ENVIRONMENTAL CHEMISTS

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December 20, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the amended results from the testing of material submitted on December 5, 2019 from the Kosmos 19499-00, F&BI 912095 project. Per request, the results were submitted as a single data package.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1219R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 5, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos 19499-00, F&BI 912095 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	Hart Crowser
912095 -01	TP-5-2.5
912095 -02	TP-5-5
912095 -03	TP-5-8
912095 -04	TP-5-10
912095 -05	TP-5-12
912095 -06	TP-5-15
912095 -07	TP-5-19
912095 -08	TP-3-8
912095 -09	TP-3-12
912095 -10	TP-3-15
912095 -11	TP-3-20
912095 -12	D-2
912095 -13	U-1
912095 -14	D-1
912095 -15	SP1-1
912095 -16	SP1-3
912095 -17	SP1-4
912095 -18	SP1-2
912095 -19	SP2-1
912095 -20	SP1-5
912095 -21	SP2-2
912095 -22	SP2-5
912095 -23	SP2-4
912095 -24	SP2-3

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE (Continued)

The water samples were sent to Fremont Analytical for hexavalent chromium and trace level mercury analyses. The report will be forwarded to your office upon receipt.

A 6020B internal standard failed the acceptance criteria for several samples. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported. In addition, arsenic and selenium in the 6020B matrix spike duplicate failed the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect.

An 8270D internal standard failed the acceptance criteria for several samples. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported.

All other quality control requirements were acceptable.

The samples were sent to Fremont Analytical for hexavalent chromium analysis. The report is enclosed.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095 Date Extracted: 12/13/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
D-2 912095-12	< 0.0007
U-1 912095-13	< 0.0007
D-1 912095-14	< 0.0007
Method Blank	< 0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095 Date Extracted: 12/06/19 Date Analyzed: 12/06/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Gasoline Range	Surrogate (<u>% Recovery)</u> (Limit 51-134)
D-2 912095-12	<100	83
U-1 912095-13	<100	85
D-1 912095-14	<100	87
Method Blank 09-2912 MB	<100	86

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095 Date Extracted: 12/06/19 Date Analyzed: 12/06/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
SP1-1 912095-15	< 0.02	<0.02	< 0.02	< 0.06	<5	88
SP1-3 912095-16	< 0.02	<0.02	< 0.02	<0.06	<5	88
SP1-4 912095-17	< 0.02	<0.02	< 0.02	<0.06	<5	88
SP1-2 912095-18 1/5	<0.02 j	<0.1	<0.1	<0.3	<25	89
SP2-1 912095-19	<0.02	<0.02	< 0.02	<0.06	<5	85
SP1-5 912095-20	< 0.02	<0.02	< 0.02	<0.06	<5	89
SP2-2 912095-21	< 0.02	<0.02	< 0.02	<0.06	<5	89
SP2-5 912095-22	<0.02	<0.02	< 0.02	<0.06	<5	89
SP2-4 912095-23	< 0.02	<0.02	< 0.02	<0.06	<5	88
SP2-3 912095-24	<0.02	< 0.02	< 0.02	<0.06	<5	84
Method Blank ^{09-2913 MB}	< 0.02	< 0.02	< 0.02	< 0.06	<5	87

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095 Date Extracted: 12/06/19 Date Analyzed: 12/06/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Extended (C10-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
D-2 912095-12	<250	90
U-1 912095-13	<250	101
D-1 912095-14	<250	105
Method Blank 09-2977 MB2	<250	94

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095 Date Extracted: 12/06/19 Date Analyzed: 12/06/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 53-144)
SP1-1 912095-15	<50	<250	99
SP1-3 912095-16	<50	<250	100
SP1-4 912095-17	<50	<250	99
SP1-2 912095-18	83 x	600	99
SP2-1 912095-19	<50	<250	101
SP1-5 912095-20	110 x	620	105
SP2-2 912095-21	74 x	480	98
SP2-5 912095-22	<50	<250	107
SP2-4 912095-23	<50	<250	101
SP2-3 912095-24	170 x	<250	101
Method Blank 09-2985 MB	<50	<250	97

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095 Date Extracted: NA Date Analyzed: 12/06/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	<u>pH</u>
D-2 912095-12	7.7
U-1 912095-13	8.0
D-1 912095-14	8.0

ENVIRONMENTAL CHEMISTS

Client ID:	SP1-1	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-15
Date Analyzed:	12/06/19	Data File:	912095-15.114
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	1.45		
Barium	65.8		
Cadmium	<1		
Chromium	13.3 J		
Lead	6.70		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP1-1	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-15 x5
Date Analyzed:	12/09/19	Data File:	912095-15 x5.041
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	18.1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP1-3	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-16
Date Analyzed:	12/06/19	Data File:	912095-16.117
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	2.22		
Barium	51.5		
Cadmium	<1		
Chromium	10.3 J		
Lead	2.51		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP1-3	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-16 x5
Date Analyzed:	12/09/19	Data File:	912095-16 x5.044
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	14.0		

ENVIRONMENTAL CHEMISTS

SP1-4	Client:	Hart Crowser
12/05/19	Project:	Kosmos 19499-00, F&BI 912095
12/06/19	Lab ID:	912095-17
12/06/19	Data File:	912095-17.118
Soil	Instrument:	ICPMS2
mg/kg (ppm) Dry Weight	Operator:	SP
Concentration		
mg/kg (ppm)		
1.49		
61.3		
<1		
10.5 J		
2.62		
<1		
<1		
<1		
	SP1-4 12/05/19 12/06/19 Soil mg/kg (ppm) Dry Weight Concentration mg/kg (ppm) 1.49 61.3 <1 10.5 J 2.62 <1 <1 <1 <1	$\begin{array}{cccc} {\rm SP1-4} & {\rm Client:} \\ 12/05/19 & {\rm Project:} \\ 12/06/19 & {\rm Lab \ ID:} \\ 12/06/19 & {\rm Data \ File:} \\ {\rm Soil} & {\rm Instrument:} \\ {\rm mg/kg \ (ppm) \ Dry \ Weight} & {\rm Operator:} \\ \\ \hline & {\rm Concentration} \\ {\rm mg/kg \ (ppm)} \\ \hline & 1.49 \\ 61.3 \\ <1 \\ 10.5 \ J \\ 2.62 \\ <1 \\ <1 \\ <1 \\ \\ <1 \\ \end{array}$

ENVIRONMENTAL CHEMISTS

Client ID:	SP1-4	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-17 x5
Date Analyzed:	12/09/19	Data File:	912095-17 x5.045
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	14.7		

ENVIRONMENTAL CHEMISTS

Client ID:	SP1-2	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-18
Date Analyzed:	12/06/19	Data File:	912095-18.124
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	1.57		
Barium	48.6		
Cadmium	<1		
Chromium	9.37 J		
Lead	13.1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP1-2	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-18 x5
Date Analyzed:	12/09/19	Data File:	912095-18 x5.048
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	12.4		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-1	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-19
Date Analyzed:	12/06/19	Data File:	912095-19.125
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	1.12		
Barium	61.7		
Cadmium	<1		
Chromium	11.4 J		
Lead	2.49		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-1	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-19 x5
Date Analyzed:	12/09/19	Data File:	912095-19 x5.049
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	15.4		

ENVIRONMENTAL CHEMISTS

Client ID:	SP1-5	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-20
Date Analyzed:	12/06/19	Data File:	912095-20.126
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	1.38		
Barium	71.9		
Cadmium	<1		
Chromium	13.5 J		
Lead	3.29		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP1-5	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-20 x5
Date Analyzed:	12/09/19	Data File:	912095-20 x5.050
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	19.1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-2	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-21
Date Analyzed:	12/06/19	Data File:	912095-21.127
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	1.44		
Barium	60.7		
Cadmium	<1		
Chromium	10.9 J		
Lead	16.9		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-2	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-21 x5
Date Analyzed:	12/09/19	Data File:	912095-21 x5.051
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	14.7		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-5	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-22
Date Analyzed:	12/06/19	Data File:	912095-22.128
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	1.91		
Barium	60.6		
Cadmium	<1		
Chromium	13.0 J		
Lead	3.52		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-5	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-22 x5
Date Analyzed:	12/09/19	Data File:	912095-22 x5.052
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	18.5		

ENVIRONMENTAL CHEMISTS

SP2-4	Client:	Hart Crowser
12/05/19	Project:	Kosmos 19499-00, F&BI 912095
12/06/19	Lab ID:	912095-23
12/06/19	Data File:	912095-23.129
Soil	Instrument:	ICPMS2
mg/kg (ppm) Dry Weight	Operator:	SP
Concentration		
mg/kg (ppm)		
<1		
67.0		
<1		
11.4 J		
2.56		
<1		
<1		
<1		
	SP2-4 12/05/19 12/06/19 Soil mg/kg (ppm) Dry Weight Concentration mg/kg (ppm) <1 67.0 <1 11.4 J 2.56 <1 <1 <1 <1	SP2-4 Client: 12/05/19 Project: 12/06/19 Lab ID: 12/06/19 Data File: Soil Instrument: mg/kg (ppm) Dry Weight Operator: Concentration mg/kg (ppm) <1

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-4	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-23 x5
Date Analyzed:	12/09/19	Data File:	912095-23 x5.053
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	15.9		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-3	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-24
Date Analyzed:	12/06/19	Data File:	912095-24.130
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	1.31		
Barium	58.7		
Cadmium	<1		
Chromium	13.3 J		
Lead	2.44		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-3	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	912095-24 x5
Date Analyzed:	12/09/19	Data File:	912095-24 x5.054
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	18.6		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	Method Blank NA 12/06/19 12/06/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos 19499-00, F&BI 912095 I9-773 mb I9-773 mb.109 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	D-2		Client:	Hart Crowser
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19		Lab ID:	912095-12 x10
Date Analyzed:	12/06/19		Data File:	912095-12 x10.071
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
	(Concentration		
Analyte:		mg/L (ppm)		
Calcium		12.3		
Magnesium		3.07		
Hardness (as CaCO3	3)	43.4		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	U-1		Client:	Hart Crowser
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19		Lab ID:	912095-13 x10
Date Analyzed:	12/06/19		Data File:	912095-13 x10.074
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		12.8		
Magnesium		3.07		
Hardness (as CaCO3	3)	44.6		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	D-1		Client:	Hart Crowser
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19		Lab ID:	912095-14 x10
Date Analyzed:	12/06/19		Data File:	912095-14 x10.075
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
	С	Concentration		
Analyte:		mg/L (ppm)		
Calcium		12.6		
Magnesium		3.11		
Hardness (as CaCO3	3)	44.3		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

< 0.35

Hardness (as CaCO3)

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	I9-772 mb
Date Analyzed:	12/06/19	Data File:	I9-772 mb.069
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	< 0.05		
Magnesium	< 0.05		

ENVIRONMENTAL CHEMISTS

Client ID:	D-2		Client:	Hart Crowser
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19		Lab ID:	912095-12
Date Analyzed:	12/06/19		Data File:	912095-12.121
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		< 0.5		
Cadmium		<0.25		
Chromium		<1		
Copper		<2		
Lead		< 0.5		
Nickel		0.571		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID:	U-1		Client:	Hart Crowser
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19		Lab ID:	912095-13
Date Analyzed:	12/06/19		Data File:	912095-13.122
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		< 0.5		
Cadmium		<0.25		
Chromium		<1		
Copper		<2		
Lead		<0.5		
Nickel		0.527		
Zinc		22.0		
ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	D-1		Client:	Hart Crowser
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19		Lab ID:	912095-14
Date Analyzed:	12/06/19		Data File:	912095-14.123
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		< 0.5		
Cadmium		<0.25		
Chromium		<1		
Copper		<2		
Lead		<0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/06/19	Lab ID:	I9-771 mb
Date Analyzed:	12/06/19	Data File:	I9-771 mb.105
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP
Analyte:	Concentration ug/L (ppb)		
Arsenic	<0.5		
Cadmium	<0.25		
Chromium	<1		
Copper	<2		
Lead	< 0.5		
Nickel	< 0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP1-1 12/05/19 12/06/19 12/07/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-15 1/25 120637.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 166 d 129 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds		Concentration		
Compounds.		mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		< 0.05		
Fluorene		< 0.05		
Phenanthrene		< 0.05		
Anthracene		< 0.05		
Fluoranthene		< 0.05		
Pyrene		< 0.05		
Benz(a)anthracene		< 0.05		
Chrysene		< 0.05		
Benzo(a)pyrene		<0.05 J		
Benzo(b)fluoranthe	ne	<0.05 J		
Benzo(k)fluoranthe	ne	<0.05 J		
Indeno(1,2,3-cd)pyre	ene	<0.05 J		
Dibenz(a,h)anthrac	ene	<0.05 J		
Benzo(g,h,i)perylene	е	<0.05 J		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP1-1 12/05/19 12/06/19 12/09/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-15 1/250 120910.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	-d12	% Recovery: 234 d 139 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		<0.5		
Acenaphthylene		< 0.5		
Acenaphthene		< 0.5		
Fluorene		< 0.5		
Phenanthrene		< 0.5		
Anthracene		< 0.5		
Fluoranthene		< 0.5		
Pyrene		< 0.5		
Benz(a)anthracene		< 0.5		
Chrysene		< 0.5		
Benzo(a)pyrene		< 0.5		
Benzo(b)fluoranther	ne	< 0.5		
Benzo(k)fluoranther	ne	< 0.5		
Indeno(1,2,3-cd)pyre	ene	< 0.5		
Dibenz(a,h)anthrace	ene	< 0.5		
Benzo(g,h,i)perylene	<u>)</u>	<0.5		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP1-3 12/05/19 12/06/19 12/06/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-16 1/5 120624.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	-d12	% Recovery: 105 120	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyre	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylene	9	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP1-4 12/05/19 12/06/19 12/06/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-17 1/5 120622.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 100 111	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Nanhthalene		<0.01		
Aconanhthylono		<0.01		
Aconaphthono		<0.01		
Fluorono		<0.01		
Dhononthrono		<0.01		
Anthracono		<0.01		
Fluoranthono		<0.01		
Pyrono		<0.01		
Renz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)nvrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1.2.3-cd)pvr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylene	е	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP1-2 12/05/19 12/06/19 12/07/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-18 1/25 120638.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	-d12	% Recovery: 140 d 116 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		< 0.05		
Fluorene		< 0.05		
Phenanthrene		< 0.05		
Anthracene		< 0.05		
Fluoranthene		< 0.05		
Pyrene		0.10		
Benz(a)anthracene		< 0.05		
Chrysene		< 0.05		
Benzo(a)pyrene		<0.05 J		
Benzo(b)fluoranther	ne	<0.05 J		
Benzo(k)fluoranther	ne	<0.05 J		
Indeno(1,2,3-cd)pyre	ene	<0.05 J		
Dibenz(a,h)anthrace	ene	<0.05 J		
Benzo(g,h,i)perylene	e	<0.05 J		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP1-2 12/05/19 12/06/19 12/09/19 Soil mg/kg (ppm)) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-18 1/250 120928.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	-d12	% Recovery: 298 d 133 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthen Benzo(b)fluoranthen	ne	<pre></pre>		
Benzo(k)fluoranther Indeno(1,2,3-cd)pyro Dibenz(a,h)anthraco Benzo(g,h,i)peryleno	ne ene ene e	$< 0.5 \\ < 0.5 \\ < 0.5 \\ < 0.5 \\ < 0.5$		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-1 12/05/19 12/06/19 12/06/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-19 1/25 120630.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	-d12	% Recovery: 160 d 140 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		< 0.05		
Fluorene		< 0.05		
Phenanthrene		0.052		
Anthracene		< 0.05		
Fluoranthene		< 0.05		
Pyrene		0.054		
Benz(a)anthracene		< 0.05		
Chrysene		< 0.05		
Benzo(a)pyrene		< 0.05		
Benzo(b)fluoranthe	ne	< 0.05		
Benzo(k)fluoranthe	ne	< 0.05		
Indeno(1,2,3-cd)pyre	ene	< 0.05		
Dibenz(a,h)anthrac	ene	< 0.05		
Benzo(g,h,i)perylene	9	< 0.05		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP1-5 12/05/19 12/06/19 12/07/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-20 1/25 120632.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	-d12	% Recovery 154 d 122 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration		
Compounds.		ing/kg (ppin)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		< 0.05		
Fluorene		< 0.05		
Phenanthrene		< 0.05		
Anthracene		< 0.05		
Fluoranthene		< 0.05		
Pyrene		< 0.05		
Benz(a)anthracene		< 0.05		
Chrysene		< 0.05		
Benzo(a)pyrene		<0.05 J		
Benzo(b)fluoranthe	ne	<0.05 J		
Benzo(k)fluoranthe	ne	<0.05 J		
Indeno(1,2,3-cd)pyre	ene	<0.05 J		
Dibenz(a,h)anthrac	ene	<0.05 J		
Benzo(g,h,i)perylene	9	<0.05 J		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP1-5 12/05/19 12/06/19 12/09/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-20 1/250 120929.D GCMS6 YA
Surrogates: Anthracene d10 Benzo(a)anthracene	-d12	% Recovery: 318 d 116 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.5		
Acenaphthylene		< 0.5		
Acenaphthene		< 0.5		
Fluorene		< 0.5		
Phenanthrene		< 0.5		
Anthracene		< 0.5		
Fluoranthene		< 0.5		
Pyrene		< 0.5		
Benz(a)anthracene		< 0.5		
Chrysene		< 0.5		
Benzo(a)pyrene		< 0.5		
Benzo(b)fluoranthe	ne	< 0.5		
Benzo(k)fluoranther	ne	< 0.5		
Indeno(1,2,3-cd)pyre	ene	< 0.5		
Dibenz(a,h)anthrac	ene	< 0.5		
Benzo(g,h,i)perylene	9	<0.5		

ENVIRONMENTAL CHEMISTS

SP2-2 12/05/19 12/06/19 12/07/19 Soil mg/kg (ppm) D	Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-21 1/25 120639.D GCMS6 ya
9 -d12	6 Recovery: 144 d 125 d	Lower Limit: 31 24	Upper Limit: 163 168
Con	oncentration ng/kg (ppm)		
ne ne ene	<0.05 <0.05 <0.05 <0.05 0.080 <0.05 <0.05 0.24 <0.05 0.13 0.055 J <0.05 J <0.05 J <0.05 J <0.05 J <0.05 J		
	SP2-2 12/05/19 12/06/19 12/07/19 Soil mg/kg (ppm) D -d12 Ca n -d12 Ca n	$SP2-2 \\ 12/05/19 \\ 12/06/19 \\ 12/07/19 \\ Soil \\ mg/kg (ppm) Dry Weight \\ -d12 & & & & & & & & & & & & & & & & & & &$	$\begin{array}{cccc} {\rm SP2-2} & {\rm Client:} \\ 12/05/19 & {\rm Project:} \\ 12/06/19 & {\rm Lab \ ID:} \\ 12/07/19 & {\rm Data \ File:} \\ {\rm Soil} & {\rm Instrument:} \\ {\rm mg/kg \ (ppm) \ Dry \ Weight} & {\rm Operator:} \\ \\ {\rm Concentration} \\ {\rm mg/kg \ (ppm)} \\ -d12 & 125 \ d & 24 \\ \\ \hline {\rm Concentration} \\ {\rm mg/kg \ (ppm)} \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ 0.24 \\ < 0.05 \\ 0.13 \\ 0.055 \ J \\ {\rm he} \\ < 0.05 \ J \\ {\rm ene} \\ < 0.05 \ J \\ <$

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted:	SP2-2 12/05/19 12/06/19		Client: Project: Lab ID:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-21 1/250
Date Analyzed:	12/09/19		Data File:	120930.D
Matrix:	Soil		Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 345 d 112 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.5		
Acenaphthylene		< 0.5		
Acenaphthene		< 0.5		
Fluorene		< 0.5		
Phenanthrene		< 0.5		
Anthracene		< 0.5		
Fluoranthene		< 0.5		
Pyrene		< 0.5		
Benz(a)anthracene		< 0.5		
Chrysene		< 0.5		
Benzo(a)pyrene		<0.5		
Benzo(b)fluoranthe	ne	< 0.5		
Benzo(k)fluoranthe	ne	< 0.5		
Indeno(1,2,3-cd)pyre	ene	< 0.5		
Dibenz(a,h)anthrac	ene	< 0.5		
Benzo(g,h,i)perylene	e	< 0.5		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-5 12/05/19 12/06/19 12/07/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-22 1/25 120636.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	-d12	% Recovery: 167 d 139 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Compounds: Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthen	ne	mg/kg (ppm) <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 J <0.05 J		
Benzo(k)fluoranthei Indeno(1,2,3-cd)pyro	ne ene	<0.05 J <0.05 J <0.05 J		
Dibenz(a,h)anthrace Benzo(g,h,i)perylene	ene e	<0.05 J <0.05 J		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-5 12/05/19 12/06/19 12/09/19 Soil mg/kg (ppm)) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-22 1/250 120909.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	-d12	% Recovery: 263 d 116 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		<0.5		
Acenaphthylene		<0.5		
Acenaphthene		< 0.5		
Fluorene		< 0.5		
Phenanthrene		<0.5		
Anthracene		< 0.5		
Fluoranthene		< 0.5		
Pyrene		< 0.5		
Benz(a)anthracene		< 0.5		
Chrysene		<0.5		
Benzo(a)pyrene		< 0.5		
Benzo(b)fluoranther	ne	< 0.5		
Benzo(k)fluoranthe	ne	< 0.5		
Indeno(1,2,3-cd)pyre	ene	< 0.5		
Dibenz(a,h)anthrac	ene	< 0.5		
Benzo(g,h,i)perylene	9	<0.5		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-4 12/05/19 12/06/19 12/06/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-23 1/5 120625.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	-d12	% Recovery: 96 108	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		<0.01 J		
Benzo(b)fluoranthe	ne	<0.01 J		
Benzo(k)fluoranthe	ne	<0.01 J		
Indeno(1,2,3-cd)pyre	ene	<0.01 J		
Dibenz(a,h)anthrac	ene	<0.01 J		
Benzo(g,h,i)perylene	5	<0.01 J		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-4 12/05/19 12/06/19 12/09/19 Soil mg/kg (ppm	ı) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-23 1/25 120931.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 145 d 114 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		< 0.05		
Fluorene		< 0.05		
Phenanthrene		< 0.05		
Anthracene		< 0.05		
Fluoranthene		< 0.05		
Pyrene		< 0.05		
Benz(a)anthracene		< 0.05		
Chrysene		< 0.05		
Benzo(a)pyrene		< 0.05		
Benzo(b)fluoranthe	ne	< 0.05		
Benzo(k)fluoranthe	ne	< 0.05		
Indeno(1,2,3-cd)pyre	ene	< 0.05		
Dibenz(a,h)anthrac	ene	< 0.05		
Benzo(g,h,i)perylene	е	< 0.05		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-3 12/05/19 12/06/19 12/07/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-24 1/25 120633.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 161 d 146 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		< 0.05		
Fluorene		< 0.05		
Phenanthrene		0.072		
Anthracene		< 0.05		
Fluoranthene		< 0.05		
Pyrene		0.072		
Benz(a)anthracene		< 0.05		
Chrysene		< 0.05		
Benzo(a)pyrene		< 0.05		
Benzo(b)fluoranthe	ne	< 0.05		
Benzo(k)fluoranthe	ne	< 0.05		
Inden o(1,2,3-cd)pyre	ene	< 0.05		
Dibenz(a,h)anthrac	ene	< 0.05		
Benzo(g,h,i)perylene	е	< 0.05		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank Not Applicable 12/06/19 12/06/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 09-2984 mb 1/5 120621.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	% Recovery: 106 d12 121	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:	Concentration mg/kg (ppm)		
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthei Benzo(k)fluoranthei	<pre></pre>		
Indeno(1,2,3-cd)pyr Dibenz(a,h)anthrac Benzo(g,h,i)perylend	ene <0.01		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912133-03 (Matrix Spike)

