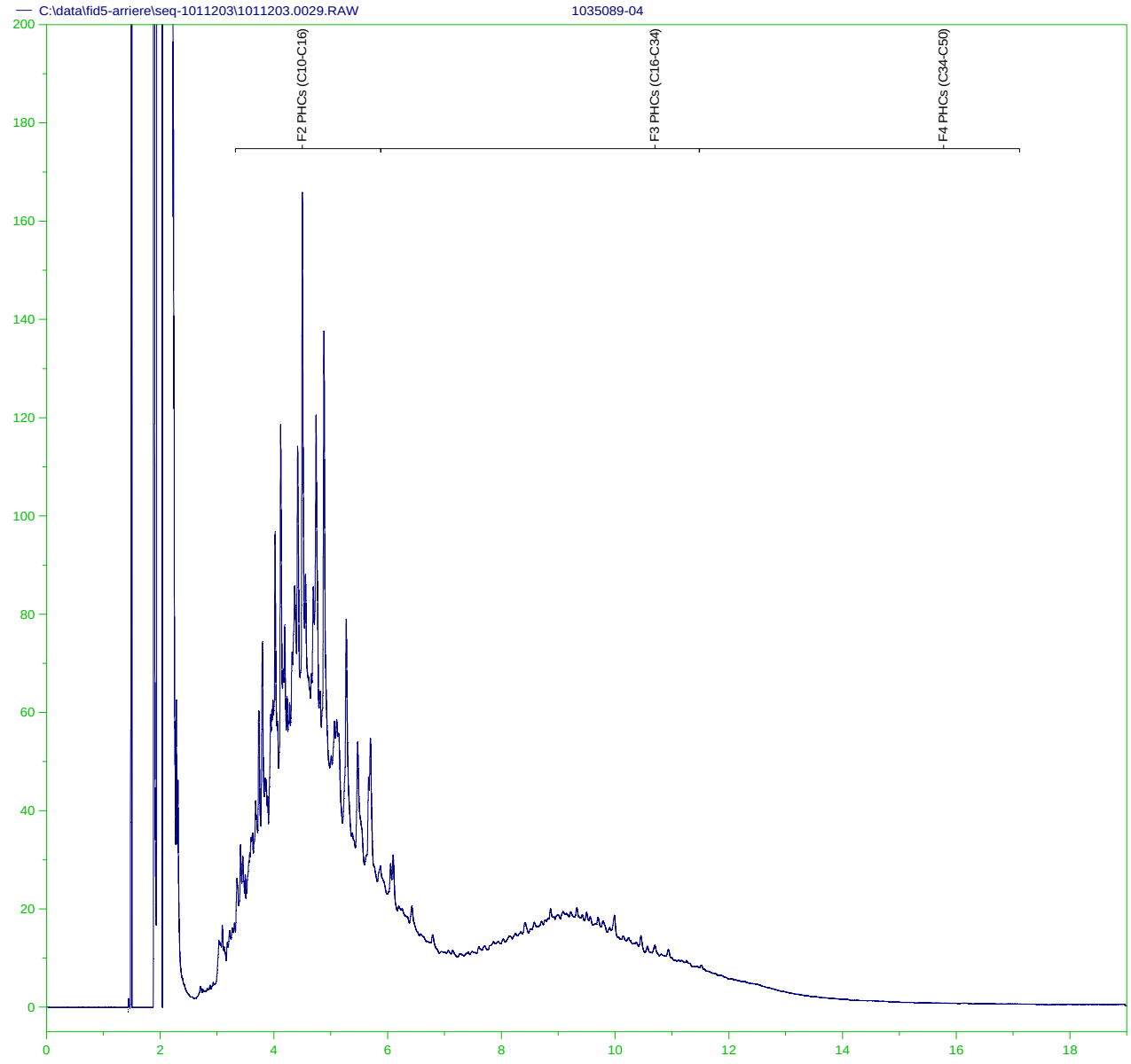
Characterization: The GC-FID chromatogram shows 2 distinct ranges of hydrocarbon distillates. The first range is from approximately <C10 to C24, typical of fuel oil and diesel fuel. The fingerprint pattern suggests that the product has been severely weathered. The second product is visible in the range from approximately C24 to C40. This range is typical of lube and motor oils. Estimating the degree of weathering is not possible for products in this range.