				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.0014	102	103	71-125	1

			Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	
Mercury	ug/L (ppb)	0.01	111	78-125	

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 91	2081-01 (Duplie	cate)					
	Reporting	Sampl	e Dup	olicate	RPD		
Analyte	Units	Resul	t Re	esult	(Limit 20)		
Gasoline	ug/L (ppb)	<100	<	100	nm		
Laboratory Code: Laboratory Control Sample							
	Percent						
	Reporting	Spike	Recovery	Acceptance			
Analyte	Units	Level	LCS	Criteria	_		
Gasoline	ug/L (ppb)	1,000	100	69-134	-		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912095-15 (Duplicate)

		Sample	Duplicate	
	Reporting	Result	Result	RPD
Analyte	Units	(Wet Wt)	(Wet Wt)	(Limit 20)
Benzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Toluene	mg/kg (ppm)	< 0.02	< 0.02	nm
Ethylbenzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Xylenes	mg/kg (ppm)	< 0.06	< 0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	mg/kg (ppm)	0.5	88	69-120
Toluene	mg/kg (ppm)	0.5	84	70-117
Ethylbenzene	mg/kg (ppm)	0.5	82	65-123
Xylenes	mg/kg (ppm)	1.5	87	66-120
Gasoline	mg/kg (ppm)	20	85	71-131

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	88	92	61-133	4

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

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QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912108-01 (Matri	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	110	114	64-133	4
Laboratory Code:	Laboratory Contr	ol Samp	le				
			Percent				
	Reporting	Spike	Recovery	y Accep	tance		
Analyte	Units	Level	LCS	Crit	eria		
Diesel Extended	mg/kg (ppm)	5,000	108	58-1	47		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code:	912095-14 (Dup			
	Sample	Duplicate	Relative Percent	Acceptance
Analyte	Result	Result	Difference	Criteria
pН	8.0	8.0	0	0-20

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 912095-15 x5 (Matrix Spike)

		Sample	Percent	Percent		
Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
mg/kg (ppm)	10	<5	78	74 vo	75-125	5
mg/kg (ppm)	50	51.1	114	122	75-125	7
mg/kg (ppm)	10	<5	105	103	75-125	2
mg/kg (ppm)	50	13.0	86	87	75-125	1
mg/kg (ppm)	50	5.84	107	110	75-125	3
mg/kg (ppm	5	<5	107	91	75-125	16
mg/kg (ppm)	5	<5	80	73 vo	75-125	9
mg/kg (ppm)	10	<5	105	104	75-125	1
	Reporting Units mg/kg (ppm) mg/kg (ppm) mg/kg (ppm) mg/kg (ppm) mg/kg (ppm) mg/kg (ppm) mg/kg (ppm)	Reporting UnitsSpike Levelmg/kg (ppm)10mg/kg (ppm)50mg/kg (ppm)10mg/kg (ppm)50mg/kg (ppm)50mg/kg (ppm)5mg/kg (ppm)5mg/kg (ppm)5mg/kg (ppm)10	Reporting Spike Result Units Level (Wet wt) mg/kg (ppm) 10 <5	Reporting Units Spike Level Result (Wet wt) Percent Recovery mg/kg (ppm) 10 <5	Sample Percent Percent Reporting Spike Result Recovery Recovery Units Level (Wet wt) MS MSD mg/kg (ppm) 10 <5	Sample Percent Percent Reporting Units Spike Level Result (Wet wt) Recovery MS Recovery MSD Acceptance Criteria mg/kg (ppm) 10 <5

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			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	mg/kg (ppm)	10	91	80-120
Barium	mg/kg (ppm)	50	102	80-120
Cadmium	mg/kg (ppm)	10	100	80-120
Chromium	mg/kg (ppm)	50	100	80-120
Lead	mg/kg (ppm)	50	104	80-120
Mercury	mg/kg (ppm)	5	103	80-120
Selenium	mg/kg (ppm)	5	99	80-120
Silver	mg/kg (ppm)	10	103	80-120

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Cod	le: 912095-12 x	10 (Matri	x Spike)				
				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	12.3	136 b	141 b	70-130	4 b
Magnesium	mg/L (ppm)	1.0	3.07	117	121	70-130	3

Laboratory Code: 912095-12 x10 (Matrix Spike)

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Calcium	mg/L (ppm)	1.0	111	85-115
Magnesium	mg/L (ppm)	1.0	111	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912081-01 (Matrix Spike)

Laboratory Cour	. 012001 01		inc)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	95	95	70-130	0
Cadmium	ug/L (ppb)	5	< 0.25	97	96	70-130	1
Chromium	ug/L (ppb)	20	<1	101	98	70-130	3
Copper	ug/L (ppb)	20	11.1	96	94	70-130	2
Lead	ug/L (ppb)	10	< 0.5	90	90	70-130	0
Nickel	ug/L (ppb)	20	3.08	96	95	70-130	1
Zinc	ug/L (ppb)	50	85.0	99	95	70-130	4

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	94	85-115
Cadmium	ug/L (ppb)	5	96	85-115
Chromium	ug/L (ppb)	20	97	85-115
Copper	ug/L (ppb)	20	98	85-115
Lead	ug/L (ppb)	10	96	85-115
Nickel	ug/L (ppb)	20	97	85-115
Zinc	ug/L (ppb)	50	98	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912095-17 1/5 (Matrix Spike)

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			Sample	Percent	
	Reporting	Spike	Result	Recovery	Acceptance
Analyte	Units	Level	(Wet wt)	MS	Criteria
Naphthalene	mg/kg (ppm)	0.17	< 0.01	80	44-129
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	89	52-121
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	81	51-123
Fluorene	mg/kg (ppm)	0.17	< 0.01	87	37-137
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	79	34-141
Anthracene	mg/kg (ppm)	0.17	< 0.01	81	32-124
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	85	16-160
Pyrene	mg/kg (ppm)	0.17	< 0.01	85	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	81	23-144
Chrysene	mg/kg (ppm)	0.17	< 0.01	75	32-149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	67	23-176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	67	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	67	21-163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	48	23-170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	49	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	47	37-133

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	_	Percent	Percent		
Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Units	Level	LCS	LCSD	Criteria	(Limit 20)
mg/kg (ppm)	0.17	84	82	58-121	2
mg/kg (ppm)	0.17	95	92	54-121	3
mg/kg (ppm)	0.17	87	85	54-123	2
mg/kg (ppm)	0.17	97	93	56-127	4
mg/kg (ppm)	0.17	86	84	55-122	2
mg/kg (ppm)	0.17	87	85	50-120	2
mg/kg (ppm)	0.17	99	93	54-129	6
mg/kg (ppm)	0.17	91	90	53-127	1
mg/kg (ppm)	0.17	95	93	51-115	2
mg/kg (ppm)	0.17	89	89	55-129	0
mg/kg (ppm)	0.17	82	82	56-123	0
mg/kg (ppm)	0.17	82	82	54-131	0
mg/kg (ppm)	0.17	81	81	51-118	0
mg/kg (ppm)	0.17	83	77	49-148	7
mg/kg (ppm)	0.17	79	75	50-141	5
mg/kg (ppm)	0.17	75	69	52-131	8
	Reporting Units mg/kg (ppm) mg/kg (ppm)	Reporting Units Spike Level mg/kg (ppm) 0.17 mg/kg (ppm) 0.17 <	Percent Reporting Units Spike Level Percent mg/kg (ppm) 0.17 84 mg/kg (ppm) 0.17 95 mg/kg (ppm) 0.17 97 mg/kg (ppm) 0.17 87 mg/kg (ppm) 0.17 87 mg/kg (ppm) 0.17 97 mg/kg (ppm) 0.17 97 mg/kg (ppm) 0.17 97 mg/kg (ppm) 0.17 97 mg/kg (ppm) 0.17 87 mg/kg (ppm) 0.17 87 mg/kg (ppm) 0.17 99 mg/kg (ppm) 0.17 91 mg/kg (ppm) 0.17 82 mg/kg (ppm) 0.17 82 mg/kg (ppm) 0.17 81 mg/kg (ppm) 0.17 83 mg/kg (ppm) 0.17 79 mg/kg (ppm) 0.17 75	Percent Percent Percent Reporting Units Spike Level Percent Recovery LCS Percent Recovery LCSD mg/kg (ppm) 0.17 84 82 mg/kg (ppm) 0.17 95 92 mg/kg (ppm) 0.17 87 85 mg/kg (ppm) 0.17 97 93 mg/kg (ppm) 0.17 86 84 mg/kg (ppm) 0.17 87 85 mg/kg (ppm) 0.17 99 93 mg/kg (ppm) 0.17 99 93 mg/kg (ppm) 0.17 91 90 mg/kg (ppm) 0.17 89 89 mg/kg (ppm) 0.17 82 82 mg/kg (ppm) 0.17 82 82 mg/kg (ppm) 0.17 83 77 mg/kg (ppm) 0.17 79 75 mg/kg (ppm) 0.17 79 75 mg/kg (ppm) 0.17 75 69	PercentPercentPercentReporting UnitsSpike LevelRecovery LCSRecovery LCSDAcceptance Criteriamg/kg (ppm)0.17848258-121mg/kg (ppm)0.17959254-121mg/kg (ppm)0.17878554-123mg/kg (ppm)0.17979356-127mg/kg (ppm)0.17878550-120mg/kg (ppm)0.17878550-120mg/kg (ppm)0.17999354-129mg/kg (ppm)0.17919053-127mg/kg (ppm)0.17959351-115mg/kg (ppm)0.17828256-123mg/kg (ppm)0.17818151-118mg/kg (ppm)0.17837749-148mg/kg (ppm)0.17797550-141mg/kg (ppm)0.17797550-141

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

 ${\bf b}$ - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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3600 Fremont Ave. N. Seattle, WA 98103 T: (206) 352-3790 F: (206) 352-7178 info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 912095 Work Order Number: 1912084

December 16, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 3 sample(s) on 12/6/2019 for the analyses presented in the following report.

Hexavalent Chromium by SM 3500 Cr B Mercury by Method 1631E

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes Project Manager

CC: Eric Young

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005 ORELAP Certification: WA 100009-007 (NELAP Recognized)



CLIENT: Project: Work Order:	Friedman & Bruya 912095 1912084	Work Order Sample Sum						
Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received					
1912084-001	D-2	12/05/2019 3:00 PM	12/06/2019 11:09 AM					
1912084-002	U-1	12/05/2019 3:10 PM	12/06/2019 11:09 AM					
1912084-003	D-1	12/05/2019 3:20 PM	12/06/2019 11:09 AM					



Case Narrative

WO#: **1912084** Date: **12/16/2019**

CLIENT:Friedman & BruyaProject:912095

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.
Qualifiers & Acronyms



WO#: **1912084** Date Reported: **12/16/2019**

Qualifiers:

- * Flagged value is not within established control limits
- B Analyte detected in the associated Method Blank
- D Dilution was required
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- I Analyte with an internal standard that does not meet established acceptance criteria
- J Analyte detected below Reporting Limit
- N Tentatively Identified Compound (TIC)
- Q Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- (<20%RSD, <20% Drift or minimum RRF)
- S Spike recovery outside accepted recovery limits
- ND Not detected at the Reporting Limit
- R High relative percent difference observed

Acronyms:

%Rec - Percent Recovery **CCB** - Continued Calibration Blank CCV - Continued Calibration Verification **DF** - Dilution Factor HEM - Hexane Extractable Material **ICV** - Initial Calibration Verification LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate MB or MBLANK - Method Blank MDL - Method Detection Limit MS/MSD - Matrix Spike / Matrix Spike Duplicate PDS - Post Digestion Spike Ref Val - Reference Value **RL** - Reporting Limit **RPD** - Relative Percent Difference SD - Serial Dilution SGT - Silica Gel Treatment SPK - Spike Surr - Surrogate



Analytical Report

 Work Order:
 1912084

 Date Reported:
 12/16/2019

Client:	Friedman & Bruya		Collection Date: 12/5/2019 3:00:00 PM								
Project:	912095										
Lab ID:	1912084-001 Matrix: Water										
Client Sa	ample ID: D-2										
Analyses	5	Result	RL	Qual	Units	DF	Date Analyzed				
Hexava	lent Chromium by SM 35	<u>00 Cr B</u>			Batc	h ID: R5	5811 Analyst: WF				
Chromiu	um, Hexavalent	ND	0.0450		mg/L	1	12/6/2019 12:15:00 PM				



Analytical Report

 Work Order:
 1912084

 Date Reported:
 12/16/2019

Client:	Friedman & Bruya		Collection Date: 12/5/2019 3:10:00 PM								
Project:	912095										
Lab ID:	1912084-002 Matrix: Water										
Client Sa	ample ID: U-1										
Analyses	6	Result	RL	Qual	Units	DF	Date Analyzed				
Hexava	lent Chromium by SM 350	<u>0 Cr B</u>			Batc	h ID: R5	5811 Analyst: WF				
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/6/2019 12:34:00 PM				



Analytical Report

 Work Order:
 1912084

 Date Reported:
 12/16/2019

Client:	Friedman & Bruya		Collection Date: 12/5/2019 3:20:00 PM									
Project:	912095											
Lab ID:	1912084-003	-003 Matrix: Water										
Client Sa	ample ID: D-1											
Analyses	S	Result	RL	Qual	Units	DF	Date Analyzed					
<u>Hexava</u>	lent Chromium by SM 350	<u>0 Cr B</u>			Batcl	n ID: Rt	55811 Analyst: WF					
Chromiu	um, Hexavalent	ND	0.0450		mg/L	1	12/6/2019 12:39:00 PM					



Work Order: CLIENT:	1912084 Friedman &	Bruva							QC S	SUMMAI	RY REF	PORT
Project:	912095							Hexava	alent Ch	romium b	y SM 350	0 Cr B
Sample ID: MB-R	55811	SampType: MBLK			Units: mg/L		Prep Date:	12/6/2019		RunNo: 558	311	
Client ID: MBLK	W	Batch ID: R55811					Analysis Date:	12/6/2019		SeqNo: 111	10979	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit H	lighLimit RP	D Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	ND	0.0450									
Sample ID: LCS-R	55811	SampType: LCS			Units: mg/L		Prep Date:	12/6/2019		RunNo: 558	311	
Client ID: LCSW	1	Batch ID: R55811					Analysis Date:	12/6/2019		SeqNo: 111	0980	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit H	lighLimit RP	D Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.247	0.0450	0.2500	0	99.0	80.9	115				
Sample ID: 19120	84-001ADUP	SampType: DUP			Units: mg/L		Prep Date:	12/6/2019		RunNo: 558	311	
Client ID: D-2		Batch ID: R55811					Analysis Date:	12/6/2019		SeqNo: 111	0982	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit H	lighLimit RP	D Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	ND	0.0450						0		30	
Sample ID: 19120	84-001AMS	SampType: MS			Units: mg/L		Prep Date:	12/6/2019		RunNo: 558	311	
Client ID: D-2		Batch ID: R55811					Analysis Date:	12/6/2019		SeqNo: 111	0983	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit H	lighLimit RP	D Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.216	0.0450	0.2500	0	86.2	46.2	138				
Sample ID: 19120	84-001AMSD	SampType: MSD			Units: mg/L		Prep Date:	12/6/2019		RunNo: 558	311	
Client ID: D-2		Batch ID: R55811					Analysis Date:	12/6/2019		SeqNo: 111	0984	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit H	lighLimit RP	D Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.221	0.0450	0.2500	0	88.5	46.2	138	0.2156	2.61	20	



Sample Log-In Check List

Clie	nt Name:	FB	Work Ord	er Numbe	er: 1912084	
Log	ged by:	Carissa True	Date Rece	eived:	12/6/2019	9 11:09:00 AM
Chair	n of Custo	ody				
1. Is	Chain of C	ustody complete?	Yes	✓	No 🗌	Not Present
2. H	low was the	sample delivered?	<u>Client</u>			
<u>Log I</u>	n					
3. C	oolers are p	resent?	Yes	✓	No 🗌	NA
4. S	hipping cont	ainer/cooler in good condition?	Yes	✓	No 🗌	
5. C (F	ustody Seal Refer to com	s present on shipping container/cooler? ments for Custody Seals not intact)	Yes [No 🗌	Not Required 🗹
6. ^v	Vas an atten	npt made to cool the samples?	Yes	✓	No 🗌	
7. V	Vere all item	s received at a temperature of $>0^{\circ}$ C to 10.0° C *	Yes [✓	No 🗌	
8. S	ample(s) in	proper container(s)?	Yes [✓	No 🗌	
9. S	Sufficient san	nple volume for indicated test(s)?	Yes -	✓	No 🗌	
10. ^A	re samples	properly preserved?	Yes	✓	No 🗌	
11. ^v	Vas preserva	ative added to bottles?	Yes	✓	No 🗌	NA
			<u>х</u> Г	_	BrCl	added to B fraction
12. Is	s there head	space in the VOA vials?	Yes			NA 🗹
13. D	nu all sample Joes paperw	es containers anive in good condition(unbroken)?	res l Yes	 ✓ 		
14.0	ese paperw		100 [
15. ^A	re matrices	correctly identified on Chain of Custody?	Yes	✓	No 🗌	
16. ^{Is}	s it clear wha	at analyses were requested?	Yes	✓	No 🗌	
17. ۷	Vere all hold	ing times able to be met?	Yes	✓	No 🗌	
<u>Spec</u>	<u>ial Handli</u>	ing (if applicable)				
18. V	Vas client no	tified of all discrepancies with this order?	Yes		No 🗌	NA 🗸
	Person	Notified: Date:				
	By Who	m: Via:	eMail	🗌 Pho	ne 🗌 Fax	In Person
	Regardi	ng:				
	Client In	structions:				
⊥ 19. A	dditional rer	narks:				

12/13/19: 1631 analysis cancelled due to instrument delays.

Item Information

Item #	Temp ⁰C
Cooler 1	4.4
Sample 1	6.9

^{*} Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fax (206) 283-5044	Ph. (206) 285-8282	Seattle, WA 98119-20	Friedman & Bruya, J 3012 16th Avenue Wi											ц -	D-2	Sample ID		Address <u>301</u> City, State, ZIP <u>Sea</u> Phone # <u>(206) 285-8</u>	Send Keport <u>10</u> Company <u>Fri</u>		
		129	est													Lab ID		<u>2 16th</u> ttle, W 282	edman		-
Received by:	Relinquished	Received by:	Betingutished									1 1	*		12/5/19	Date Sampled		1 Ave W 1A 98119 Fax #	and Bruya	and a hl	
	by:	Nonthing M	SIGNAI UNE	ATANIAMIDE									. 1520	0151	1500	Time Sampled)6) 283-5044	Inc.		SUBCO
		TANNEr											4	-	1420	Matrix		REA	PRC	SUE	NTRACT
		M A	Mic	ſ												# of jars		AARKS PI	JECT	CONT	SAN
		mbe	hael E													Dioxins/Furans		ease E	NAME	RACT	IPLE
		721	rdahl	PRINT												EPH		mail R	nno.	ER F	CHA
	-	M		NAM												VPH	P	esults		~me.	O NI
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ĉ	ž	121619	12/6/19	DATE												No		PLE DISPOS fter 30 days mples with instruction	(2 Weeks) LH hour	HAROUND T	12084
		11:04	10:15	TIME												tes)AL)ns	Page 10		

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 20, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the amended results from the testing of material submitted on December 6, 2019 from the Kosmos, F&BI 912124 project. Per request, the results were submitted as a single data package.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1217R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 6, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912124 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Hart Crowser				
912124 -01	D-1				

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124 Date Extracted: 12/13/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY **USING EPA METHOD 1631E**

Results Reported as ug/L (ppb)

Sample ID Laboratory ID **Total Mercury**

D-1 912124-01

0.00096

Method Blank

< 0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124 Date Extracted: 12/09/19 Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 52-124)
D-1 912124-01	<1	<1	<1	<3	<100	77
Method Blank 09-2914 MB	<1	<1	<1	<3	<100	79

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124 Date Extracted: 12/09/19 Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Extended (C10-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
D-1 912124-01	<250	101
Method Blank 09-2990 MB	<250	86

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124 Date Extracted: NA Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID pН

D-1 912124-01 7.7

ENVIRONMENTAL CHEMISTS

Client ID:	D-1		Client:	Hart Crowser
Date Received:	12/06/19		Project:	Kosmos, F&BI 912124
Date Extracted:	12/09/19		Lab ID:	912124-01 x10
Date Analyzed:	12/10/19		Data File:	912124-01 x10.030
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.9		
Magnesium		2.70		
Hardness (as CaCO	3)	38.3		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912124
Date Extracted:	12/09/19	Lab ID:	I9-778 mb
Date Analyzed:	12/10/19	Data File:	I9-778 mb.023
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	< 0.05		
Magnesium	< 0.05		
Hardness (as CaCO	3) <0.35		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D-1 12/06/19 12/09/19 12/09/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912124 912124-01 912124-01.075 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		<0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		<2		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		60.0		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912124
Date Extracted:	12/09/19	Lab ID:	I9-776 mb
Date Analyzed:	12/09/19	Data File:	I9-776 mb.064
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP
	Concentration		
Analyte:	ug/L (ppb)		
Arsenic	<0.5		
Cadmium	< 0.25		
Chromium	<1		
Copper	<2		
Lead	<0.5		
Nickel	<0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912124-01 (Duplicate) Reporting Sample Duplicate RPD Analyte Units Result Result (Limit 20) Benzene ug/L (ppb) <1 <1 nm Toluene ug/L (ppb) <1 <1 nm Ethylbenzene ug/L (ppb) <1 <1 nm Xylenes ug/L (ppb) <3 <3 nm Gasoline <100 ug/L (ppb) <100 nm

	Percent					
	Reporting	Spike	Recovery	Acceptance		
Analyte	Units	Level	LCS	Criteria		
Benzene	ug/L (ppb)	50	100	65-118		
Toluene	ug/L (ppb)	50	96	72-122		
Ethylbenzene	ug/L (ppb)	50	100	73-126		
Xylenes	ug/L (ppb)	150	93	74-118		
Gasoline	ug/L (ppb)	1,000	99	69-134		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	92	63-142	4

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code:	912133-03 (Dupl	icate)		
	Sample	Duplicate	Relative Percent	Acceptance
Analyte	Result	Result	Difference	Criteria
pH	7.7	7.6	1	0-20

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Cod	e: 912133-01 x	iu (Matri	x Spike)				
				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	9.85	105	126	70-130	18
Magnesium	mg/L (ppm)	1.0	2.47	96	97	70-130	1

Laboratory Code: 912133-01 x10 (Matrix Spike)

		Percent				
	Reporting	Spike	Recovery	Acceptance		
Analyte	Units	Level	LCS	Criteria		
Calcium	mg/L (ppm)	1.0	98	85-115		
Magnesium	mg/L (ppm)	1.0	101	85-115		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912133-02 (Matrix Spike)

Laboratory Cour			JIKC)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	98	95	70-130	3
Cadmium	ug/L (ppb)	5	< 0.25	96	93	70-130	3
Chromium	ug/L (ppb)	20	<1	97	96	70-130	1
Copper	ug/L (ppb)	20	<2	94	92	70-130	2
Lead	ug/L (ppb)	10	< 0.5	98	95	70-130	3
Nickel	ug/L (ppb)	20	< 0.5	95	94	70-130	1
Zinc	ug/L (ppb)	50	<2.5	93	91	70-130	2

	Percent				
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	
Arsenic	ug/L (ppb)	10	94	85-115	
Cadmium	ug/L (ppb)	5	98	85-115	
Chromium	ug/L (ppb)	20	94	85-115	
Copper	ug/L (ppb)	20	96	85-115	
Lead	ug/L (ppb)	10	96	85-115	
Nickel	ug/L (ppb)	20	97	85-115	
Zinc	ug/L (ppb)	50	95	85-115	

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/06/19 Project: Kosmos, F&BI 912124

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912133-03 (Matrix Spike)

				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.0014	102	103	71-125	1

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Mercury	ug/L (ppb)	0.01	111	78-125

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

 ${\bf b}$ - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

 ${\rm d}$ - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Friedman & Bruya, Inc. 3012 16 th Avenue West Seattle, WA 98119-2029 Ph. (206) 285-8282			Sample ID	Report To AMAIR Company Hawa C Address City, State, ZIP Phone F
SIG Relinquished by: Received by: Relinquished by: Received by:	×		Lab ID	Goodwin Howser
NATURE De Neg			Date Sampled $\frac{12/(b_1)}{9}$	
Mr.			Time Sampled	SAMPLE SAMPLE PRUJEC PRUJEC
Jolie Higgins Diseat ustat			Type # of Jars Jars V NWTPH-Dx V NWTPH-Gx	CHAIN OF CUSTO RS (signature) AU, TTOLETA T NAME T NAME MOS KS
ESSE Hart (1	Samples rec	Image: selection of the	 BTEX EPA 8021 NWTPH-HCID VOCs EPA 8260 PAHs EPA 8270 PCBs EPA 8082 PCBs EPA 8082 Total Metals 	DY ME La(6/14 PO# INVOICE TO
ANY DATE TIME TWSER 12/6/19 1856	eived at 3 °C	Mchls: 200.8 As, Cd, Cr. (a, Dd, Ni, Zn 1621E Hz. to 0.0005 mal L.	STED PH Hardness Notes Notes	Uwy AT 2 Page # of TURNAROUND TIME Standard turnaround RUSH 24hr Rush charges authorized by: SAMPLE DISPOSAL Archive samples Other Default: Dispose after 30 days

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 20, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the amended results from the testing of material submitted on December 9, 2019 from the Kosmos, F&BI 912133 project. Per request, the results were submitted as a single data package.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1217R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 9, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912133 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	Hart Crowser
912133 -01	D-1
912133 -02	D-1
912133 -03	D-1A

The water samples were sent to Fremont Analytical trace level mercury analyses. The report will be forwarded to your office upon receipt.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133 Date Extracted: 12/13/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Total Mercury
D-1 912133-01	0.0016
D-1 912133-02	0.0015
D-1A 912133-03	0.0014
Method Blank	<0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133 Date Extracted: 12/09/19 Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 52-124)
D-1 912133-01	<1	<1	<1	<3	<100	76
D-1 912133-02	<1	<1	<1	<3	<100	80
D-1A 912133-03	<1	<1	<1	<3	<100	78
Method Blank ^{09-2914 MB}	<1	<1	<1	<3	<100	79

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133 Date Extracted: 12/09/19 Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL **USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds**

<u>Sample ID</u> Laboratory ID	Diesel Extended (C10-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
D-1 912133-01	<250	87
D-1 912133-02	<250	93
D-1A 912133-03	<250	102

Results Reported as ug/L (ppb)

<250

86

Method Blank
09-2990 MB

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133 Date Extracted: NA Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	<u>pH</u>
D-1 912133-01	7.8
D-1 912133-02	7.8
D-1A 912133-03	7.7

ENVIRONMENTAL CHEMISTS

Client ID:	D-1		Client:	Hart Crowser
Date Received:	12/09/19		Project:	Kosmos, F&BI 912133
Date Extracted:	12/09/19		Lab ID:	912133-01 x10
Date Analyzed:	12/10/19		Data File:	912133-01 x10.025
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		9.85		
Magnesium		2.47		
Hardness (as CaCO	3)	34.8		

ENVIRONMENTAL CHEMISTS

Client ID:	D-1		Client:	Hart Crowser
Date Received:	12/09/19		Project:	Kosmos, F&BI 912133
Date Extracted:	12/09/19		Lab ID:	912133-02 x10
Date Analyzed:	12/10/19		Data File:	912133-02 x10.028
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.3		
Magnesium		2.54		
Hardness (as CaCO	3)	36.2		

ENVIRONMENTAL CHEMISTS

Client ID:	D-1A		Client:	Hart Crowser
Date Received:	12/09/19		Project:	Kosmos, F&BI 912133
Date Extracted:	12/09/19		Lab ID:	912133-03 x10
Date Analyzed:	12/10/19		Data File:	912133-03 x10.029
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.2		
Magnesium		2.79		
Hardness (as CaCO	3)	37.0		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912133
Date Extracted:	12/09/19	Lab ID:	I9-778 mb
Date Analyzed:	12/10/19	Data File:	I9-778 mb.023
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	< 0.05		
Magnesium	< 0.05		
Hardness (as CaCO	3) <0.35		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D-1 12/09/19 12/09/19 12/09/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912133 912133-01 912133-01.067 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		<0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		<2		
Lead		<0.5		
Nickel		< 0.5		
Zinc		<2.5		
ENVIRONMENTAL CHEMISTS

Client ID:	D-1		Client:	Hart Crowser
Date Received:	12/09/19		Project:	Kosmos, F&BI 912133
Date Extracted:	12/09/19		Lab ID:	912133-02
Date Analyzed:	12/09/19		Data File:	912133-02.068
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		<0.5		
Cadmium		<0.25		
Chromium		<1		
Copper		<2		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D-1A 12/09/19 12/09/19 12/09/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912133 912133-03 912133-03.071 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		<0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		2.82		
Lead		<0.5		
Nickel		0.900		
Zinc		2.76		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912133
Date Extracted:	12/09/19	Lab ID:	I9-776 mb
Date Analyzed:	12/09/19	Data File:	I9-776 mb.064
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP
	Concentration		
Analyte:	ug/L (ppb)		
Arsenic	<0.5		
Cadmium	< 0.25		
Chromium	<1		
Copper	<2		
Lead	<0.5		
Nickel	<0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, **XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx**

<100

RPD

nm

nm

nm

nm

nm

Laboratory Code: 912124-01 (Duplicate) Sample Reporting Duplicate Analyte Units Result Result (Limit 20) Benzene ug/L (ppb) <1 <1 Toluene ug/L (ppb) <1 <1 Ethylbenzene ug/L (ppb) <1 <1 Xylenes ug/L (ppb) <3 <3

<100

Laboratory Code: Laboratory Control Sample

ug/L (ppb)

Gasoline

		Percent					
	Reporting	Spike	Recovery	Acceptance			
Analyte	Units	Level	LCS	Criteria			
Benzene	ug/L (ppb)	50	100	65-118			
Toluene	ug/L (ppb)	50	96	72-122			
Ethylbenzene	ug/L (ppb)	50	100	73-126			
Xylenes	ug/L (ppb)	150	93	74-118			
Gasoline	ug/L (ppb)	1,000	99	69-134			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	92	63-142	4

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code:				
	Sample	Duplicate	Relative Percent	Acceptance
Analyte	Result	Result	Difference	Criteria
pH	7.7	7.6	1	0-20

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Code: 912133-01 x10 (Matrix Spike)									
				Percent	Percent				
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD		
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)		
Calcium	mg/L (ppm)	1.0	9.85	105	126	70-130	18		
Magnesium	mg/L (ppm)	1.0	2.47	96	97	70-130	1		

Laboratory Code: 912133-01 x10 (Matrix Spike)

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Calcium	mg/L (ppm)	1.0	98	85-115
Magnesium	mg/L (ppm)	1.0	101	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912133-02 (Matrix Spike)

Laboratory Cour			(IKC)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	98	95	70-130	3
Cadmium	ug/L (ppb)	5	< 0.25	96	93	70-130	3
Chromium	ug/L (ppb)	20	<1	97	96	70-130	1
Copper	ug/L (ppb)	20	<2	94	92	70-130	2
Lead	ug/L (ppb)	10	< 0.5	98	95	70-130	3
Nickel	ug/L (ppb)	20	< 0.5	95	94	70-130	1
Zinc	ug/L (ppb)	50	<2.5	93	91	70-130	2

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	94	85-115
Cadmium	ug/L (ppb)	5	98	85-115
Chromium	ug/L (ppb)	20	94	85-115
Copper	ug/L (ppb)	20	96	85-115
Lead	ug/L (ppb)	10	96	85-115
Nickel	ug/L (ppb)	20	97	85-115
Zinc	ug/L (ppb)	50	95	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912133

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912133-03 (Matrix Spike)

				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.0014	102	103	71-125	1

			Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	_
Mercury	ug/L (ppb)	0.01	111	78-125	

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

 ${\bf b}$ - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

 ${\rm d}$ - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Shirwery Metroc, Painary COURIER TURNAROUND TIME: Image: Image						
ATION: TURNAROUND TIME: COURIER DOVERNIGHT COURT TURNAROUND TIME: CA224 HOURS CI 1 WEEK CI 48 HOURS CI STANDARD	for Other Contract Requirements		OMPANY			COMPANY
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TOTAL NUMBER OF CONTAINERS	SPECIAL SHIPMENT HANDLING OR	DATE	ECANCED BY	DATE R	IISHED BY	RELINQU
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$= 12 \left(9 \right) \left(7 $	HARTCROWSER ME		ord 91213	ody Rec	ole Custo	Sam _j Samples St



3600 Fremont Ave. N. Seattle, WA 98103 T: (206) 352-3790 F: (206) 352-7178 info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 912133 Work Order Number: 1912110

December 16, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 3 sample(s) on 12/9/2019 for the analyses presented in the following report.

Hexavalent Chromium by SM 3500 Cr B

This report consists of the following:

- Case Narrative

- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes Project Manager

CC: Eric Young

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005 ORELAP Certification: WA 100009-007 (NELAP Recognized)



CLIENT: Project: Work Order:	Friedman & Bruya 912133 1912110	Work Order Sample Sum						
Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received					
1912110-001	D-1	12/07/2019 1:30 PM	12/09/2019 11:16 AM					
1912110-002	D-1	12/08/2019 1:35 PM	12/09/2019 11:16 AM					
1912110-003	D-1A	12/08/2019 1:55 PM	12/09/2019 11:16 AM					



Case Narrative

WO#: **1912110** Date: **12/16/2019**

CLIENT:Friedman & BruyaProject:912133

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms



WO#: **1912110** Date Reported: **12/16/2019**

Qualifiers:

- * Flagged value is not within established control limits
- B Analyte detected in the associated Method Blank
- D Dilution was required
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- I Analyte with an internal standard that does not meet established acceptance criteria
- J Analyte detected below Reporting Limit
- N Tentatively Identified Compound (TIC)
- Q Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- (<20%RSD, <20% Drift or minimum RRF)
- S Spike recovery outside accepted recovery limits
- ND Not detected at the Reporting Limit
- R High relative percent difference observed

Acronyms:

%Rec - Percent Recovery **CCB** - Continued Calibration Blank CCV - Continued Calibration Verification **DF** - Dilution Factor HEM - Hexane Extractable Material **ICV** - Initial Calibration Verification LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate MB or MBLANK - Method Blank MDL - Method Detection Limit MS/MSD - Matrix Spike / Matrix Spike Duplicate PDS - Post Digestion Spike Ref Val - Reference Value **RL** - Reporting Limit **RPD** - Relative Percent Difference SD - Serial Dilution SGT - Silica Gel Treatment SPK - Spike Surr - Surrogate



Analytical Report

 Work Order:
 1912110

 Date Reported:
 12/16/2019

Client:	t: Friedman & Bruya Collection Date: 12/8/2019 1:35:00 PM												
Project:	912133												
Lab ID:	1912110-002				Matrix: W	ater							
Client Sample ID: D-1													
Analyses	5	Result	RL	Qual	Units	DF	Date Analyzed						
Hexava	lent Chromium by SM 350	<u>0 Cr B</u>			Batc	h ID: R5	5822 Analyst: WF						
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/9/2019 11:59:00 AM						



Analytical Report

 Work Order:
 1912110

 Date Reported:
 12/16/2019

Client:	It: Friedman & Bruya Collection Date: 12/8/2019 1:55:00 PM												
Project:	912133												
Lab ID:	1912110-003				Matrix: W	ater							
Client Sa	ample ID: D-1A												
Analyses	6	Result	RL	Qual	Units	DF	Date Analyzed						
Hexava	lent Chromium by SM 350	<u>0 Cr B</u>			Batc	n ID: R	55822 Analyst: WF						
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/9/2019 12:19:00 PM						



Work Order: CLIENT:	1912110 Friedman &	Bruya						llove	QC S			
Project:	912133							пеха	Ivalent Ch	d mumor	y 51vi 350	U Cr B
Sample ID: MB-55	822	SampType: MBLK			Units: mg/L		Prep Date	: 12/9/201 9	9	RunNo: 558	322	
Client ID: MBLK	W	Batch ID: R55822					Analysis Date	e: 12/9/2019	9	SeqNo: 11	12059	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	ND	0.0450									
Sample ID: LCS-5	5822	SampType: LCS			Units: mg/L		Prep Date	e: 12/9/2019	9	RunNo: 558	322	
Client ID: LCSW	1	Batch ID: R55822					Analysis Date	: 12/9/201 9	9	SeqNo: 11	12060	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.249	0.0450	0.2500	0	99.6	80.9	115				
Sample ID: 19121	10-002BDUP	SampType: DUP			Units: mg/L		Prep Date	e: 12/9/2019	9	RunNo: 558	322	
Client ID: D-1		Batch ID: R55822					Analysis Date	e: 12/9/2019	9	SeqNo: 11	12062	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	ND	0.0450						0		30	
Sample ID: 19121	10-002BMS	SampType: MS			Units: mg/L		Prep Date	e: 12/9/2019	9	RunNo: 558	322	
Client ID: D-1		Batch ID: R55822					Analysis Date	e: 12/9/201 9	9	SeqNo: 11	12063	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.250	0.0450	0.2500	0	99.8	46.2	138				
Sample ID: 19121	10-002BMSD	SampType: MSD			Units: mg/L		Prep Date	e: 12/9/2019	9	RunNo: 558	322	
Client ID: D-1		Batch ID: R55822					Analysis Date	e: 12/9/2019	9	SeqNo: 11	12064	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.251	0.0450	0.2500	0	100	46.2	138	0.2496	0.400	20	



Sample Log-In Check List

Client Name: FB		Work Order Numb	ber: 1912110		
Logged by: Clare Griggs		Date Received:	12/9/2019	11:16:00 AM	
Chain of Custody					
1. Is Chain of Custody complete?		Yes 🖌	No 🗌	Not Present	
2. How was the sample delivered?		<u>FedEx</u>			
<u>Log In</u>					
3. Coolers are present?		Yes 🖌	No 🗌		
Shipping container/cooler in good co	ndition?	Yes 🗹	No 🗌	_	
 Custody Seals present on shipping of (Refer to comments for Custody Sea 	container/cooler? Ils not intact)	Yes 🗋	No 🔽	Not Required	
6. Was an attempt made to cool the sa	mples?	Yes 🖌	No 🗌		
7. Were all items received at a tempera	ature of >0°C to 10.0°C*	Yes 🔽	No 🗌		
8. Sample(s) in proper container(s)?		Yes 🖌	No 🗌		
9. Sufficient sample volume for indicate	ed test(s)?	Yes 🖌	No 🗌		
10. Are samples properly preserved?		Yes 🖌	No 🗌		
11. Was preservative added to bottles?		Yes	No 🔽	NA 🗌	
12. Is there headspace in the VOA vials	?	Yes	No 🗌	NA 🔽	
13. Did all samples containers arrive in g	good condition(unbroken)?	Yes 🖌	No 🗌		
14. Does paperwork match bottle labels	?	Yes 🖌	No 🗌		
15. Are matrices correctly identified on C	Chain of Custody?	Yes 🖌	No 🗌		
16. Is it clear what analyses were reques	sted?	Yes 🖌	No 🗌		
17. Were all holding times able to be me	et?	Yes	No 🗹		
Special Handling (if applicable)					
18. Was client notified of all discrepance	es with this order?	Yes	No 🗌	NA 🔽	
Person Notified:	Date	:			
By Whom:	Via:	🗌 eMail 🗌 Ph	one 🗌 Fax [In Person	
Regarding:					
Client Instructions:					
19 Additional remarks:					

Per client request, do not analyze Hex Cr for sample collected on 12/7/19. 12/13/19: 1631 analysis cancelled due to instrument delays.