Figure 3: GC-FID Chromatogram for the Sample 'Pile 2'; Paracel ID: 1035089-03



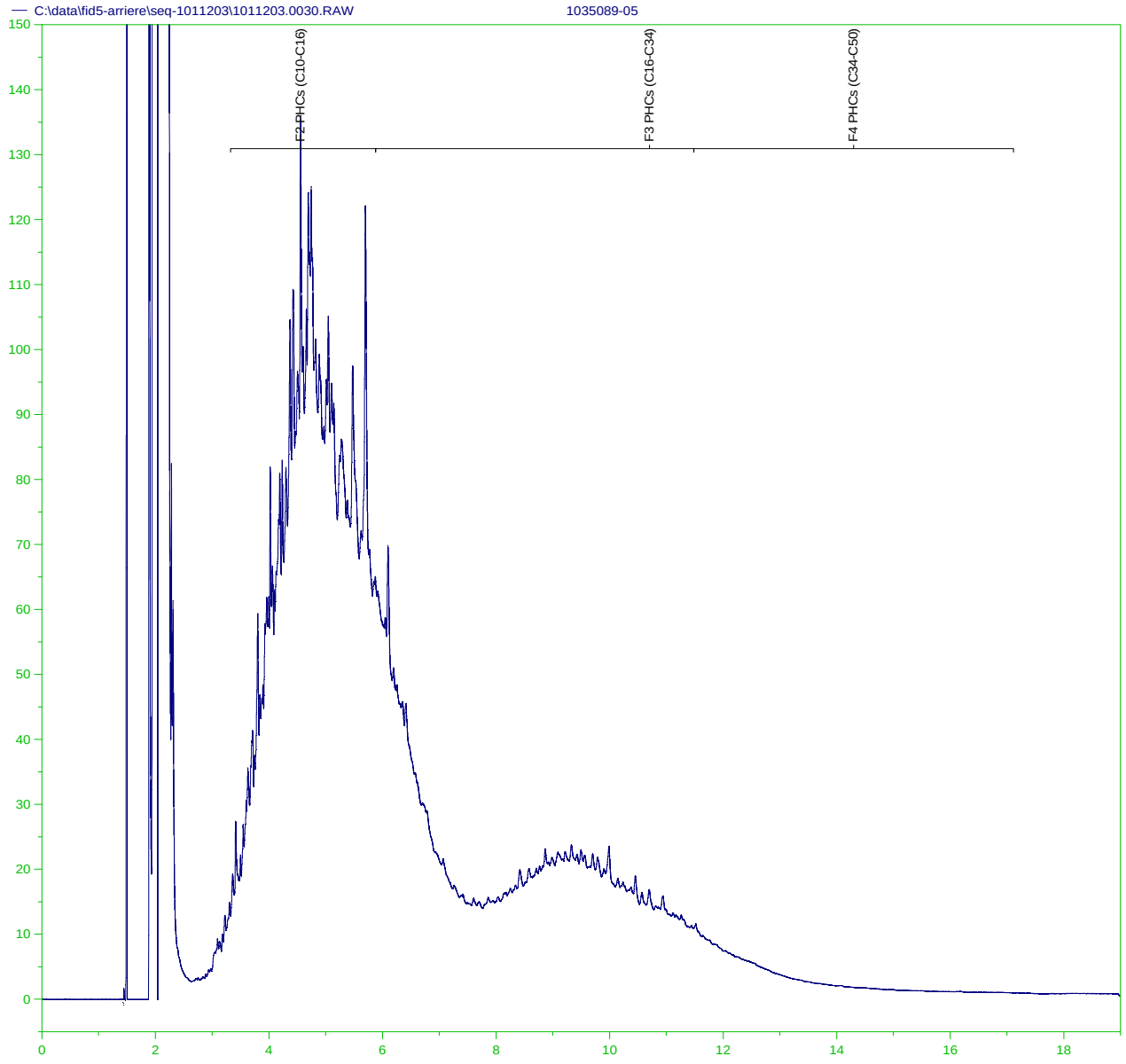
Characterization: The GC-FID chromatogram shows 2 distinct ranges of hydrocarbon distillates. The first range is from approximately <C10 to C24, typical of fuel oil and diesel fuel. The fingerprint pattern suggests that the product has been severely weathered. The second product is visible in the range from approximately C24 to C40. This range is typical of lube and motor oils. Estimating the degree of weathering is not possible for products in this range.