Item Information

Item #	Temp ⁰C
Cooler	4.6
Sample	3.9

^{*} Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

PROJECT NAMEANO. PROJECT NAMEANO. PROJECT NAMEANO. PLEASE Email Results PLEASE Email Results PLEASE Email Results PLEASE Email Results PLEASE Email Results PLEASE Email Results ANALYSES REQUESTED ANALYSES REQUESTED ANALYSES REQUESTED Will ca Results PH PH VPH VPH VPH VPH VPH VPH	x (206) 283-5044 Keceived by:	. (206) 285-8282 Relinquished by:	12 IOUU AUGUWE WEST ACHIMPAISING DY	19 16th America West Rolingue Carden SIGNATURE			•			D-1A 1 1355 2	D-1 12/8/16 2 1325	D-1 12/7/19 1330 H2	Sample ID Lab Date Time ID Sampled Sampled Ma		⁹ hone # (206) 285-8282 Fax # (206) 283-5044	City, State, ZIP Seattle, WA 98119	Address 3012 16th Ave W	CompanyFriedman and Bruya, Inc.	Send Report To Michael Erdahl
PO # I Stand A. SOI BS REQUESTED I Dispos I Dispos I Return COMPANY Friedman & Bruya		San Becker Crayi	Michael Erdahl	PRINT NAME						× ×	× ×	0 × ×	EPH VPH Usyavalint Chromium Low kenel 149 the page 14	ANALYSI	Please Email Results	REMARKS	912133	PROJECT NAME/NO.	Amon
		FAI	Friedman & Bruya	COMPANY					,				τι ο . 000 5 μ <u>ι</u> [L	ES REQUESTED	C Return	1 Dispose	A.SO Rush cha	PO# Standa	114

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 20, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the amended results from the testing of material submitted on December 9, 2019 from the Kosmos, F&BI 912148 project. Per request, the data were submitted as a single report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1217R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 9, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912148 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Hart Crowser
912148 -01	Boom 1
912148 -02	D-1B
912148 -03	Trip Blank

The water samples were sent to Fremont Analytical for hexavalent chromium and trace level mercury analyses. The report will be forwarded to your office upon receipt.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148 Date Extracted: 12/13/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
Boom 1 912148-01	0.00094
D-1B 912148-02	0.0012
Method Blank	<0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148 Date Extracted: 12/11/19 Date Analyzed: 12/11/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 52-124)
Boom 1 912148-01	<1	<1	<1	<3	<100	80
D-1B 912148-02	<1	<1	<1	<3	<100	79
Method Blank 09-2917 MB	<1	<1	<1	<3	<100	81

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148 Date Extracted: 12/10/19 Date Analyzed: 12/10/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds

Results Reported as ug/L (ppb)

		Surrogate
<u>Sample ID</u>	Diesel Extended	(% Recovery)
Laboratory ID	(C ₁₀ -C ₃₆)	(Limit 41-152)
Boom 1 912148-01	<250	81
D-1B 912148-02	<250	82
Method Blank 09-3003 MB	<250	81

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148 Date Extracted: NA Date Analyzed: 12/10/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	<u>рН</u>
Boom 1 912148-01	7.8
D-1B 912148-02	7.5

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Boom 1 12/09/19 12/10/19 12/10/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912148 912148-01 912148-01.068 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic Cadmium Chromium		<0.5 <0.25 <1		
Copper Lead Nickel Zinc		<2 <0.5 0.522 <2.5		

ENVIRONMENTAL CHEMISTS

Client ID:	D-1B		Client:	Hart Crowser
Date Received:	12/09/19		Project:	Kosmos, F&BI 912148
Date Extracted:	12/10/19		Lab ID:	912148-02
Date Analyzed:	12/10/19		Data File:	912148-02.071
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		<0.5		
Cadmium		<0.25		
Chromium		<1		
Copper		<2		
Lead		<0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912148
Date Extracted:	12/10/19	Lab ID:	I9-781 mb
Date Analyzed:	12/10/19	Data File:	I9-781 mb.066
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP
	Concentration		
Analyte:	ug/L (ppb)		
Arsenic	<0.5		
Cadmium	<0.25		
Chromium	<1		
Copper	<2		
Lead	<0.5		
Nickel	<0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	Boom 1		Client:	Hart Crowser
Date Received:	12/09/19		Project:	Kosmos, F&BI 912148
Date Extracted:	12/10/19		Lab ID:	912148-01 x10
Date Analyzed:	12/10/19		Data File:	912148-01 x10.088
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		9.85		
Magnesium		2.56		
Hardness (as CaCO	3)	35.1		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	D-1B		Client:	Hart Crowser
Date Received:	12/09/19		Project:	Kosmos, F&BI 912148
Date Extracted:	12/10/19		Lab ID:	912148-02 x10
Date Analyzed:	12/10/19		Data File:	912148-02 x10.089
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		9.59		
Magnesium		2.45		
Hardness (as CaCO	3)	34.0		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912148
Date Extracted:	12/10/19	Lab ID:	I9-778 mb2
Date Analyzed:	12/10/19	Data File:	I9-778 mb2.087
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	<0.05		
Magnesium	< 0.05		
Hardness (as CaCO	3) <0.35		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912074-04 (Duplicate)

-	Reporting	Sample	Duplicate	RPD
Analyte	Units	Result	Result	(Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

	Percent							
	Reporting	Spike	Recovery	Acceptance				
Analyte	Units	Level	LCS	Criteria				
Benzene	ug/L (ppb)	50	94	65-118				
Toluene	ug/L (ppb)	50	100	72-122				
Ethylbenzene	ug/L (ppb)	50	107	73-126				
Xylenes	ug/L (ppb)	150	99	74-118				
Gasoline	ug/L (ppb)	1,000	95	69-134				

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	88	63-142	9

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code:	912148-01 (Dup	olicate)		
	Sample	Duplicate	Relative Percent	Acceptance
Analyte	Result	Result	Difference	Criteria
pН	7.8	7.8	0	0-20
ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912148-01 (Matrix Spike)

Laboratory Cour		(Matrix Op	(IKC)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	94	96	70-130	2
Cadmium	ug/L (ppb)	5	< 0.25	94	96	70-130	2
Chromium	ug/L (ppb)	20	<1	96	96	70-130	0
Copper	ug/L (ppb)	20	<2	93	93	70-130	0
Lead	ug/L (ppb)	10	< 0.5	96	97	70-130	1
Nickel	ug/L (ppb)	20	0.522	96	95	70-130	1
Zinc	ug/L (ppb)	50	<2.5	93	91	70-130	2

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	91	85-115
Cadmium	ug/L (ppb)	5	94	85-115
Chromium	ug/L (ppb)	20	94	85-115
Copper	ug/L (ppb)	20	94	85-115
Lead	ug/L (ppb)	10	94	85-115
Nickel	ug/L (ppb)	20	94	85-115
Zinc	ug/L (ppb)	50	92	85-115
Arsenic Cadmium Chromium Copper Lead Nickel Zinc	ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb)	10 5 20 20 10 20 50	91 94 94 94 94 94 92	85-115 85-115 85-115 85-115 85-115 85-115 85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/12/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Cod	e: 912133-01 x	10 (Matri	x Spike)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	9.85	105	126	70-130	18
Magnesium	mg/L (ppm)	1.0	2.47	96	97	70-130	1

Laboratory Code: 912133-01 x10 (Matrix Spike)

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Calcium	mg/L (ppm)	1.0	98	85-115
Magnesium	mg/L (ppm)	1.0	101	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912148

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912133-03 (Matrix Spike)

				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.0014	102	103	71-125	1

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Mercury	ug/L (ppb)	0.01	111	78-125

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

 ${\bf b}$ - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

 ${\rm d}$ - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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Friedman & Bruya, Inc. 3012 16 th Avenue West Seattle, WA 98119-2029 Ph. (206) 285-8282		BOOM 2 (M Trip Blank	BOON 1 D-1 B	Sample ID	Address City, State, ZIP Phone En	Report To Angie Company Hart C
SIGNA Relinquished by: Received by: Relinquished by: Received by:			01 A.F 12	Lab ID Sa	nail alhail, goo	boodwin
I'VERION			19/19/133	Date Time unpled Sampl	dwin Proj	SAMI SAM
Die			0 Water	ed Type	ARKS	APUERS signatu
Higgin S AT TADES				WTPH-Dx WTPH-Gx	- Yes / No	OF CUSTOD
	Samp			WTPH-HCID Cs EPA 8260 Hs EPA 8270	INVOICE T	Y ME
COMPANY	les received a		× × To × × To N N Ho N N Io	H	O D D D D D D d n D D d n	12/9/10 BRU BRU BRU BRU
DATE	ů ů	Vorts	× Ker × Ker × other × admp	chrome Per 12/10 No	charges authornz SAMPLE DISPO hive samples her ult: Dispose afte	Pare # 1
1850		A CR	1. Dotte	AG Via MÉ tes	sd by: SAL r <u>30 days</u>	TIME Cos



3600 Fremont Ave. N. Seattle, WA 98103 T: (206) 352-3790 F: (206) 352-7178 info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 912148 Work Order Number: 1912127

December 16, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 2 sample(s) on 12/10/2019 for the analyses presented in the following report.

Hexavalent Chromium by SM 3500 Cr B

This report consists of the following:

- Case Narrative

- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes Project Manager

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005 ORELAP Certification: WA 100009-007 (NELAP Recognized)



CLIENT:	Friedman & Bruya	Work Order Sample Summary	
Project:	912148		
Work Order:	1912127		
Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1912127-001	Boom1	12/09/2019 1:30 PM	12/10/2019 11:55 AM
1912127-002	D-1B	12/09/2019 2:30 PM	12/10/2019 11:55 AM



Case Narrative

WO#: **1912127** Date: **12/16/2019**

CLIENT:Friedman & BruyaProject:912148

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms



WO#: **1912127** Date Reported: **12/16/2019**

Qualifiers:

- * Flagged value is not within established control limits
- B Analyte detected in the associated Method Blank
- D Dilution was required
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- I Analyte with an internal standard that does not meet established acceptance criteria
- J Analyte detected below Reporting Limit
- N Tentatively Identified Compound (TIC)
- Q Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- (<20%RSD, <20% Drift or minimum RRF)
- S Spike recovery outside accepted recovery limits
- ND Not detected at the Reporting Limit
- R High relative percent difference observed

Acronyms:

%Rec - Percent Recovery **CCB** - Continued Calibration Blank CCV - Continued Calibration Verification **DF** - Dilution Factor HEM - Hexane Extractable Material **ICV** - Initial Calibration Verification LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate MB or MBLANK - Method Blank MDL - Method Detection Limit MS/MSD - Matrix Spike / Matrix Spike Duplicate PDS - Post Digestion Spike Ref Val - Reference Value **RL** - Reporting Limit **RPD** - Relative Percent Difference SD - Serial Dilution SGT - Silica Gel Treatment SPK - Spike Surr - Surrogate



Analytical Report

 Work Order:
 1912127

 Date Reported:
 12/16/2019

Client:	Friedman & Bruya				Collectior	Date:	: 12/9/2019 1:30:00 PM
Project:	912148						
Lab ID:	1912127-001				Matrix: W	ater	
Client Sa	ample ID: Boom1						
Analyses	6	Result	RL	Qual	Units	DF	Date Analyzed
Hexava	lent Chromium by SM 350	<u>)0 Cr B</u>			Batc	n ID: R	55878 Analyst: TN
Chromiu	um, Hexavalent	ND	0.0450		mg/L	1	12/10/2019 1:41:00 PM



Analytical Report

 Work Order:
 1912127

 Date Reported:
 12/16/2019

Client:	Friedman & Bruya				Collection	Date:	12/9/2019 2:30:00 PM
Project:	912148						
Lab ID:	1912127-002				Matrix: W	ater	
Client Sa	ample ID: D-1B						
Analyses	6	Result	RL	Qual	Units	DF	Date Analyzed
Hexava	lent Chromium by SM 3500	<u>) Cr B</u>			Batcl	n ID: R	55878 Analyst: TN
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/10/2019 1:45:00 PM



Work Order: CLIENT: Project:	1912127 Friedman & 912148	Bruya						Hex	QC S avalent Ch	SUMMAI romium b	RY REF y SM 350	PORT 10 Cr B
Sample ID: MB-R	55878	SampType: MBLK			Units: mg/L		Prep Dat	e: 12/10/2	019	RunNo: 558	378	
Client ID: MBLK	W	Batch ID: R55878					Analysis Dat	e: 12/10/2	019	SeqNo: 11	12371	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	ND	0.0450									
Sample ID: LCS-R	\$55878	SampType: LCS			Units: mg/L		Prep Dat	e: 12/10/2	019	RunNo: 558	378	
Client ID: LCSW	1	Batch ID: R55878					Analysis Dat	e: 12/10/2	019	SeqNo: 11	2372	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.252	0.0450	0.2500	0	101	80.9	115				
Sample ID: 19121	27-001ADUP	SampType: DUP			Units: mg/L		Prep Dat	e: 12/10/2	019	RunNo: 558	378	
Client ID: Boom	1	Batch ID: R55878					Analysis Dat	e: 12/10/2	019	SeqNo: 11	12375	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	ND	0.0450						0		30	
Sample ID: 19121	27-001AMS	SampType: MS			Units: mg/L		Prep Dat	e: 12/10/2	019	RunNo: 558	378	
Client ID: Boom	1	Batch ID: R55878					Analysis Dat	e: 12/10/2	019	SeqNo: 11	2376	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.261	0.0450	0.2500	0	105	46.2	138				
Sample ID: 19121	27-001AMSD	SampType: MSD			Units: mg/L		Prep Dat	e: 12/10/2	019	RunNo: 558	378	
Client ID: Boom	1	Batch ID: R55878					Analysis Dat	e: 12/10/2	019	SeqNo: 11	2377	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.246	0.0450	0.2500	0	98.3	46.2	138	0.2613	6.15	20	



Sample Log-In Check List

Client Name: FB	Work Order Numb	per: 1912127		
Logged by: Carissa True	Date Received:	12/10/201	9 11:55:00 AM	
Chain of Custody				
1. Is Chain of Custody complete?	Yes 🖌	No 🗌	Not Present	
2. How was the sample delivered?	<u>FedEx</u>			
Loa In				
3 Coolers are present?	Yes 🔽	No 🗌		
4. Shipping container/cooler in good condition?	Yes 🖌	No 🗌		
 Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) 	Yes	No 🗹	Not Required	
6. Was an attempt made to cool the samples?	Yes 🖌	No 🗌	NA 🗌	
7. Were all items received at a temperature of $>0^{\circ}C$ to $10.0^{\circ}C^{*}$	Yes 🔽	No 🗌		
8. Sample(s) in proper container(s)?	Yes 🖌	No 🗌		
9. Sufficient sample volume for indicated test(s)?	Yes 🖌	No 🗌		
10. Are samples properly preserved?	Yes 🖌	No 🗌		
11. Was preservative added to bottles?	Yes	No 🖌	NA 🗌	
12. Is there headspace in the VOA vials?	Yes	No 🗌	NA 🖌	
13. Did all samples containers arrive in good condition(unbroken)?	Yes 🖌	No 🗌		
14. Does paperwork match bottle labels?	Yes 🖌	No		
15. Are matrices correctly identified on Chain of Custody?	Yes 🖌	No 🗌		
16. Is it clear what analyses were requested?	Yes 🖌	No 🗌		
17. Were all holding times able to be met?	Yes 🖌	No 🗌		
<u>Special Handling (if applicable)</u>				
18. Was client notified of all discrepancies with this order?	Yes	No 🗌	NA 🔽	
Person Notified: Da	te:			
By Whom: Via	a: 🗌 eMail 🗌 Ph	one 🗌 Fax	In Person	
Regarding:				
Client Instructions:				

12/13/19: 1631 analysis cancelled due to instrument delays.

Item Information

Item #	Temp ⁰C
Cooler 1	4.9
Sample 1	6.3

Fax (206) 283-5044	Ph. (206) 285-8282	Seattle, WA 98119-2	Friedman & Bruya, 3012 16th Avenue W						•				D-18	BOOM 1	Sample ID		Phone # <u>(206) 28</u> ;	City, State, ZIP	Address	Company]	Send Report To	
			Inc.												Lab ID		5-8282	Seattle,	3012 16	Friedm	Michae	
Received by:	Relinquished by	Received by:	Relimnuisherthe											12/2/15	Date Sampled		Fax #(2	WA 98119	ith Ave W	an and Bruy	H Erdahl	
	Wanyin //	i le	SIGNATURE									,	\$1430	1330	Time Sampled		06) 283-5044			a, Inc.		SUBC
	Know												4	H2 0	Matrix			RE	.	PR	US	ONTRAC
	YVV	INTICU	Mart										2	2	# of jars		P	MARK	. 0	OJECI	JBCON	TSA
	NEN	ael Ero	q q												Dioxins/Furans		lease E	ß	1121	NAM	TRACI	MPLE
	12.2	lanı	RINT				- Contraction								EPH		lmail F		20 4	E/NO.	TER	CHL
	MI	2	NAME												VPH		lesults				Frem	AIN
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		Bruya	ANY						 							D		d D	Rus	D S		
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ĉ	12/10/19	12/10/19	DATE					•		-					7		samples with instruc	MPLE DISP after 30 day	ges authoriz	d (2 Weeks) 24 hour	rnaround	9121
	55	IU:00AN	TIME												lotes		tions	OSAL S	ed by:	Pag	TIME of	27
1.8			Ì								 		I				L			i ay		0

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 20, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the amended results from the testing of material submitted on December 10, 2019 from the Kosmos, F&BI 912164 project. Per request, the results were submitted as a single data package.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1218R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 10, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912164 project. Samples were logged in under the laboratory ID's listed below.

Hart Crowser
Boom 2
Boom 1
D3
D-2
D-1B

The samples were sent to Fremont Analytical for hexavalent chromium analysis. The report is enclosed.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/18/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164 Date Extracted: 12/13/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
Boom 2 912164-01	<0.0007
Boom 1 912164-02	<0.0007
D3 912164-03	<0.0007
D-2 912164-04	0.0017
D-1B 912164-05	<0.0007
Method Blank	<0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164 Date Extracted: 12/11/19 Date Analyzed: 12/11/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 52-124)
Boom 2 912164-01	<1	<1	<1	<3	<100	78
Boom 1 912164-02	<1	<1	<1	<3	<100	78
D3 912164-03	<1	<1	<1	<3	<100	78
D-2 912164-04	<1	<1	<1	<3	<100	78
D-1B 912164-05	<1	<1	<1	<3	<100	79
Method Blank 09-2917 MB	<1	<1	<1	<3	<100	81

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164 Date Extracted: 12/11/19 Date Analyzed: 12/11/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Extended (C10-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
Boom 2 912164-01	<250	88
Boom 1 912164-02	<250	93
D3 912164-03	<250	88
D-2 912164-04	<250	84
D-1B 912164-05	<250	95
Method Blank 09-3003 MB3	<250	103

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164 Date Extracted: NA Date Analyzed: 12/11/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	<u>pH</u>
Boom 2 912164-01	7.8
Boom 1 912164-02	7.9
D3 912164-03	7.0
D-2 912164-04	7.7
D-1B 912164-05	7.8

ENVIRONMENTAL CHEMISTS

Client ID:	Boom 2		Client:	Hart Crowser
Date Received:	12/10/19		Project:	Kosmos, F&BI 912164
Date Extracted:	12/11/19		Lab ID:	912164-01
Date Analyzed:	12/11/19		Data File:	912164-01.081
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		<0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		<2		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Boom 1 12/10/19 12/11/19 12/11/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912164 912164-02 912164-02.082 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic Cadmium Chromium Copper		< 0.5 < 0.25 < 1 < 2		
Lead Nickel Zinc		<0.5 <0.5 <2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D3 12/10/19 12/11/19 12/11/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912164 912164-03 912164-03.083 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic Cadmium Chromium Copper Load		0.599 < 0.25 < 1 < 2 < 0.5		
Nickel Zinc		<0.3 0.608 <2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D-2 12/10/19 12/11/19 12/11/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912164 912164-04 912164-04.084 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic Cadmium Chromium		<0.5 <0.25 1.18		
Copper Lead		5.01 0.947		
Nickel Zinc		1.55 12.2		

ENVIRONMENTAL CHEMISTS

Client ID:	D-1B		Client:	Hart Crowser
Date Received:	12/10/19		Project:	Kosmos, F&BI 912164
Date Extracted:	12/11/19		Lab ID:	912164-05
Date Analyzed:	12/11/19		Data File:	912164-05.085
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		<0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		<2		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912164
Date Extracted:	12/11/19	Lab ID:	I9-781 mb2
Date Analyzed:	12/11/19	Data File:	I9-781 mb2.080
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP
	Concentration		
Analyte:	ug/L (ppb)		
Arsenic	<0.5		
Cadmium	< 0.25		
Chromium	<1		
Copper	<2		
Lead	<0.5		
Nickel	<0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Client ID:	Boom 2		Client:	Hart Crowser
Date Received:	12/10/19		Project:	Kosmos, F&BI 912164
Date Extracted:	12/11/19		Lab ID:	912164-01 x10
Date Analyzed:	12/11/19		Data File:	912164-01 x10.144
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.3		
Magnesium		2.54		
Hardness (as CaCO	3)	36.2		

ENVIRONMENTAL CHEMISTS

Client ID:	Boom 1		Client:	Hart Crowser
Date Received:	12/10/19		Project:	Kosmos, F&BI 912164
Date Extracted:	12/11/19		Lab ID:	912164-02 x10
Date Analyzed:	12/11/19		Data File:	912164-02 x10.147
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.7		
Magnesium		2.59		
Hardness (as CaCO	3)	37.4		

ENVIRONMENTAL CHEMISTS

Client ID:	D3		Client:	Hart Crowser
Date Received:	12/10/19		Project:	Kosmos, F&BI 912164
Date Extracted:	12/11/19		Lab ID:	912164-03 x10
Date Analyzed:	12/11/19		Data File:	912164-03 x10.148
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		12.9		
Magnesium		3.15		
Hardness (as CaCO	3)	45.2		

ENVIRONMENTAL CHEMISTS

Client ID:	D-2		Client:	Hart Crowser
Date Received:	12/10/19		Project:	Kosmos, F&BI 912164
Date Extracted:	12/11/19		Lab ID:	912164-04 x10
Date Analyzed:	12/11/19		Data File:	912164-04 x10.149
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		11.3		
Magnesium		3.29		
Hardness (as CaCO	3)	41.8		

ENVIRONMENTAL CHEMISTS

Client ID:	D-1B		Client:	Hart Crowser
Date Received:	12/10/19		Project:	Kosmos, F&BI 912164
Date Extracted:	12/11/19		Lab ID:	912164-05 x10
Date Analyzed:	12/11/19		Data File:	912164-05 x10.150
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.8		
Magnesium		2.64		
Hardness (as CaCO	3)	37.8		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912164
Date Extracted:	12/11/19	Lab ID:	I9-782 mb
Date Analyzed:	12/11/19	Data File:	I9-782 mb.142
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	< 0.05		
Magnesium	< 0.05		
Hardness (as CaCO	3) <0.35		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912074-04 (Duplicate)

Ū	Reporting	Sample	Duplicate	RPD
Analyte	Units	Result	Result	(Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	ug/L (ppb)	50	94	65-118
Toluene	ug/L (ppb)	50	100	72-122
Ethylbenzene	ug/L (ppb)	50	107	73-126
Xylenes	ug/L (ppb)	150	99	74-118
Gasoline	ug/L (ppb)	1,000	95	69-134

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	88	63-142	9

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code: 912164-05 (Duplicate)							
	Sample	Duplicate	Relative Percent	Acceptance			
Analyte	Result	Result	Difference	Criteria			
pH	7.8	7.7	1	0-20			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912148-01 (Matrix Spike)

Laboratory Cour	. 012140 01		JIKG)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	94	96	70-130	2
Cadmium	ug/L (ppb)	5	< 0.25	94	96	70-130	2
Chromium	ug/L (ppb)	20	<1	96	96	70-130	0
Copper	ug/L (ppb)	20	<2	93	93	70-130	0
Lead	ug/L (ppb)	10	< 0.5	96	97	70-130	1
Nickel	ug/L (ppb)	20	0.522	96	95	70-130	1
Zinc	ug/L (ppb)	50	<2.5	93	91	70-130	2

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	91	85-115
Cadmium	ug/L (ppb)	5	94	85-115
Chromium	ug/L (ppb)	20	94	85-115
Copper	ug/L (ppb)	20	94	85-115
Lead	ug/L (ppb)	10	94	85-115
Nickel	ug/L (ppb)	20	94	85-115
Zinc	ug/L (ppb)	50	92	85-115
ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

	le. 912104-01 x	IU (Iviati)	x Spike)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	10.3	155 b	145 b	70-130	7 b
Magnesium	mg/L (ppm)	1.0	2.54	103	112	70-130	8

Laboratory Code: 912164-01 x10 (Matrix Spike)

Laboratory Code: Laboratory Control Sample

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Calcium	mg/L (ppm)	1.0	101	85-115
Magnesium	mg/L (ppm)	1.0	101	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/18/19 Date Received: 12/10/19 Project: Kosmos, F&BI 912164

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912133-03 (Matrix Spike)

				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.0014	102	103	71-125	1

Laboratory Code: Laboratory Control Sample

			Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	_
Mercury	ug/L (ppb)	0.01	111	78-125	

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

 ${\bf b}$ - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Ph. (206) 285-8282	Friedman & Bruya, Inc. 3012 16 th Avenue West Seattle, WA 98119-2029					P1B	0-2-	D3	Boom 1	B00M 2	Sample ID		PhoneEm	City State 71P	Address	Commany Hart m	912164 Report To HWAIR
Received by:	Relinquished by:	SIGNATURE			K	8.	<i>b4</i>	63	02	01 A - 6 12/10 10	Lab ID Date Sampled		ail				2000 du M
	iggin j					1205 cont	1155 wat	150 Wat	10410 War	1 1025 Wat	Time Samı Sampled Typ			REMARKS	Kosma	PROJECT NA	SAMPLE CHA
	olie Higgi	PRINT NAME				W7XX	C 7 X X	XXE	C 7XX	er 7 X X	Image: Second state Image: Second		RLs? - Yes / No		SC	ME , DO	AIN OF CUSTO
-	ns Har		· · · · · · · · ·			\otimes					BTEX EPA 8021 NWTPH-HCID VOCs EPA 8260 PAHs EPA 8270 PCBs EPA 8082	ANALYSES RE		INVOICE TO		PO #	DY ME 12/
Samples received at +++	+ (xouser 14/9/19/14/14/	OMPANY DATE TIN			, ner	X S X X X X II	X S X	X ® X	X @ @ & mercu	X @ @ #nex. Cr	Total Metal Hereing He	EQUESTED	Default: Dispose after 30 c	SAMPLE DISPOSAL	Rush charges authorized by:	C Standard turnaround	10// Page # VW 3/AI3 TURNAROUND TIME



3600 Fremont Ave. N. Seattle, WA 98103 T: (206) 352-3790 F: (206) 352-7178 info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 912164 Work Order Number: 1912155

December 16, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 5 sample(s) on 12/11/2019 for the analyses presented in the following report.