Figure 4: GC-FID Chromatogram for the Sample 'Pile 3'; Paracel ID: 1035089-04



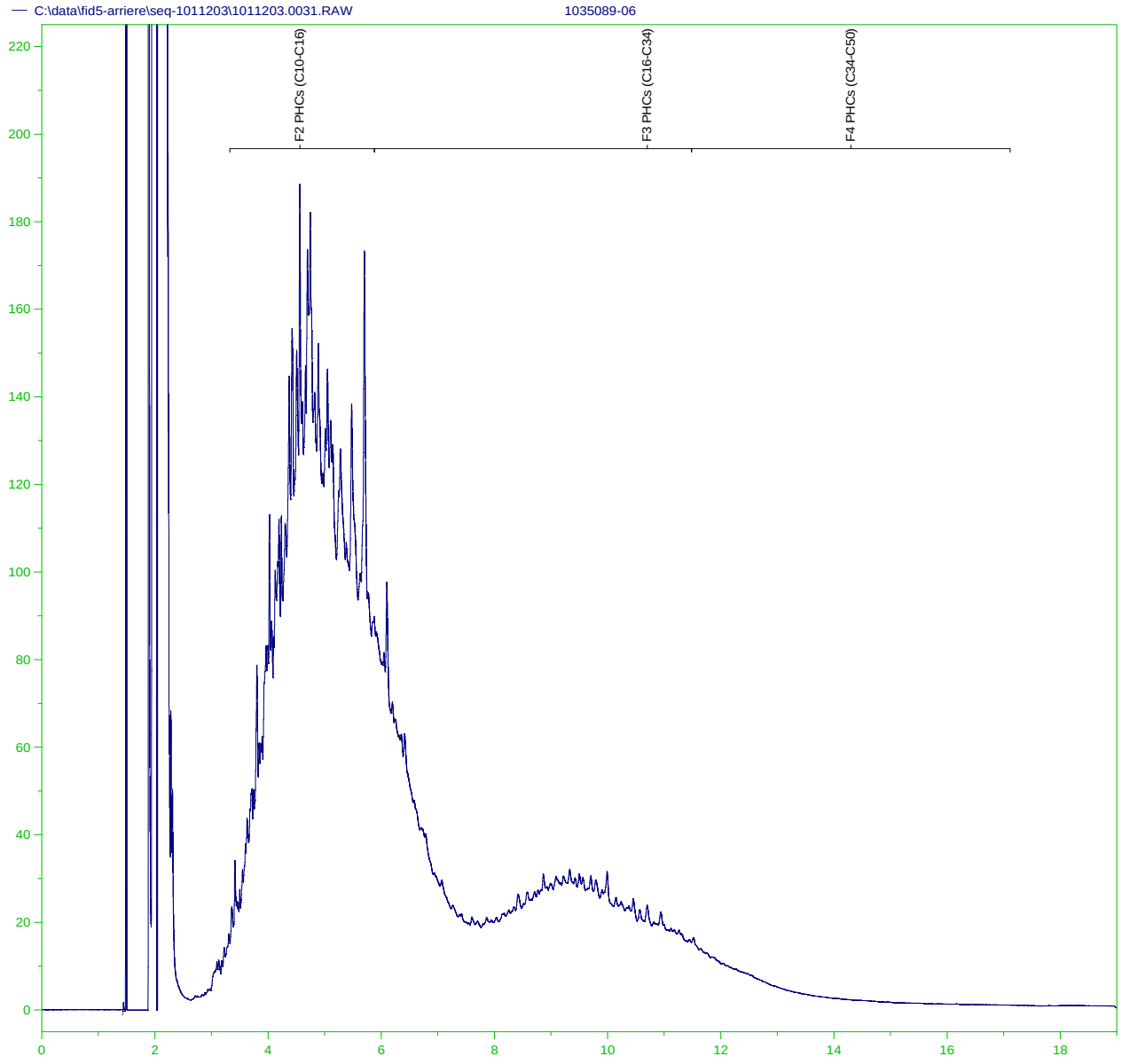
Characterization: The GC-FID chromatogram shows 2 distinct ranges of hydrocarbon distillates. The first range is from approximately <C10 to C24, typical of fuel oil and diesel fuel. The fingerprint pattern suggests that the product has been severely weathered similarly to that of the sample Pile 2. The second product is visible in the range from approximately C24 to C40. This range is typical of lube and motor oils. Estimating the degree of weathering is not possible for products in this range.

Figure 5: GC-FID Chromatogram for the Sample 'Cell 3 North'; Paracel ID: 1035089-05



Characterization: The GC-FID chromatogram shows 2 distinct ranges of hydrocarbon distillates. The first range is from approximately <C10 to C24, typical of fuel oil and diesel fuel. The fingerprint pattern suggests that the product has been severely weathered similarly to that of the sample Pile 2 and Pile 3. The second product is visible in the range from approximately C24 to C40. This range is typical of lube and motor oils. Estimating the degree of weathering is not possible for products in this range.

Figure 6: GC-FID Chromatogram for the Sample 'Cell 3 South'; Paracel ID: 1035089-06



Characterization: The GC-FID chromatogram shows 2 distinct ranges of hydrocarbon distillates. The first range is from approximately <C10 to C24, typical of fuel oil and diesel fuel. The fingerprint pattern suggests that the product has been severely weathered similarly to that of the sample Pile 2, Pile 3, and Cell 3 North. The second product is visible in the range from approximately C24 to C40. This range is typical of lube and motor oils. Estimating the degree of weathering is not possible for products in this range.