Hexavalent Chromium by SM 3500 Cr B

This report consists of the following:

- Case Narrative

- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes Project Manager

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005 ORELAP Certification: WA 100009-007 (NELAP Recognized)



CLIENT: Project: Work Order: Lab Sample ID 1912155-001 1912155-002 1912155-003 1912155-004 1912155-005	Friedman & Bruya 912164 1912155	Work Order Sample						
Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received					
1912155-001	Boom2	12/10/2019 10:25 AM	12/11/2019 9:40 AM					
1912155-002	Boom1	12/10/2019 10:40 AM	12/11/2019 9:40 AM					
1912155-003	D3	12/10/2019 10:50 AM	12/11/2019 9:40 AM					
1912155-004	D-2	12/10/2019 11:55 AM	12/11/2019 9:40 AM					
1912155-005	D-1B	12/10/2019 12:05 PM	12/11/2019 9:40 AM					



Case Narrative

WO#: **1912155** Date: **12/16/2019**

CLIENT:Friedman & BruyaProject:912164

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms



WO#: **1912155** Date Reported: **12/16/2019**

Qualifiers:

- * Flagged value is not within established control limits
- B Analyte detected in the associated Method Blank
- D Dilution was required
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- I Analyte with an internal standard that does not meet established acceptance criteria
- J Analyte detected below Reporting Limit
- N Tentatively Identified Compound (TIC)
- Q Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- (<20%RSD, <20% Drift or minimum RRF)
- S Spike recovery outside accepted recovery limits
- ND Not detected at the Reporting Limit
- R High relative percent difference observed

Acronyms:

%Rec - Percent Recovery **CCB** - Continued Calibration Blank CCV - Continued Calibration Verification **DF** - Dilution Factor HEM - Hexane Extractable Material **ICV** - Initial Calibration Verification LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate MB or MBLANK - Method Blank MDL - Method Detection Limit MS/MSD - Matrix Spike / Matrix Spike Duplicate PDS - Post Digestion Spike Ref Val - Reference Value **RL** - Reporting Limit **RPD** - Relative Percent Difference SD - Serial Dilution SGT - Silica Gel Treatment SPK - Spike Surr - Surrogate



Client:	Friedman & Bruya				Collection	n Date:	12/10/2019 10:25:00 AM				
Project:	912164										
Lab ID:	DID: 1912155-001 Matrix: Water										
Client Sample ID: Boom2											
Analyses	6	Result	RL	Qual	Units	DF	Date Analyzed				
Hexava	lent Chromium by SM 350	0 Cr B			Batc	h ID: R	55895 Analyst: WF				
Chromium, Hexavalent ND 0.0450 mg/L 1 12/11/2019 10											



Client:	Friedman & Bruya				Collection	n Date:	12/10/2019 10:40:00 AM				
Project:	912164										
Lab ID:	1912155-002	2 Matrix: Water									
Client Sa	ample ID: Boom1										
Analyses	S	Result	RL	Qual	Units	DF	Date Analyzed				
Hexava	lent Chromium by SM 350	<u>00 Cr B</u>			Batc	h ID: R5	55895 Analyst: WF				
Chromiu	um, Hexavalent	ND	0.0450		mg/L	1	12/11/2019 11:03:00 AM				



Client:	Friedman & Bruya				Collection	Date:	12/10/2019 10:50:00 AM
Project:	912164						
Lab ID:	1912155-003				Matrix: W	ater	
Client Sa	ample ID: D3						
Analyses	8	Result	RL	Qual	Units	DF	Date Analyzed
Hexava	lent Chromium by SM 350	<u>0 Cr B</u>			Batcl	n ID: R	55895 Analyst: WF
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/11/2019 11:07:00 AM



Client:	Friedman & Bruya				Collection	Date:	12/10/2019 11:55:00 AM
Project:	912164						
Lab ID:	1912155-004				Matrix: W	ater	
Client Sa	ample ID: D-2						
Analyses	6	Result	RL	Qual	Units	DF	Date Analyzed
Hexava	lent Chromium by SM 350	0 Cr B			Batc	h ID: R	55895 Analyst: WF
Chromiu	um, Hexavalent	ND	0.0450		mg/L	1	12/11/2019 11:13:00 AM



Client:	Friedman & Bruya	Friedman & Bruya Collection Date: 12/10/2019 12:05:00 F										
Project:	912164											
Lab ID: 1912155-005 Matrix: Water												
Client Sample ID: D-1B												
Analyses	S	Result	Result RL Qual Units DF Date A									
Hexava	lent Chromium by SM 350	<u>00 Cr B</u>			Batc	h ID: R5	5895 Analyst: WF					
Chromiu	um, Hexavalent	ND	0.0450		mg/L	1	12/11/2019 11:18:00 AM					



Work Order: CLIENT: Project:	1912155 Friedman & 912164	Bruya						Hexa	QC S avalent Ch	SUMMAI romium b	RY REF y SM 350	PORT
Sample ID: MB-R	55895	SampType: MBLK			Units: mg/L		Prep Date	e: 12/11/20)19	RunNo: 558	395	
Client ID: MBLK	W	Batch ID: R55895					Analysis Date	e: 12/11/20)19	SeqNo: 11	3468	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	ND	0.0450									
Sample ID: LCS-F	\$55895	SampType: LCS			Units: mg/L		Prep Date	e: 12/11/20	019	RunNo: 558	395	
Client ID: LCSW	1	Batch ID: R55895					Analysis Date	e: 12/11/20)19	SeqNo: 11	13469	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	0.250	0.0450	0.2500	0	100	80.9	115				
Sample ID: 19121	55-001ADUP	SampType: DUP			Units: mg/L		Prep Date	e: 12/11/20)19	RunNo: 558	395	
Client ID: Boom	2	Batch ID: R55895					Analysis Date	e: 12/11/20	019	SeqNo: 11	13471	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	ND	0.0450						0		30	
Sample ID: 19121	55-001AMS	SampType: MS			Units: mg/L		Prep Date	e: 12/11/20)19	RunNo: 558	395	
Client ID: Boom	2	Batch ID: R55895					Analysis Date	e: 12/11/20)19	SeqNo: 11	3472	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	0.247	0.0450	0.2500	0	98.8	46.2	138				
Sample ID: 19121	55-001AMSD	SampType: MSD			Units: mg/L		Prep Date	e: 12/11/20)19	RunNo: 558	395	
Client ID: Boom	2	Batch ID: R55895					Analysis Date	e: 12/11/20)19	SeqNo: 11	13473	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	0.246	0.0450	0.2500	0	98.5	46.2	138	0.2471	0.365	20	



Sample Log-In Check List

Client Name: FB	Work Order Nur	mber: 1912155	
Logged by: Carissa True	Date Received:	12/11/201	19 9:40:00 AM
Chain of Custody			
1. Is Chain of Custody complete?	Yes 🖌	No 🗌	Not Present
2. How was the sample delivered?	UPS		
<u>Log In</u>			
3. Coolers are present?	Yes 🗸	No 🗌	NA 🗌
4. Shipping container/cooler in good condition?	Yes 🖌	No 🗌	
 Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) 	Yes 🗌	No 🗹	Not Required
6. Was an attempt made to cool the samples?	Yes 🖌	No 🗌	NA 🗌
7. Were all items received at a temperature of $>0^{\circ}C$ to 10.	0°C* Yes ✔	No 🗌	
8. Sample(s) in proper container(s)?	Yes 🖌	No 🗌	
9. Sufficient sample volume for indicated test(s)?	Yes 🖌	No 🗌	
10. Are samples properly preserved?	Yes 🖌	No 🗌	
11. Was preservative added to bottles?	Yes	No 🔽	NA 🗌
12. Is there headspace in the VOA vials?	Yes	No 🗌	NA 🗹
13. Did all samples containers arrive in good condition(unbro	oken)? Yes 🗹	No 🗌	
14. Does paperwork match bottle labels?	Yes 🖌	No 🗌	
15. Are matrices correctly identified on Chain of Custody?	Yes 🖌	No 🗌	
16. Is it clear what analyses were requested?	Yes 🖌	No 🗌	
17. Were all holding times able to be met?	Yes 🖌	No 🗌	
<u>Special Handling (if applicable)</u>			
18. Was client notified of all discrepancies with this order?	Yes 🖌	No 🗌	NA 🗌
Person Notified: Michael Erdahl	Date:	12/11/2019	
By Whom: Carissa True	Via: 🖌 eMail 🗌 F	Phone 🗌 Fax	In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

1631- sample bottles were not labeled at time of receipt. Labeled bags containing "Boom2" and "D-1B" bottles were removed during sample receipt and bottles were potentially swapped. 1631 will also be run on the other containers we received for confirmation.

12/13/19: 1631 analysis cancelled due to instrument delays.

Item Information

Item #	Temp ⁰C
Cooler 1	9.5
Sample 1	5.4

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



Sample Log-In Check List

Client Name:	FB	Work Order Number	1912155
Logged by:	Carissa True	Date Received:	12/11/2019 9:40:00 AM

^{*} Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Seattle, WA 98119-2029 Ph. (206) 285-8282 Fax (206) 283-5044	Friedman & Bruya, Inc. 3012 16th Avenue West				D- 13	D-2	03	Scom	Soom 2	-	Sample ID ID Sa	Phone #	City, State, ZIP <u>Seattle, WA</u>	Address 3012 16th Av	Send Report <u>To Michael Erd</u> Company <u>Friedman an</u>	
Received by: Relinquisher Received by:	Relinquished				-				10/10/10	- ha	Date ampled		<u>уд113</u> ах # (20	ve W	ahl d Bruya,	
d by:	SIGNATURE				1005	1001	1165	i laco	Chul	> 241	Time Sampled		6) 283-5044		Inc.	SUBCON
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 26, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the additional results from the testing of material submitted on December 11, 2019 from the Kosmos, F&BI 912192 project. There are 8 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparaos HCR1226R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 11, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912192 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912192 -01	D-1B
912192 -02	D-2
912192 -03	Boom1
912192 -04	U-2

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D-1B 12/11/19 12/19/19 12/19/19 Water ug/L (pph)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912192 912192-01 121950.D GCMS9 MS
			т	TI
Surrogates: 1,2-Dichloroethane-d4 Toluene-d8 4-Bromofluorobenzene		% Recovery: 102 103 105	Lower Limit: 50 50 50	Upper Limit: 150 150 150
Compounds:		Concentration ug/L (ppb)		
Benzene Toluene Ethylbenzene m,p-Xylene o-Xylene		<0.2 <0.2 <0.2 <0.4 <0.2		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D-2 12/11/19 12/19/19 12/20/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912192 912192-02 121951.D GCMS9 MS	
	8 (FF*)		T	TL	
C .		0/ D	Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane-	d4	101	50	150	
Toluene-d8		107	50	150	
4-Bromofluorobenze	ene	108	50	150	
		Concentration			
Compounds:		ug/L (ppb)			
Benzene		< 0.2			
Toluene		< 0.2			
Ethylbenzene		< 0.2			
m.p-Xvlene		< 0.4			
o-Xylene		<0.2			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Boom1 12/11/19 12/19/19 12/20/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912192 912192-03 121952.D GCMS9 MS
Surrogates: 1,2-Dichloroethane- Toluene-d8 4-Bromofluorobenze	d4 ene	% Recovery: 100 107 108	Lower Limit: 50 50 50	Upper Limit: 150 150 150
Compounds:		Concentration ug/L (ppb)		
Benzene Toluene Ethylbenzene m,p-Xylene o-Xylene		<0.2 <0.2 <0.2 <0.4 <0.2		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix:	U-2 12/11/19 12/19/19 12/20/19 Water		Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912192 912192-04 121953.D GCMS9	
Units:	ug/L (ppb)		Operator:	MS	
			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane-	d4	101	50	150	
Toluene-d8		105	50	150	
4-Bromofluorobenze	ene	109	50	150	
		Concentration			
Compounds:		ug/L (ppb)			
Benzene		< 0.2			
Toluene		< 0.2			
Ethylbenzene		< 0.2			
m,p-Xylene		< 0.4			
o-Xylene		< 0.2			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bla	nk	Client:	Hart Crowser
Date Received:	Not Applica	ble	Project:	Kosmos, F&BI 912192
Date Extracted:	12/19/19		Lab ID:	09-3067 mb
Date Analyzed:	12/19/19		Data File:	121937.D
Matrix:	Water		Instrument:	GCMS9
Units:	ug/L (ppb)		Operator:	MS
			Lower	Upper
Surrogates:		% Recovery:	Limit:	Limit:
1,2-Dichloroethane-	d4	100	50	150
Toluene-d8		105	50	150
4-Bromofluorobenze	ene	110	50	150
		Concentration		
Compounds:		ug/L (ppb)		
Benzene		< 0.2		
Toluene		< 0.2		
Ethylbenzene		< 0.2		
m,p-Xylene		< 0.4		
o-Xylene		< 0.2		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912298-01 (Matrix Spike)

-				Percent	
	Reporting	Spike	Sample	Recovery	Acceptance
Analyte	Units	Level	Result	MS	Criteria
Benzene	ug/L (ppb)	50	< 0.35	112	75-114
Toluene	ug/L (ppb)	50	<1	107	73-117
Ethylbenzene	ug/L (ppb)	50	<1	107	66 - 124
m,p-Xylene	ug/L (ppb)	100	<2	104	63 - 128
o-Xylene	ug/L (ppb)	50	<1	104	64 - 129

Laboratory Code: Laboratory Control Sample

	I I I I I		Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Benzene	ug/L (ppb)	50	103	109	75-116	6
Toluene	ug/L (ppb)	50	96	102	79 - 115	6
Ethylbenzene	ug/L (ppb)	50	99	105	83-111	6
m,p-Xylene	ug/L (ppb)	100	98	104	81-112	6
o-Xylene	ug/L (ppb)	50	99	104	81-117	5

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Friedman & 3012 16 th Ave Seattle, WA ! Ph. (206) 285						23	D-	R	8	Phone	City, State,	Company Address	Report To
Bruya, Inc. mue West 98119-2029		, , , , , , , , , , , , , , , , , , ,			2	2mc	2	B	mple ID	<u></u> Er	ZIP	C J	Anaie
S Relinquished by: Received by: Relinquishen by: Received by:					04	20	07	DIAV	Lab ID	nail			boodwir
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 19, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin :

Included are the amended results from the testing of material submitted on December 11, 2019 from the Kosmos, F&BI 912192 project. Per request, the results were submitted as a single report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1219R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 11, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912192 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	Hart Crowser
912192 -01	D-1B
912192 -02	D-2
912192 -03	Boom1
912192 -04	U-2

The samples were sent to Fremont Analytical for hexavalent chromium analysis. The report is enclosed.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192 Date Extracted: 12/13/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

Sample ID	<u>Total Mercury</u>
Laboratory ID	
D-1B	0.0037
912192-01	
D-2	0.015
912192-02	
Boom1	0.0017
912192-03	
U-2	< 0.0007
912192-04	

Method Blank

< 0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/16/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192 Date Extracted: 12/12/19 Date Analyzed: 12/12/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 52-124)
D-1B 912192-01	<1	<1	<1	<3	<100	79
D-2 912192-02	<1	<1	<1	<3	<100	77
Boom1 912192-03	<1	<1	<1	<3	<100	76
U-2 912192-04	<1	<1	<1	<3	<100	79
Method Blank 09-2920 MB	<1	<1	<1	<3	<100	82

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/16/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192 Date Extracted: 12/12/19 Date Analyzed: 12/12/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL **USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds**

<u>Sample ID</u> Laboratory ID	Diesel Extended (C ₁₀ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 47-140)
D-1B 912192-01	<250	106
D-2 912192-02	270 x	108
Boom1 912192-03	<250	128
U-2 912192-04	<250	104
Method Blank 09-3026 MB2	<250	106

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/16/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192 Date Extracted: NA Date Analyzed: 12/12/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	<u>pH</u>
D-1B 912192-01	7.4
D-2 912192-02	7.4
Boom1 912192-03	7.6
U-2 912192-04	7.7

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	D-1B		Client:	Hart Crowser
Date Received:	12/11/19		Project:	Kosmos, F&BI 912192
Date Extracted:	12/12/19		Lab ID:	912192-01 x10
Date Analyzed:	12/13/19		Data File:	912192-01 x10.048
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.8		
Magnesium		2.80		
Hardness (as CaCO	3)	38.5		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	D-2		Client:	Hart Crowser
Date Received:	12/11/19		Project:	Kosmos, F&BI 912192
Date Extracted:	12/12/19		Lab ID:	912192-02 x10
Date Analyzed:	12/13/19		Data File:	912192-02 x10.049
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		12.7		
Magnesium		4.11		
Hardness (as CaCO	3)	48.6		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	Boom1		Client:	Hart Crowser
Date Received:	12/11/19		Project:	Kosmos, F&BI 912192
Date Extracted:	12/12/19		Lab ID:	912192-03 x10
Date Analyzed:	12/13/19		Data File:	912192-03 x10.050
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.7		
Magnesium		2.74		
Hardness (as CaCO	3)	38.0		
ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	U-2		Client:	Hart Crowser
Date Received:	12/11/19		Project:	Kosmos, F&BI 912192
Date Extracted:	12/12/19		Lab ID:	912192-04 x10
Date Analyzed:	12/13/19		Data File:	912192-04 x10.051
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.7		
Magnesium		2.63		
Hardness (as CaCO	3)	37.5		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912192
Date Extracted:	12/12/19	Lab ID:	I9-782 mb2
Date Analyzed:	12/13/19	Data File:	I9-782 mb2.047
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	< 0.05		
Magnesium	< 0.05		
Hardness (as CaCO	3) <0.35		

ENVIRONMENTAL CHEMISTS

Client ID:	D-1B		Client:	Hart Crowser
Date Received:	12/11/19		Project:	Kosmos, F&BI 912192
Date Extracted:	12/12/19		Lab ID:	912192-01
Date Analyzed:	12/12/19		Data File:	912192-01.111
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		<0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		<2		
Lead		< 0.5		
Nickel		0.743		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D-2 12/11/19 12/12/19 12/12/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912192 912192-02 912192-02.114 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic Cadmium Chromium Copper Lead Nickel		0.722 <0.25 3.14 13.5 1.80 3.30		
Zinc		17.9		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Boom1 12/11/19 12/12/19 12/12/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912192 912192-03 912192-03.115 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		<0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		<2		
Lead		< 0.5		
Nickel		0.683		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID:	U-2		Client:	Hart Crowser
Date Received:	12/11/19		Project:	Kosmos, F&BI 912192
Date Extracted:	12/12/19		Lab ID:	912192-04
Date Analyzed:	12/12/19		Data File:	912192-04.116
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		<0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		<2		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank NA 12/12/19 12/12/19 Water ug/L (ppb)	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912192 I9-788 mb I9-788 mb.107 ICPMS2 SP
Analyte:	Concentration ug/L (ppb)	1	
Arsenic Cadmium Chromium	<0.5 <0.25 <1		
Copper	<2		
Lead	< 0.5		
Nickel	<0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/16/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912123-18 (Duplicate) Reporting Sample Duplicate RPD Analyte Units Result Result (Limit 20) Benzene ug/L (ppb) <1 <1 nm Toluene ug/L (ppb) <1 <1 nm Ethylbenzene ug/L (ppb) <1 <1 nm Xylenes ug/L (ppb) <3 <3 nm Gasoline ug/L (ppb) <100 <100 nm

	Percent						
	Reporting	Spike	Recovery	Acceptance			
Analyte	Units	Level	LCS	Criteria			
Benzene	ug/L (ppb)	50	94	65-118			
Toluene	ug/L (ppb)	50	98	72-122			
Ethylbenzene	ug/L (ppb)	50	107	73-126			
Xylenes	ug/L (ppb)	150	100	74-118			
Gasoline	ug/L (ppb)	1,000	106	69-134			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/16/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	104	96	61-133	8

ENVIRONMENTAL CHEMISTS

Date of Report: 12/16/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code:	912192-04 (Dup	olicate)		
	Sample	Duplicate	Relative Percent	Acceptance
Analyte	Result	Result	Difference	Criteria
pН	7.7	7.7	0	0-20

ENVIRONMENTAL CHEMISTS

Date of Report: 12/16/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Code: 912164-01 x10 (Matrix Spike)							
				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	10.3	155 b	145 b	70-130	7 b
Magnesium	mg/L (ppm)	1.0	2.54	103	112	70-130	8

Laboratory Code: 912164-01 x10 (Matrix Spike)

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Calcium	mg/L (ppm)	1.0	101	85-115
Magnesium	mg/L (ppm)	1.0	101	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/16/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912192-01 (Matrix Spike)

Laboratory Cour	2. 512152-01	(Matrix Sp	(IKC)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	94	96	70-130	2
Cadmium	ug/L (ppb)	5	< 0.25	96	98	70-130	2
Chromium	ug/L (ppb)	20	<1	95	96	70-130	1
Copper	ug/L (ppb)	20	<2	93	94	70-130	1
Lead	ug/L (ppb)	10	< 0.5	91	93	70-130	2
Nickel	ug/L (ppb)	20	0.743	94	94	70-130	0
Zinc	ug/L (ppb)	50	<2.5	89	90	70-130	1

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	94	85-115
Cadmium	ug/L (ppb)	5	98	85-115
Chromium	ug/L (ppb)	20	97	85-115
Copper	ug/L (ppb)	20	97	85-115
Lead	ug/L (ppb)	10	94	85-115
Nickel	ug/L (ppb)	20	97	85-115
Zinc	ug/L (ppb)	50	95	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912192

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912133-03 (Matrix Spike)

				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.0014	102	103	71-125	1

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Mercury	ug/L (ppb)	0.01	111	78-125

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

 ${\bf b}$ - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

 ${\rm d}$ - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Friedman & 3012 16th Ave Seattle, WA § Ph. (206) 285					Ç	03	D'	R	· 50	Phone	City, State,	Address	Report To
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3600 Fremont Ave. N. Seattle, WA 98103 T: (206) 352-3790 F: (206) 352-7178 info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 912192 Work Order Number: 1912176

December 16, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 4 sample(s) on 12/12/2019 for the analyses presented in the following report.

Hexavalent Chromium by SM 3500 Cr B

This report consists of the following:

- Case Narrative

- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes Project Manager

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005 ORELAP Certification: WA 100009-007 (NELAP Recognized)



CLIENT: Project: Work Order:	Friedman & Bruya 912192 1912176	Work Order Sample Summa						
Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received					
1912176-001	D-1B	12/11/2019 11:40 AM	12/12/2019 9:12 AM					
1912176-002	D-2	12/11/2019 12:03 PM	12/12/2019 9:12 AM					
1912176-003	Boom1	12/11/2019 12:30 PM	12/12/2019 9:12 AM					
1912176-004	U-2	12/11/2019 1:00 PM	12/12/2019 9:12 AM					



Case Narrative

WO#: **1912176** Date: **12/16/2019**

CLIENT:Friedman & BruyaProject:912192

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms



WO#: **1912176** Date Reported: **12/16/2019**

Qualifiers:

- * Flagged value is not within established control limits
- B Analyte detected in the associated Method Blank
- D Dilution was required
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- I Analyte with an internal standard that does not meet established acceptance criteria
- J Analyte detected below Reporting Limit
- N Tentatively Identified Compound (TIC)
- Q Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- (<20%RSD, <20% Drift or minimum RRF)
- S Spike recovery outside accepted recovery limits
- ND Not detected at the Reporting Limit
- R High relative percent difference observed

Acronyms:

%Rec - Percent Recovery **CCB** - Continued Calibration Blank CCV - Continued Calibration Verification **DF** - Dilution Factor HEM - Hexane Extractable Material **ICV** - Initial Calibration Verification LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate MB or MBLANK - Method Blank MDL - Method Detection Limit MS/MSD - Matrix Spike / Matrix Spike Duplicate PDS - Post Digestion Spike Ref Val - Reference Value **RL** - Reporting Limit **RPD** - Relative Percent Difference SD - Serial Dilution SGT - Silica Gel Treatment SPK - Spike Surr - Surrogate



Client:	Friedman & Bruya				Collection	Date:	12/11/2019 11:40:00 AM
Project:	912192						
Lab ID:	1912176-001				Matrix: W	ater	
Client Sa	ample ID: D-1B						
Analyses	6	Result	RL	Qual	Units	DF	Date Analyzed
Hexava	lent Chromium by SM 350	<u>0 Cr B</u>			Batcl	n ID: R5	5920 Analyst: WF
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/12/2019 10:27:00 AM



Client:	Friedman & Bruya				Collection	Date:	12/11/2019 12:03:00 PM
Project:	912192						
Lab ID:	1912176-002				Matrix: W	ater	
Client Sa	ample ID: D-2						
Analyses	5	Result	RL	Qual	Units	DF	Date Analyzed
Hexava	lent Chromium by SM 350	<u>0 Cr B</u>			Batcl	h ID: R	55920 Analyst: WF
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/12/2019 10:46:00 AM



Client:	Friedman & Bruya				Collection	Date:	12/11/2019 12:30:00 PM
Project:	912192						
Lab ID:	1912176-003				Matrix: W	ater	
Client Sa	ample ID: Boom1						
Analyses	S	Result	RL	Qual	Units	DF	Date Analyzed
Hexava	lent Chromium by SM 350	<u>00 Cr B</u>			Batcl	n ID: R	55920 Analyst: WF
Chromiu	um, Hexavalent	ND	0.0450		mg/L	1	12/12/2019 10:56:00 AM



Client:	Friedman & Bruya				Collection	Date:	12/11/2019 1:00:00 PM
Project:	912192						
Lab ID:	1912176-004				Matrix: W	ater	
Client Sa	ample ID: U-2						
Analyses	5	Result	RL	Qual	Units	DF	Date Analyzed
Hexava	lent Chromium by SM 350	0 Cr B			Batch	n ID: R	55920 Analyst: WF
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/12/2019 10:51:00 AM



Work Order:	1912176	_						QC S	SUMMAI	RY REF	ORT
CLIENT:	Friedman &	Bruya					ц	ovavalont Ch	romium b	V SM 350	
Project:	912192						11			y 3141 330	
Sample ID: MB-R	55920	SampType: MBLK			Units: mg/L		Prep Date: 12/1	2/2019	RunNo: 559	920	
Client ID: MBLK	W	Batch ID: R55920					Analysis Date: 12/1	2/2019	SeqNo: 111	3501	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit HighLim	it RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	ND	0.0450								
Sample ID: LCS-R	\$55920	SampType: LCS			Units: mg/L		Prep Date: 12/1	2/2019	RunNo: 559	920	
Client ID: LCSW	1	Batch ID: R55920					Analysis Date: 12/1	2/2019	SeqNo: 111	3502	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit HighLim	it RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.242	0.0450	0.2500	0	96.8	80.9 11	5			
Sample ID: 19121	76-001BDUP	SampType: DUP			Units: mg/L		Prep Date: 12/1	2/2019	RunNo: 559	920	
Client ID: D-1B		Batch ID: R55920					Analysis Date: 12/1	2/2019	SeqNo: 111	3504	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit HighLim	it RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	ND	0.0450					0		30	
Sample ID: 19121	76-001BMS	SampType: MS			Units: mg/L		Prep Date: 12/1	2/2019	RunNo: 559	920	
Client ID: D-1B		Batch ID: R55920					Analysis Date: 12/1	2/2019	SeqNo: 111	3505	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit HighLim	it RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.240	0.0450	0.2500	0	95.9	46.2 13	8			
Sample ID: 19121	76-001BMSD	SampType: MSD			Units: mg/L		Prep Date: 12/1	2/2019	RunNo: 559	920	
Client ID: D-1B		Batch ID: R55920					Analysis Date: 12/1	2/2019	SeqNo: 111	3506	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit HighLim	it RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexava	alent	0.241	0.0450	0.2500	0	96.5	46.2 13	0.2398	0.582	20	



Sample Log-In Check List

Client Name: FB	Work Order Numb	ber: 1912176		
Logged by: Carissa True	Date Received:	12/12/201	I9 9:12:00 AM	
Chain of Custody				
1. Is Chain of Custody complete?	Yes 🖌	No 🗌	Not Present	
2. How was the sample delivered?	<u>FedEx</u>			
Loa In				
3 Coolers are present?	Yes 🗹	No 🗌		
4. Shipping container/cooler in good condition?	Yes 🖌	No 🗌		
 Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) 	Yes	No 🗹	Not Required	
6. Was an attempt made to cool the samples?	Yes 🖌	No 🗌	NA 🗌	
7. Were all items received at a temperature of $>0^{\circ}C$ to $10.0^{\circ}C^{*}$	Yes 🔽	No 🗌	NA 🗌	
8. Sample(s) in proper container(s)?	Yes 🖌	No 🗌		
9. Sufficient sample volume for indicated test(s)?	Yes 🔽	No 🗌		
10. Are samples properly preserved?	Yes 🖌	No 🗌		
11. Was preservative added to bottles?	Yes 🗌	No 🖌	NA 🗌	
12. Is there headspace in the VOA vials?	Yes	No 🗌	NA 🗹	
13. Did all samples containers arrive in good condition(unbroken)?	Yes 🖌	No 🗌		
14. Does paperwork match bottle labels?	Yes 🖌	No		
15. Are matrices correctly identified on Chain of Custody?	Yes 🖌	No 🗌		
16. Is it clear what analyses were requested?	Yes 🖌	No 🗌		
17. Were all holding times able to be met?	Yes 🗹	No 🗌		
<u>Special Handling (if applicable)</u>				
18. Was client notified of all discrepancies with this order?	Yes	No 🗌	NA 🔽	
Person Notified: Date	e:			
By Whom: Via:	eMail Ph	one 🗌 Fax	In Person	
Regarding:				
Client Instructions:				

12/13/19: 1631 analysis cancelled due to instrument delays.

Item Information

Item #	Temp °C
Cooler 1	3.4
Sample 1	6.5

^{*} Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

⁷ ax (206) 283-5044	^o h. (206) 285-8282	Seattle. WA 98119-2029	2012 16th Avenue West								W-2	Boom	0.2	D-18	Sample ID		Phone # (206) 285-8;	City, State, ZIP Sea	Address 301	CompanyFrie	Send Report To Mi	
Received by:	Relinquished by	Received by: h	Relinquished hu								-			h/11/19	ab Date D Sampled		282 Fax # (2	ttle, WA 98119	2 16th Ave W	edman and Bruy	chael Erdahl	
		2K C	SIGNATURE								1300	. 1230	1203	1140	Time Sampled		206) 283-5044			a, Inc.		SUBCC
		K	A								-			H= O	Matrix			RE		PR	JS	INTRAC
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 20, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin :

Included are the amended results from the testing of material submitted on December 12, 2019 from the Kosmos, F&BI 912213 project. Per request, the results were submitted as a single data package.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1217R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 12, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912213 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Hart Crowser
912213 -01	D-1B
912213 -02	D-2
912213 -03	Boom1

The samples were sent to Fremont Analytical for hexavalent chromium analysis. The report is enclosed.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213 Date Extracted: 12/13/19 Date Analyzed: 12/13/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 52-124)
D-1B 912213-01	<1	<1	<1	<3	<100	78
D-2 912213-02	<1	<1	<1	<3	<100	78
Boom1 912213-03	<1	<1	<1	<3	<100	78
Method Blank 09-2922 MB	<1	<1	<1	<3	<100	80

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213 Date Extracted: 12/13/19 Date Analyzed: 12/13/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	Motor Oil Range (C25-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
D-1B 912213-01	72 x	<250	104
D-2 912213-02	150 x	<250	101
Boom1 912213-03	<50	<250	98
Method Blank 09-3035 MB	<50	<250	108

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213 Date Extracted: NA Date Analyzed: 12/13/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	<u>pH</u>
D-1B 912213-01	7.5
D-2 912213-02	7.6
Boom1 912213-03	7.6

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D-1B 12/12/19 12/13/19 12/13/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912213 912213-01 912213-01.110 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		<0.5		
Cadmium		<0.25		
Chromium		<1		
Copper		<2		
Lead		<0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID:	D-2		Client:	Hart Crowser
Date Received:	12/12/19		Project:	Kosmos, F&BI 912213
Date Extracted:	12/13/19		Lab ID:	912213-02
Date Analyzed:	12/13/19		Data File:	912213-02.111
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		<0.5		
Cadmium		< 0.25		
Chromium		1.69		
Copper		8.16		
Lead		0.726		
Nickel		1.77		
Zinc		5.98		

ENVIRONMENTAL CHEMISTS

Client ID:	Boom1		Client:	Hart Crowser
Date Received:	12/12/19		Project:	Kosmos, F&BI 912213
Date Extracted:	12/13/19		Lab ID:	912213-03
Date Analyzed:	12/13/19		Data File:	912213-03.112
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		<0.5		
Cadmium		<0.25		
Chromium		<1		
Copper		<2		
Lead		<0.5		
Nickel		0.695		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank NA 12/13/19 12/13/19 Water wa(L (app))	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912213 I9-788 mb2 I9-788 mb2.109 ICPMS2 SD
Units.	ug/L (ppb)	Operator.	Sr
Analyte:	Concentrati ug/L (ppb)	on)	
Arsenic	< 0.5		
Cadmium	< 0.25		
Chromium	<1		
Copper	<2		
Lead	<0.5		
Nickel	<0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	D-1B		Client:	Hart Crowser
Date Received:	12/12/19		Project:	Kosmos, F&BI 912213
Date Extracted:	12/13/19		Lab ID:	912213-01 x10
Date Analyzed:	12/13/19		Data File:	912213-01 x10.054
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.1		
Magnesium		2.46		
Hardness (as CaCO	3)	35.3		
ENVIRONMENTAL CHEMISTS

Client ID:	D-2		Client:	Hart Crowser
Date Received:	12/12/19		Project:	Kosmos, F&BI 912213
Date Extracted:	12/13/19		Lab ID:	912213-02 x10
Date Analyzed:	12/13/19		Data File:	912213-02 x10.058
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		11.2		
Magnesium		3.36		
Hardness (as CaCO	3)	41.8		

ENVIRONMENTAL CHEMISTS

Client ID:	Boom1		Client:	Hart Crowser
Date Received:	12/12/19		Project:	Kosmos, F&BI 912213
Date Extracted:	12/13/19		Lab ID:	912213-03 x10
Date Analyzed:	12/13/19		Data File:	912213-03 x10.059
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		9.91		
Magnesium		2.46		
Hardness (as CaCO	3)	34.9		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912213
Date Extracted:	12/13/19	Lab ID:	I9-793 mb
Date Analyzed:	12/13/19	Data File:	I9-793 mb.052
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	< 0.05		
Magnesium	< 0.05		
Hardness (as CaCO	3) <0.35		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213 Date Extracted: 12/13/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
D-1B 912213-01	0.00097
D-2 912213-02	0.0034
Boom1 912213-03	0.0015
Method Blank	<0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912169-01 (Duplicate)

	Reporting	Sample	Duplicate	RPD
Analyte	Units	Result	Result	(Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

	Percent				
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	
Benzene	ug/L (ppb)	50	94	65-118	
Toluene	ug/L (ppb)	50	97	72-122	
Ethylbenzene	ug/L (ppb)	50	104	73-126	
Xylenes	ug/L (ppb)	150	97	74-118	
Gasoline	ug/L (ppb)	1,000	105	69-134	

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	112	116	63-142	4

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code: 912192-04 (Duplicate)								
	Sample	Duplicate	Relative Percent	Acceptance				
Analyte	Result	Result	Difference	Criteria				
pН	7.7	7.7	0	0-20				

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912192-01 (Matrix Spike)

Laboratory Cour	. 012102 01	(matrix op	inc)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	94	96	70-130	2
Cadmium	ug/L (ppb)	5	< 0.25	96	98	70-130	2
Chromium	ug/L (ppb)	20	<1	95	96	70-130	1
Copper	ug/L (ppb)	20	<2	93	94	70-130	1
Lead	ug/L (ppb)	10	< 0.5	91	93	70-130	2
Nickel	ug/L (ppb)	20	0.743	94	94	70-130	0
Zinc	ug/L (ppb)	50	<2.5	89	90	70-130	1

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	94	85-115
Cadmium	ug/L (ppb)	5	98	85-115
Chromium	ug/L (ppb)	20	97	85-115
Copper	ug/L (ppb)	20	97	85-115
Lead	ug/L (ppb)	10	94	85-115
Nickel	ug/L (ppb)	20	97	85-115
Zinc	ug/L (ppb)	50	95	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Code: 912213-01 X10 (Matrix Spike)							
				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	10.1	106 b	84 b	70-130	23 b
Magnesium	mg/L (ppm)	1.0	2.46	99	94	70-130	5

Laboratory Code: 912213-01 x10 (Matrix Spike)

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Calcium	mg/L (ppm)	1.0	104	85-115
Magnesium	mg/L (ppm)	1.0	101	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/17/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912213

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912213-01 (Matrix Spike)

				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.00097	115	113	71-125	2

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Mercury	ug/L (ppb)	0.01	108	78-125

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

 ${\bf b}$ - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

 ${\rm d}$ - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

1 II. (200) 200-0202	Ph (906) 200 200	Seattle, WA 98119-2029	2019 16th America What F	Friedman & Priva Inc								1200M	D-2	U-18	Sample ID		PhoneEm:	City, State, ZIP	Address	Company HAVA CVD	Report To Maje (9 (22)
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3600 Fremont Ave. N. Seattle, WA 98103 T: (206) 352-3790 F: (206) 352-7178 info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 912213 Work Order Number: 1912213

December 16, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 3 sample(s) on 12/13/2019 for the analyses presented in the following report.

Hexavalent Chromium by SM 3500 Cr B

This report consists of the following:

- Case Narrative

- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes Project Manager

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005 ORELAP Certification: WA 100009-007 (NELAP Recognized)



CLIENT: Project: Work Order:	Friedman & Bruya 912213 1912213	Work Order S	Sample Summary					
Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received					
1912213-001	D-1B	12/12/2019 11:45 AM	12/13/2019 9:30 AM					
1912213-002	D-2	12/12/2019 11:45 AM	12/13/2019 9:30 AM					
1912213-003	Boom1	12/12/2019 11:45 AM	12/13/2019 9:30 AM					



Case Narrative

WO#: **1912213** Date: **12/16/2019**

CLIENT:Friedman & BruyaProject:912213

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms



WO#: **1912213** Date Reported: **12/16/2019**

Qualifiers:

- * Flagged value is not within established control limits
- B Analyte detected in the associated Method Blank
- D Dilution was required
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- I Analyte with an internal standard that does not meet established acceptance criteria
- J Analyte detected below Reporting Limit
- N Tentatively Identified Compound (TIC)
- Q Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- (<20%RSD, <20% Drift or minimum RRF)
- S Spike recovery outside accepted recovery limits
- ND Not detected at the Reporting Limit
- R High relative percent difference observed

Acronyms:

%Rec - Percent Recovery **CCB** - Continued Calibration Blank CCV - Continued Calibration Verification **DF** - Dilution Factor HEM - Hexane Extractable Material **ICV** - Initial Calibration Verification LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate MB or MBLANK - Method Blank MDL - Method Detection Limit MS/MSD - Matrix Spike / Matrix Spike Duplicate PDS - Post Digestion Spike Ref Val - Reference Value **RL** - Reporting Limit **RPD** - Relative Percent Difference SD - Serial Dilution SGT - Silica Gel Treatment SPK - Spike Surr - Surrogate



CLIENT: Friedman & Bruya

Analytical Report

 Work Order:
 1912213

 Date Reported:
 12/16/2019

Project: 912213						
Lab ID: 1912213-001 Client Sample ID: D-1B				Collectio Matrix: V	n Date: Vater	12/12/2019 11:45:00 AM
Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexavalent Chromium by SM 35	<u>00 Cr B</u>			Batc	h ID: R5	6000 Analyst: WF
Chromium, Hexavalent	ND	0.0450	н	mg/L	1	12/13/2019 12:33:00 PM
Lab ID: 1912213-002				Collectio Matrix: V	n Date: Vater	12/12/2019 11:45:00 AM
Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexavalent Chromium by SM 35	00 Cr B			Batc	h ID: R5	6000 Analyst: WF
Chromium, Hexavalent	ND	0.0450	н	mg/L	1	12/13/2019 12:53:00 PM
Lab ID: 1912213-003 Client Sample ID: Boom1				Collectio Matrix: V	n Date: Vater	12/12/2019 11:45:00 AM
Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexavalent Chromium by SM 35	00 Cr B			Batc	h ID: R5	6000 Analyst: WF
Chromium, Hexavalent	ND	0.0450	н	mg/L	1	12/13/2019 12:58:00 PM



Work Order: CLIENT: Project:	1912213 Friedman & 912213	Bruya				QC SUMMARY REPOR Hexavalent Chromium by SM 3500 C	RT r B
Sample ID: MB-56	6000	SampType: MBLK			Units: mg/L	Prep Date: 12/13/2019 RunNo: 56000	
Client ID: MBLK	W	Batch ID: R56000				Analysis Date: 12/13/2019 SeqNo: 1115098	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua	al
Chromium, Hexava	alent	ND	0.0450				
Sample ID: LCS-5	6000	SampType: LCS			Units: mg/L	Prep Date: 12/13/2019 RunNo: 56000	
Client ID: LCSW	1	Batch ID: R56000				Analysis Date: 12/13/2019 SeqNo: 1115099	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua	al
Chromium, Hexava	alent	0.250	0.0450	0.2500	0	99.9 80.9 115	
Sample ID: 19122	13-001ADUP	SampType: DUP			Units: mg/L	Prep Date: 12/13/2019 RunNo: 56000	
Client ID: D-1B		Batch ID: R56000				Analysis Date: 12/13/2019 SeqNo: 1115101	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua	al
Chromium, Hexava	alent	ND	0.0450			0 30 H	
Sample ID: 19122	13-001AMS	SampType: MS			Units: mg/L	Prep Date: 12/13/2019 RunNo: 56000	
Client ID: D-1B		Batch ID: R56000				Analysis Date: 12/13/2019 SeqNo: 1115102	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua	al
Chromium, Hexava	alent	0.246	0.0450	0.2500	0	98.4 46.2 138 H	
Sample ID: 19122	13-001AMSD	SampType: MSD			Units: mg/L	Prep Date: 12/13/2019 RunNo: 56000	
Client ID: D-1B		Batch ID: R56000				Analysis Date: 12/13/2019 SeqNo: 1115103	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua	al
Chromium, Hexava	alent	0.249	0.0450	0.2500	0	99.6 46.2 138 0.2460 1.21 20 H	



Sample Log-In Check List

Client Name: FB	Work Order Number: 1912213							
Logged by: Carissa True	Date Received:	12/13/201	9 9:30:00 AM					
Chain of Custody								
1. Is Chain of Custody complete?	Yes 🖌	No 🗌	Not Present					
2. How was the sample delivered?	FedEx							
Log In								
3. Coolers are present?	Yes 🖌	No 🗌	NA 🗌					
4. Shipping container/cooler in good condition?	Yes 🖌	No 🗌						
 Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) 	Yes	No 🗌	Not Required 🗹					
6. Was an attempt made to cool the samples?	Yes 🖌	No 🗌	NA 🗌					
7. Were all items received at a temperature of $>0^{\circ}C$ to $10.0^{\circ}C^{*}$	Yes 🖌	No 🗌						
8. Sample(s) in proper container(s)?	Yes 🖌	No 🗌						
9. Sufficient sample volume for indicated test(s)?	Yes 🖌	No 🗌						
10. Are samples properly preserved?	Yes 🖌	No 🗌						
11. Was preservative added to bottles?	Yes	No 🔽	NA 🗌					
12. Is there headspace in the VOA vials?	Yes	No 🗌	NA 🗹					
13. Did all samples containers arrive in good condition(unbroken)?	Yes 🗹	No 🗌						
14. Does paperwork match bottle labels?	Yes 🖌	No						
15. Are matrices correctly identified on Chain of Custody?	Yes 🖌	No 🗌						
16. Is it clear what analyses were requested?	Yes 🖌	No 🗌						
17. Were all holding times able to be met?	Yes	No 🗹						
<u>Special Handling (if applicable)</u>								
18. Was client notified of all discrepancies with this order?	Yes	No 🗌	NA 🗹					
Person Notified: Date	:							
By Whom: Via:	eMail Ph	one 🗌 Fax	In Person					
Regarding:								
Client Instructions:								

12/13/19: 1631 analysis cancelled due to instrument delays.

Item Information

Item #	Temp ⁰C
Cooler 1	8.2
Sample 1	2.3

Ph. (206) 285-8282 Fax (206) 283-5044	Seattle, WA 98119-20	3012 16th Avenue We	Friedman & Bruva 1					•	(ten)			BOOMI	D-2	D-1B	Sample ID		Phone #(206) 285-{	City, State, ZIP <u>Se</u> ;	Address 30	Company Fr	Send Report To M	*
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 19, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin :

Included are the results from the testing of material submitted on December 13, 2019 from the Kosmos, F&BI 912243 project. There are 20 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1219R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 13, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912243 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912243 -01	Boom 1
912243 -02	D1B
912243 -03	D2

The samples were sent to Fremont Analytical for hexavalent chromium analysis. The report is enclosed.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243 Date Extracted: 12/16/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 52-124)
Boom 1 912243-01	<1	<1	<1	<3	<100	79
D1B 912243-02	<1	<1	<1	<3	<100	80
D2 912243-03	<1	<1	<1	<3	<100	79
Method Blank ^{09-2924 MB}	<1	<1	<1	<3	<100	80

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243 Date Extracted: 12/16/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Extended (C10-C36)	Surrogate <u>(% Recovery)</u> (Limit 47-140)
Boom 1 912243-01	<250	116
D1B 912243-02	<250	114
D2 912243-03	<250	70
Method Blank ^{09-3043 MB}	<250	110

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243 Date Extracted: NA Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	<u>pH</u>
Boom 1 912243-01	7.4
D1B 912243-02	7.3
D2 912243-03	7.2

ENVIRONMENTAL CHEMISTS

Client ID:	Boom 1		Client:	Hart Crowser
Date Received:	12/13/19		Project:	Kosmos, F&BI 912243
Date Extracted:	12/16/19		Lab ID:	912243-01
Date Analyzed:	12/16/19		Data File:	912243-01.081
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		< 0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		2.80		
Lead		< 0.5		
Nickel		0.849		
Zinc		2.25		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D1B 12/13/19 12/16/19 12/16/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912243 912243-02 912243-02.082 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)	-	
Arsenic Cadmium		<0.5 <0.25		
Copper		<1 2.41		
Lead		< 0.5		
Nickel		0.771		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID:	D2		Client:	Hart Crowser
Date Received:	12/13/19		Project:	Kosmos, F&BI 912243
Date Extracted:	12/16/19		Lab ID:	912243-03
Date Analyzed:	12/16/19		Data File:	912243-03.083
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		0.965		
Cadmium		< 0.25		
Chromium		3.99		
Copper		19.0		
Lead		2.96		
Nickel		3.87		
Zinc		29.7		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed	Method Blank NA 12/16/19 12/16/19	Client: Project: Lab ID: Data File:	Hart Crowser Kosmos, F&BI 912243 I9-797 mb I9-797 mb 079
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP
Analyte:	Concentration ug/L (ppb)		
Arsenic	< 0.5		
Cadmium	< 0.25		
Chromium	<1		
Copper	<2		
Lead	< 0.5		
Nickel	< 0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Client ID:	Boom 1		Client:	Hart Crowser
Date Received:	12/13/19		Project:	Kosmos, F&BI 912243
Date Extracted:	12/17/19		Lab ID:	912243-01 x10
Date Analyzed:	12/17/19		Data File:	912243-01 x 10.053
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		7.38		
Magnesium		2.02		
Hardness (as CaCO3	3)	26.7		

ENVIRONMENTAL CHEMISTS

Client ID:	D1B		Client:	Hart Crowser
Date Received:	12/13/19		Project:	Kosmos, F&BI 912243
Date Extracted:	12/17/19		Lab ID:	912243-02 x10
Date Analyzed:	12/17/19		Data File:	912243-02 x10.056
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		7.62		
Magnesium		1.96		
Hardness (as CaCO	3)	27.1		

ENVIRONMENTAL CHEMISTS

Client ID:	D2		Client:	Hart Crowser
Date Received:	12/13/19		Project:	Kosmos, F&BI 912243
Date Extracted:	12/17/19		Lab ID:	912243-03 x10
Date Analyzed:	12/17/19		Data File:	$912243-03 ext{ x10.057}$
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		9.69		
Magnesium		3.88		
Hardness (as CaCO	3)	40.2		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912243
Date Extracted:	12/17/19	Lab ID:	I9-810 mb
Date Analyzed:	12/17/19	Data File:	I9-810 mb.051
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	< 0.05		
Magnesium	< 0.05		
Hardness (as CaCO	3) <0.35		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243 Date Extracted: 12/13/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY **USING EPA METHOD 1631E** Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
Boom 1 912243-01	0.0034
D1B 912243-02	0.0030
D2 912243-03	0.0038
Method Blank	< 0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912178-04 (Duplicate)

	Reporting	Sample	Duplicate	RPD
Analyte	Units	Result	Result	(Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

	Percent			
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	ug/L (ppb)	50	90	65-118
Toluene	ug/L (ppb)	50	93	72 - 122
Ethylbenzene	ug/L (ppb)	50	101	73 - 126
Xylenes	ug/L (ppb)	150	93	74-118
Gasoline	ug/L (ppb)	1,000	106	69 - 134
ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	100	100	61-133	0

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code:	912243-03 (Dup	licate)		
	Sample	Duplicate	Relative Percent	Acceptance
Analyte	Result	Result	Difference	Criteria
pН	7.2	7.3	1	0-20

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912238-05 (Matrix Spike)

Laboratory coa		(intati in op	(1110)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	${ m MS}$	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	3.38	97	95	70-130	2
Cadmium	ug/L (ppb)	5	< 0.25	99	98	70-130	1
Chromium	ug/L (ppb)	20	<1	88	87	70 - 130	1
Copper	ug/L (ppb)	20	10.3	$56 \mathrm{b}$	39 b	70 - 130	36 b
Lead	ug/L (ppb)	10	< 0.5	83	84	70-130	1
Nickel	ug/L (ppb)	20	3.22	91	91	70 - 130	0
Zinc	ug/L (ppb)	50	<2.5	83	81	70-130	2

		Percent	
Reporting	Spike	Recovery	Acceptance
Units	Level	LCS	Criteria
ug/L (ppb)	10	96	85-115
ug/L (ppb)	5	98	85 - 115
ug/L (ppb)	20	98	85 - 115
ug/L (ppb)	20	97	85 - 115
ug/L (ppb)	10	99	85 - 115
ug/L (ppb)	20	100	85 - 115
ug/L (ppb)	50	98	85 - 115
	Reporting Units ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb)	Reporting Units Spike Level ug/L (ppb) 10 ug/L (ppb) 5 ug/L (ppb) 20 ug/L (ppb) 20 ug/L (ppb) 10 ug/L (ppb) 20 ug/L (ppb) 20 ug/L (ppb) 20 ug/L (ppb) 50	Reporting Units Spike Level Recovery LCS ug/L (ppb) 10 96 ug/L (ppb) 5 98 ug/L (ppb) 20 98 ug/L (ppb) 20 97 ug/L (ppb) 10 99 ug/L (ppb) 20 97 ug/L (ppb) 20 97 ug/L (ppb) 10 99 ug/L (ppb) 20 100 ug/L (ppb) 50 98

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Cod	10: 912243-01 x	10 (matri	ix Spike)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	7.38	104 b	136 b	70-130	27 b
Magnesium	mg/L (ppm)	1.0	2.02	92	105	70 - 130	13

Laboratory Code: 912243-01 x10 (Matrix Spike)

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Calcium	mg/L (ppm)	1.0	103	85-115
Magnesium	mg/L (ppm)	1.0	103	85 - 115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/19/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912243

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912213-01 (Matrix Spike)

Laboratory could	•••••••••••••	in opino)		Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.00097	115	113	71 - 125	2

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Mercury	ug/L (ppb)	0.01	108	78-125

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



3600 Fremont Ave. N. Seattle, WA 98103 T: (206) 352-3790 F: (206) 352-7178 info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 912243 Work Order Number: 1912247

December 16, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 3 sample(s) on 12/13/2019 for the analyses presented in the following report.

Hexavalent Chromium by SM 3500 Cr B

This report consists of the following:

- Case Narrative

- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes Project Manager

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005 ORELAP Certification: WA 100009-007 (NELAP Recognized)



CLIENT: Project: Work Order:	Friedman & Bruya 912243 1912247	Work Order S	Sample Summary		
Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received		
1912247-001	Room 1	12/13/2019 10:55 AM	12/13/2019 5:11 PM		
1912247-002	D1 B	12/13/2019 11:15 AM	12/13/2019 5:11 PM		
1912247-003	D2	12/13/2019 10:30 AM	12/13/2019 5:11 PM		



Case Narrative

WO#: **1912247** Date: **12/16/2019**

CLIENT:Friedman & BruyaProject:912243

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms



WO#: **1912247** Date Reported: **12/16/2019**

Qualifiers:

- * Flagged value is not within established control limits
- B Analyte detected in the associated Method Blank
- D Dilution was required
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- I Analyte with an internal standard that does not meet established acceptance criteria
- J Analyte detected below Reporting Limit
- N Tentatively Identified Compound (TIC)
- Q Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- (<20%RSD, <20% Drift or minimum RRF)
- S Spike recovery outside accepted recovery limits
- ND Not detected at the Reporting Limit
- R High relative percent difference observed

Acronyms:

%Rec - Percent Recovery **CCB** - Continued Calibration Blank CCV - Continued Calibration Verification **DF** - Dilution Factor HEM - Hexane Extractable Material **ICV** - Initial Calibration Verification LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate MB or MBLANK - Method Blank MDL - Method Detection Limit MS/MSD - Matrix Spike / Matrix Spike Duplicate PDS - Post Digestion Spike Ref Val - Reference Value **RL** - Reporting Limit **RPD** - Relative Percent Difference SD - Serial Dilution SGT - Silica Gel Treatment SPK - Spike Surr - Surrogate



Friedman & Bruya

CLIENT:

Analytical Report

Work Order: 1912247 Date Reported: 12/16/2019

Project: 912243					
Lab ID: 1912247-001 Client Sample ID: Room 1			Collectior Matrix: W	Date: /ater	12/13/2019 10:55:00 AM
Analyses	Result	RL Qual	Units	DF	Date Analyzed
Hexavalent Chromium by SM 350	<u>00 Cr B</u>		Batch	n ID: R5	6000 Analyst: WF
Chromium, Hexavalent	ND	0.0450	mg/L	1	12/13/2019 6:19:00 PM

Lab ID: 1912247-002 Client Sample ID: D1 B		Collection Date: 12/13/2019 11:15:00 AM Matrix: Water				
Analyses	Result	RL Qual	Units	DF	Date Analyzed	
Hexavalent Chromium by SM 3	3500 Cr B		Batcl	h ID: R5	6000 Analyst: WF	
Chromium, Hexavalent	ND	0.0450	mg/L	1	12/13/2019 6:23:00 PM	
Lab ID: 1912247-003			Collection	n Date:	12/13/2019 10:30:00 AM	
Client Sample ID: D2			Matrix: V	Vater		
Analyses	Result	RL Qual	Units	DF	Date Analyzed	
Hexavalent Chromium by SM 3	8 <u>500 Cr B</u>		Batcl	h ID: R5	6000 Analyst: WF	
Chromium, Hexavalent	ND	0.0450	mg/L	1	12/13/2019 6:29:00 PM	



Work Order: CLIENT: Project:	1912247 Friedman & 912243	Bruya						Hex	QC S avalent Ch	SUMMAI romium b	RY REF y SM 350	PORT 00 Cr B
Sample ID: MB-5	6000	SampType: MBLK			Units: mg/L		Prep Da	te: 12/13/2	019	RunNo: 560	000	
Client ID: MBLM	(W	Batch ID: R56000					Analysis Da	te: 12/13/2	019	SeqNo: 111	5098	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	ND	0.0450									
Sample ID: LCS-	56000	SampType: LCS			Units: mg/L		Prep Da	te: 12/13/2	019	RunNo: 560	000	
Client ID: LCSV	1	Batch ID: R56000					Analysis Da	te: 12/13/2	019	SeqNo: 111	5099	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	0.250	0.0450	0.2500	0	99.9	80.9	115				
Sample ID: 19122	13-001ADUP	SampType: DUP			Units: mg/L		Prep Da	te: 12/13/2	019	RunNo: 560	000	
Client ID: BATC	H	Batch ID: R56000					Analysis Da	te: 12/13/2	019	SeqNo: 111	5101	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	ND	0.0450						0		30	Н
Sample ID: 19122	13-001AMS	SampType: MS			Units: mg/L		Prep Da	te: 12/13/2	019	RunNo: 560	000	
Client ID: BATC	H	Batch ID: R56000					Analysis Da	te: 12/13/2	019	SeqNo: 111	5102	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	0.246	0.0450	0.2500	0	98.4	46.2	138				Н
Sample ID: 19122	13-001AMSD	SampType: MSD			Units: mg/L		Prep Da	te: 12/13/2	019	RunNo: 560	000	
Client ID: BATC	H	Batch ID: R56000					Analysis Da	te: 12/13/2	019	SeqNo: 111	5103	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexav	alent	0.249	0.0450	0.2500	0	99.6	46.2	138	0.2460	1.21	20	Н



Clier	nt Name:	FB	Work Order Numb	Work Order Number: 1912247				
Logg	ged by:	Clare Griggs	Date Received:	12/13/201	9 5:11:00 PM			
<u>Chain</u>	of Custo	<u>ody</u>						
1. Is	Chain of C	ustody complete?	Yes 🖌	No 🗌	Not Present			
2. Ho	ow was the	sample delivered?	<u>Client</u>					
<u>Log Ir</u>	<u>n</u>							
3. Co	oolers are p	resent?	Yes	No 🔽	NA 🗌			
			No cooler preser	<u>nt.</u>				
4. Sł	hipping cont	ainer/cooler in good condition?	Yes 🗹	No 🗌				
5. Cı (R	ustody Seal Refer to com	s present on shipping container/cooler? ments for Custody Seals not intact)	Yes	No 🗌	Not Required 🗹			
6. W	/as an attem	npt made to cool the samples?	Yes	No 🔽	NA 🗌			
			<u>Unknown prior to re</u>	<u>ceipt.</u>				
7. W	/ere all item	s received at a temperature of >0°C to 10.0°C*	Yes 🗌	No 🔽	NA 🗌			
			Refer to item inform	ation.				
8. Sa	ample(s) in	proper container(s)?	Yes 🖌	No 🗌				
9. Si	ufficient san	nple volume for indicated test(s)?	Yes 🖌	No 🗌				
10. Ar	re samples	properly preserved?	Yes 🖌	No 🗌				
11. W	/as preserva	ative added to bottles?	Yes 🗌	No 🔽	NA 🗌			
12. ^{Is}	there head	space in the VOA vials?	Yes	No 🗌	NA 🔽			
13. Di	id all sample	es containers arrive in good condition(unbroken)?	Yes 🖌	No 🗌				
14. Do	oes paperw	ork match bottle labels?	Yes 🖌	No 🗌				
15. ^{Ar}	re matrices	correctly identified on Chain of Custody?	Yes 🖌	No 🗌				
16. ^{Is}	it clear what	at analyses were requested?	Yes 🖌	No				
17. W	/ere all hold	ing times able to be met?	Yes 🗹	No 🗌				
<u>Speci</u>	ial Handli	ng (if applicable)						
18. W	/as client no	tified of all discrepancies with this order?	Yes	No 🗌	NA 🗹			
	Person I	Notified: Dat	e:					
	By Who	m: Via	eMail Ph	one 🗌 Fax [In Person			
	Regardi	ng:						
	Client In	structions:						
19. Ad	dditional ren	narks:						

Item Information

Item #	Temp ⁰C
Sample	12.7

^{*} Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Ph. (206) 285-8282	3012 16 ⁿ Avenue West Seattle, WA 98119-2029	Friedman & Bruya, Inc.								02	BIG	B Room 1	Sample ID		Phone En	City, State, ZIP	Address	Company HC+C	Report To ANK 600	q
Received by:	Keceived by: Relinquished by:	Relinquished by:	SIC							1 50	02	014-6	Lab ID		nail March vode			on St	ANN.	2243
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	Bry	hrr										-)	NWTPH-HCID							N
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18

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 23, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 16, 2019 from the Kosmos, F&BI 912264 project. There are 26 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1223R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 16, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912264 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912264 -01	D1B
912264 -02	Boom1
912264 -03	D2
912264 -04	D1B
912264 -05	Boom1
912264 -06	D2

Sample D1B, Boom1, and D2 were sent to Fremont Analytical for hexavalent chromium analysis. The report is enclosed.

The 1631E sample Boom1 (912264-02) preserved at the laboratory on 12/18/19. The data were qualified accordingly.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264 Date Extracted: 12/17/19 Date Analyzed: 12/18/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
D1B 912264-01	<1	<1	<1	<3	<100	87
Boom1 912264-02	<1	<1	<1	<3	<100	83
D2 912264-03	<1	<1	<1	<3	<100	85
D1B 912264-04	<1	<1	<1	<3	<100	83
Boom1 912264-05	<1	<1	<1	<3	<100	82
D2 912264-06	<1	<1	<1	<3	<100	82
Method Blank 09-2927 MB	<1	<1	<1	<3	<100	77

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264 Date Extracted: 12/17/19 Date Analyzed: 12/17/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Extended (C10-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
D1B 912264-01	<250	102
Boom1 912264-02	<250	108
D2 912264-03	1,100 x	79
D1B 912264-04	<250	101
Boom1 912264-05	<250	93
D2 912264-06	450 x	103
Method Blank 09-3050 MB	<250	78

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264 Date Extracted: NA Date Analyzed: 12/17/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	<u>pH</u>
D1B 912264-01	7.5
Boom1 912264-02	7.5
D2 912264-03	7.1

ENVIRONMENTAL CHEMISTS

Client ID:	D1B		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912264
Date Extracted:	12/17/19		Lab ID:	912264-01 x10
Date Analyzed:	12/17/19		Data File:	$912264-01 ext{ x10.059}$
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		8.46		
Magnesium		1.98		
Hardness (as CaCO3	3)	29.3		

ENVIRONMENTAL CHEMISTS

Client ID:	Boom1		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912264
Date Extracted:	12/17/19		Lab ID:	912264-02 x10
Date Analyzed:	12/17/19		Data File:	$912264-02 ext{ x10.060}$
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		8.54		
Magnesium		2.00		
Hardness (as CaCO	3)	29.6		

ENVIRONMENTAL CHEMISTS

Client ID:	D2		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912264
Date Extracted:	12/17/19		Lab ID:	912264-03 x10
Date Analyzed:	12/17/19		Data File:	$912264-03 ext{ x10.061}$
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		10.9		
Magnesium		3.82		
Hardness (as CaCO	3)	42.9		

ENVIRONMENTAL CHEMISTS

Client ID:	D1B		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912264
Date Extracted:	12/17/19		Lab ID:	912264-04 x10
Date Analyzed:	12/17/19		Data File:	912264-04 x10.062
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		9.06		
Magnesium		2.11		
Hardness (as CaCO	3)	31.3		

ENVIRONMENTAL CHEMISTS

Client ID:	Boom1		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912264
Date Extracted:	12/17/19		Lab ID:	912264-05 x10
Date Analyzed:	12/17/19		Data File:	912264-05 x10.063
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		8.98		
Magnesium		2.06		
Hardness (as CaCO	3)	30.9		

ENVIRONMENTAL CHEMISTS

Client ID:	D2		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912264
Date Extracted:	12/17/19		Lab ID:	912264-06 x10
Date Analyzed:	12/17/19		Data File:	912264-06 x10.064
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		11.4		
Magnesium		3.54		
Hardness (as CaCO	3)	43.0		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912264
Date Extracted:	12/17/19	Lab ID:	I9-810 mb
Date Analyzed:	12/17/19	Data File:	I9-810 mb.051
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	< 0.05		
Magnesium	< 0.05		
Hardness (as CaCO	3) <0.35		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D1B 12/16/19 12/17/19 12/17/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912264 912264-01 912264-01.103 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic Cadmium		<0.5 <0.25		
Chromium		<1		
Copper		<2		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Boom1 12/16/19 12/17/19 12/17/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912264 912264-02 912264-02.106 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		<0.5		
Chromium		<0.25		
Copper		<2		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D2 12/16/19 12/17/19 12/17/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912264 912264-03 912264-03.107 ICPMS2 SP
		Concentration	1	
Analyte:		ug/L (ppb)		
Arsenic		0.654		
Cadmium		< 0.25		
Chromium		2.95		
Copper		16.2		
Lead		1.36		
Nickel		1.92		
Zinc		38.4		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D1B 12/16/19 12/17/19 12/19/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912264 912264-04 912264-04.072 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		<0.5		
Chromium		<0.25		
Copper		<2		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Boom1 12/16/19 12/17/19 12/19/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912264 912264-05 912264-05.073 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic Cadmium		<0.5 <0.25		
Chromium Copper		<1 <2		
Lead Nickel		<0.5 0.510		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D2 12/16/19 12/17/19 12/17/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912264 912264-06 912264-06.110 ICPMS2 SP
	5 (II /	Concentration	Ĩ	
Analyte:		ug/L (ppb)		
Arsenic		< 0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		4.22		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		47.7		

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	Method Blank NA 12/17/19 12/19/19 Water	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912264 I9-809 mb I9-809 mb.069 ICPMS2
Units:	ug/L (ppb)	Operator:	SP
Analyte:	Concentration ug/L (ppb)		
Arsenic	< 0.5		
Cadmium	< 0.25		
Chromium	<1		
Copper	<2		
Lead	< 0.5		
Nickel	< 0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264 Date Extracted: 12/17/19 Date Analyzed: 12/18/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY **USING EPA METHOD 1631E**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
D1B 912264-01	0.0016
Boom1 pc 912264-02	0.0020
D2 912264-03	0.019
D1B 912264-04	0.00077
Boom1 912264-05	0.00085
D2 912264-06	0.0052
Method Blank	< 0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912184-03 (Duplicate)

	Reporting	Sample	Duplicate	RPD
Analyte	Units	Result	Result	(Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

	Percent			
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	ug/L (ppb)	50	77	65-118
Toluene	ug/L (ppb)	50	88	72 - 122
Ethylbenzene	ug/L (ppb)	50	103	73 - 126
Xylenes	ug/L (ppb)	150	97	74-118
Gasoline	ug/L (ppb)	1,000	103	69 - 134
ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	100	63-142	4

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code:	912243-03 (Dup	licate)		
	Sample	Duplicate	Relative Percent	Acceptance
Analyte	Result	Result	Difference	Criteria
pН	7.2	7.3	1	0-20

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Cod	e: 912243-01 x	10 (Matri	x Spike)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	\mathbf{MS}	MSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	7.38	104 b	136 b	70-130	27 b
Magnesium	mg/L (ppm)	1.0	2.02	92	105	70 - 130	13

Laboratory Code: 912243-01 x10 (Matrix Spike)

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Calcium	mg/L (ppm)	1.0	103	85-115
Magnesium	mg/L (ppm)	1.0	103	85 - 115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912264-01 (Matrix Spike)

Laboratory coo			(1110)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	104	98	70-130	6
Cadmium	ug/L (ppb)	5	< 0.25	99	94	70-130	5
Chromium	ug/L (ppb)	20	< 0.5	103	99	70-130	4
Copper	ug/L (ppb)	20	<2	99	95	70-130	4
Lead	ug/L (ppb)	10	< 0.5	103	97	70-130	6
Nickel	ug/L (ppb)	20	< 0.5	103	117	70-130	13
Zinc	ug/L (ppb)	50	<2.5	96	94	70-130	2

		Percent	
Reporting	Spike	Recovery	Acceptance
Units	Level	LCS	Criteria
ug/L (ppb)	10	103	85-115
ug/L (ppb)	5	100	85 - 115
ug/L (ppb)	20	100	85 - 115
ug/L (ppb)	20	103	85 - 115
ug/L (ppb)	10	101	85 - 115
ug/L (ppb)	20	106	85 - 115
$-\pi m/T$ (mm h)	50	101	0E 11E
	Reporting Units ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb) ug/L (ppb)	Reporting Units Spike Level ug/L (ppb) 10 ug/L (ppb) 5 ug/L (ppb) 20 ug/L (ppb) 20 ug/L (ppb) 10 ug/L (ppb) 20 ug/L (ppb) 20 ug/L (ppb) 10 ug/L (ppb) 20 ug/L (ppb) 50	Percent Reporting Spike Recovery Units Level LCS ug/L (ppb) 10 103 ug/L (ppb) 5 100 ug/L (ppb) 20 100 ug/L (ppb) 20 103 ug/L (ppb) 20 103 ug/L (ppb) 20 103 ug/L (ppb) 10 101 ug/L (ppb) 20 106 ug/L (ppb) 50 101

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912264

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912264-06 (Matrix Spike)

Laboratory coue		in opino)		Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.0052	100	92	71 - 125	8

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Mercury	ug/L (ppb)	0.01	99	78-125

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



3600 Fremont Ave. N. Seattle, WA 98103 T: (206) 352-3790 F: (206) 352-7178 info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 912264 Work Order Number: 1912270

December 18, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 3 sample(s) on 12/17/2019 for the analyses presented in the following report.

Hexavalent Chromium by SM 3500 Cr B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes Project Manager

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005 ORELAP Certification: WA 100009-007 (NELAP Recognized)



CLIENT: Project: Work Order:	Friedman & Bruya 912264 1912270	Work Order S	Sample Summary		
Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received		
1912270-001	D1B	12/16/2019 11:20 AM	12/17/2019 10:34 AM		
1912270-002	Boom 1	12/16/2019 11:00 AM	12/17/2019 10:34 AM		
1912270-003	D2	12/16/2019 11:50 AM	12/17/2019 10:34 AM		



Case Narrative

WO#: **1912270** Date: **12/18/2019**

CLIENT:Friedman & BruyaProject:912264

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms



WO#: **1912270** Date Reported: **12/18/2019**

Qualifiers:

- * Flagged value is not within established control limits
- B Analyte detected in the associated Method Blank
- D Dilution was required
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- I Analyte with an internal standard that does not meet established acceptance criteria
- J Analyte detected below Reporting Limit
- N Tentatively Identified Compound (TIC)
- Q Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- (<20%RSD, <20% Drift or minimum RRF)
- S Spike recovery outside accepted recovery limits
- ND Not detected at the Reporting Limit
- R High relative percent difference observed

Acronyms:

%Rec - Percent Recovery **CCB** - Continued Calibration Blank **CCV** - Continued Calibration Verification **DF** - Dilution Factor HEM - Hexane Extractable Material ICV - Initial Calibration Verification LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate MB or MBLANK - Method Blank MDL - Method Detection Limit MS/MSD - Matrix Spike / Matrix Spike Duplicate PDS - Post Digestion Spike Ref Val - Reference Value **RL - Reporting Limit RPD** - Relative Percent Difference SD - Serial Dilution SGT - Silica Gel Treatment SPK - Spike Surr - Surrogate



Analytical Report

 Work Order:
 1912270

 Date Reported:
 12/18/2019

Client:	Friedman & Bruya				Collection	Date:	12/16/2019 11:20:00 AM
Project:	912264						
Lab ID:	1912270-001				Matrix: W	ater	
Client Sa	ample ID: D1B						
Analyses	5	Result	RL	Qual	Units	DF	Date Analyzed
<u>Hexava</u>	lent Chromium by SM 3500	<u>) Cr B</u>			Batcl	n ID: R	56084 Analyst: WF
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/17/2019 11:42:00 AM



Analytical Report

 Work Order:
 1912270

 Date Reported:
 12/18/2019

Client:	Friedman & Bruya				Collection	Date:	12/16/2019 11:00:00 AM
Project:	912264						
Lab ID:	1912270-002				Matrix: W	ater	
Client Sa	ample ID: Boom 1						
Analyses	S	Result	RL	Qual	Units	DF	Date Analyzed
<u>Hexava</u>	lent Chromium by SM 35	<u>00 Cr B</u>			Batch	n ID: R	56084 Analyst: WF
Chromiu	um, Hexavalent	ND	0.0450		mg/L	1	12/17/2019 11:22:00 AM



Analytical Report

 Work Order:
 1912270

 Date Reported:
 12/18/2019

Client:	Friedman & Bruya				Collection	Date:	12/16/2019 11:50:00 AM
Project:	912264						
Lab ID:	1912270-003				Matrix: W	ater	
Client Sa	ample ID: D2						
Analyses	6	Result	RL	Qual	Units	DF	Date Analyzed
<u>Hexava</u>	lent Chromium by SM 350	<u>0 Cr B</u>			Batch	n ID: R	56084 Analyst: WF
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/17/2019 11:47:00 AM



Work Order: CLIENT: Project:	1912270 Friedman & 912264	Bruya				QC SUMMARY REPORT Hexavalent Chromium by SM 3500 Cr B
Sample ID: MB-R	56084	SampType: MBLK			Units: mg/L	Prep Date: 12/17/2019 RunNo: 56084
Client ID: MBLK	W	Batch ID: R56084				Analysis Date: 12/17/2019 SeqNo: 1116789
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexava	alent	ND	0.0450			
Sample ID: LCS-R	\$56084	SampType: LCS			Units: mg/L	Prep Date: 12/17/2019 RunNo: 56084
Client ID: LCSW	1	Batch ID: R56084				Analysis Date: 12/17/2019 SeqNo: 1116790
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexava	alent	0.232	0.0450	0.2500	0	92.8 80.9 115
Sample ID: 19122	70-002ADUP	SampType: DUP			Units: mg/L	Prep Date: 12/17/2019 RunNo: 56084
Client ID: Boom	1	Batch ID: R56084				Analysis Date: 12/17/2019 SeqNo: 1116792
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexava	alent	ND	0.0450			0 30
Sample ID: 19122	70-002AMS	SampType: MS			Units: mg/L	Prep Date: 12/17/2019 RunNo: 56084
Client ID: Boom	1	Batch ID: R56084				Analysis Date: 12/17/2019 SeqNo: 1116793
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexava	alent	0.242	0.0450	0.2500	0	96.8 46.2 138
Sample ID: 19122	70-002AMSD	SampType: MSD			Units: mg/L	Prep Date: 12/17/2019 RunNo: 56084
Client ID: Boom	1	Batch ID: R56084				Analysis Date: 12/17/2019 SeqNo: 1116794
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chromium, Hexava	alent	0.244	0.0450	0.2500	0	97.5 46.2 138 0.2419 0.741 20



Sample Log-In Check List

Clien	t Name:	FB	Work O	rder Numl	ber: 1912270	
Logge	ed by:	Clare Griggs	Date Re	ceived:	12/17/201	9 10:34:00 AM
Chain	of Cust	ody				
1. Is (Chain of C	ustody complete?	Yes	✓	No 🗌	Not Present
2. Ho	w was the	sample delivered?	FedE	<u>Ix</u>		
<u>Loq In</u>	!					
3. Co	olers are p	resent?	Yes	✓	No	NA 🗌
4. Sh	ipping con	tainer/cooler in good condition?	Yes	✓	No 🗌	
5. Cu (Re	istody Seal efer to com	s present on shipping container/cooler? ments for Custody Seals not intact)	Yes		No 🗌	Not Required 🗹
6. Wa	as an atten	npt made to cool the samples?	Yes	✓	No 🗌	NA 🗌
7. We	ere all item	s received at a temperature of >0°C to 10.0°C*	Yes	✓	No 🗌	
8. Sa	mple(s) in	proper container(s)?	Yes	✓	No 🗌	
9. Su	ifficient sar	nple volume for indicated test(s)?	Yes	✓	No 🗌	
10. Are	e samples	properly preserved?	Yes	✓	No 🗌	
11. Wa	as preserva	ative added to bottles?	Yes		No 🖌	NA 🗌
12. ^{Is t}	there head	space in the VOA vials?	Yes		No 🗌	NA 🗹
13. Dio	d all sample	es containers arrive in good condition(unbroken)?	Yes		No 🗌	
14. Do	es paperw	ork match bottle labels?	Yes	✓	No 🗌	
15. Are	e matrices	correctly identified on Chain of Custody?	Yes	✓	No 🗌	
16. ^{Is i}	it clear wha	at analyses were requested?	Yes	✓	No 🗌	
17. We	ere all hold	ing times able to be met?	Yes	✓	No 🗌	
<u>Specia</u>	al Handl	ing (if applicable)				
18. Wa	as client no	tified of all discrepancies with this order?	Yes		No 🗌	NA 🗹
	Person By Who Regardi	Notified: Date: m: Via: ng:	eMa	il 🗌 Ph	none 🗌 Fax	In Person
	Client Ir	istructions:				
19. Ad	Iditional rer	narks:				

Item Information

Item #	Temp ⁰C
Cooler	8.6
Sample	6.6

^{*} Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Friedman & Bruya, 3012 16th Avenue W Seattle, WA 98119-2 Ph. (206) 285-8282 Ph. (206) 283-5044							Boom -	KIK	NR I		Sample ID	Phone #	City, State, ZIP Seat	Address3012	CompanyFried	Send Report To Mich		×
Inc. est 029											ID ^{Jab}		82 82	TOUL	lman :	iael Ei		
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 23, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 17, 2019 from the Kosmos, F&BI 912295 project. There are 18 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1223R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 17, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912295 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912295 -01	D1B
912295 -02	Boom1

The samples were sent to Fremont Analytical for hexavalent chromium analysis. The sample analysis could not happen within the holding time, therefore the analysis was canceled.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295 Date Extracted: 12/18/19 Date Analyzed: 12/18/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 52-124)
D1B 912295-01	<1	<1	<1	<3	<100	78
Boom1 912295-02	<1	<1	<1	<3	<100	78
Method Blank ^{09-2930 MB}	<1	<1	<1	<3	<100	79

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295 Date Extracted: 12/18/19 Date Analyzed: 12/18/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Extended (C ₁₀ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 47-140)
D1B 912295-01	<250	133
Boom1 912295-02	<250	132
Method Blank 09-3050 MB2	<250	138

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295 Date Extracted: NA Date Analyzed: 12/18/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

Sample ID Laboratory ID	<u>pH</u>
D1B 912295-01	7.7
Boom1 912295-02	7.5

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	D1B		Client:	Hart Crowser
Date Received:	12/17/19		Project:	Kosmos, F&BI 912295
Date Extracted:	12/18/19		Lab ID:	912295-01 x10
Date Analyzed:	12/19/19		Data File:	912295-01 x10.020
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		13.5		
Magnesium		2.74		
Hardness (as CaCO	3)	45.0		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	Boom1		Client:	Hart Crowser
Date Received:	12/17/19		Project:	Kosmos, F&BI 912295
Date Extracted:	12/18/19		Lab ID:	912295-02 x10
Date Analyzed:	12/19/19		Data File:	$912295-02 ext{ x10.021}$
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		11.5		
Magnesium		2.36		
Hardness (as CaCO3	3)	38.4		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912295
Date Extracted:	12/18/19	Lab ID:	I9-810 mb2
Date Analyzed:	12/19/19	Data File:	I9-810 mb2.019
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	<0.3		
Magnesium	< 0.05		
Hardness (as CaCO	3) <1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D1B 12/17/19 12/19/19 12/19/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912295 912295-01 912295-01.067 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic		<0.5		
Chromium		<0.25		
Copper		<2		
Lead		< 0.5		
Nickel		< 0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Boom1 12/17/19 12/19/19 12/19/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912295 912295-02 912295-02.068 ICPMS2 SP
Analyte:		Concentration ug/L (ppb)		
Arsenic Cadmium Chromium		<0.5 <0.25 <1		
Copper		<2		
Lead Nickel		<0.5 <0.5		
Zinc		<2.5		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	Method Blank NA 12/19/19 12/19/19 Water	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912295 I9-817 mb I9-817 mb.084 ICPMS2
Units:	ug/L (ppb)	Operator:	SP
Analyte:	Concentration ug/L (ppb)		
Arsenic	< 0.5		
Cadmium	< 0.25		
Chromium	<1		
Copper	<2		
Lead	< 0.5		
Nickel	< 0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295 Date Extracted: 12/17/19 Date Analyzed: 12/18/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
D1B 912295-01	0.00071
Boom1 912295-02	< 0.0007
Method Blank	< 0.0007

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ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912295-01 (Duplicate)

	Reporting	Sample	Duplicate	RPD
Analyte	Units	Result	Result	(Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

		Percent				
	Reporting	Spike	Recovery	Acceptance		
Analyte	Units	Level	LCS	Criteria		
Benzene	ug/L (ppb)	50	97	65-118		
Toluene	ug/L (ppb)	50	97	72 - 122		
Ethylbenzene	ug/L (ppb)	50	102	73 - 126		
Xylenes	ug/L (ppb)	150	96	74-118		
Gasoline	ug/L (ppb)	1,000	100	69 - 134		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	100	63-142	4

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code:	912295-02 (Dup	olicate)		
	Sample	Duplicate	Relative Percent	Acceptance
Analyte	Result	Result	Difference	Criteria
pН	7.5	7.6	1	0-20

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Cou	le. 312243-01 x	10 (main	x spike)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	\mathbf{MS}	MSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	7.38	104 b	136 b	70-130	27 b
Magnesium	mg/L (ppm)	1.0	2.02	92	105	70 - 130	13

Laboratory Code: 912243-01 x10 (Matrix Spike)

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Calcium	mg/L (ppm)	1.0	103	85-115
Magnesium	mg/L (ppm)	1.0	103	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912329-01 (Matrix Spike)

Laboratory coo			(1110)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	95	94	70-130	1
Cadmium	ug/L (ppb)	5	< 0.25	97	95	70-130	2
Chromium	ug/L (ppb)	20	<1	100	98	70 - 130	2
Copper	ug/L (ppb)	20	4.54	94	89	70 - 130	5
Lead	ug/L (ppb)	10	0.541	98	96	70-130	2
Nickel	ug/L (ppb)	20	1.30	97	93	70-130	4
Zinc	ug/L (ppb)	50	3.82	91	87	70 - 130	4

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	97	85-115
Cadmium	ug/L (ppb)	5	99	85 - 115
Chromium	ug/L (ppb)	20	103	85 - 115
Copper	ug/L (ppb)	20	100	85 - 115
Lead	ug/L (ppb)	10	99	85 - 115
Nickel	ug/L (ppb)	20	102	85 - 115
Zinc	ug/L (ppb)	50	100	85 - 115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912295

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912264-06 (Matrix Spike)

Laboratory coue		in opino)		Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.0052	100	92	71 - 125	8

		Percent			
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	
Mercury	ug/L (ppb)	0.01	99	78-125	

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.
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Seattle, Washington 98121 Office: 206.324.9530 • Fax 206.328.5581	HARTCROWSER					ped to:	Samples Shij
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 23, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin :

Included are the results from the testing of material submitted on December 18, 2019 from the Kosmos, F&BI 912329 project. There are 16 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1223R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 18, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912329 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912329 -01	D1B

Sample D1B was sent to Fremont Analytical for hexavalent chromium analysis. The report is enclosed.

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329 Date Extracted: 12/19/19 Date Analyzed: 12/19/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 52-124)
D1B 912329-01	<1	<1	<1	<3	<100	77
Method Blank ^{09-2932 MB}	<1	<1	<1	<3	<100	78

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329 Date Extracted: 12/19/19 Date Analyzed: 12/19/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx Extended to Include Motor Oil Range Compounds

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Extended (C10-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
D1B 912329-01	<250	86
Method Blank 09-3058 MB2	<250	90

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329 Date Extracted: NA Date Analyzed: 12/19/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH USING EPA METHOD 150.2

 $\frac{Sample \ ID}{Laboratory \ ID}$

<u>pH</u>

D1B 912329-01 7.6

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	D1B 12/18/19 12/19/19 12/19/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912329 912329-01 912329-01.086 ICPMS2 SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		< 0.5		
Cadmium		< 0.25		
Chromium		<1		
Copper		4.54		
Lead		0.541		
Nickel		1.30		
Zinc		3.82		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912329
Date Extracted:	12/19/19	Lab ID:	I9-817 mb
Date Analyzed:	12/19/19	Data File:	I9-817 mb.084
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP
	Concentration		
Analyte:	ug/L (ppb)		
Arsenic	< 0.5		
Cadmium	< 0.25		
Chromium	<1		
Copper	<2		
Lead	< 0.5		
Nickel	< 0.5		
Zinc	<2.5		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	D1B		Client:	Hart Crowser
Date Received:	12/18/19		Project:	Kosmos, F&BI 912329
Date Extracted:	12/19/19		Lab ID:	912329-01 x10
Date Analyzed:	12/19/19		Data File:	912329-01 x10.080
Matrix:	Water		Instrument:	ICPMS2
Units:	mg/L (ppm)		Operator:	SP
		Concentration		
Analyte:		mg/L (ppm)		
Calcium		9.75		
Magnesium		2.46		
Hardness (as CaCO	3)	34.5		

ENVIRONMENTAL CHEMISTS

Analysis For Hardness By EPA Method 200.8 and SM 2340B

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912329
Date Extracted:	12/19/19	Lab ID:	I9-818 mb
Date Analyzed:	12/19/19	Data File:	I9-818 mb.077
Matrix:	Water	Instrument:	ICPMS2
Units:	mg/L (ppm)	Operator:	SP
	Concentration		
Analyte:	mg/L (ppm)		
Calcium	< 0.05		
Magnesium	< 0.05		
Hardness (as CaCO	3) <0.35		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329 Date Extracted: 12/19/19 Date Analyzed: 12/20/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID Total Mercury

D1B 912329-01 0.0052

Method Blank

< 0.0007

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912319-29 (Duplicate)

	Reporting	Sample	Duplicate	RPD
Analyte	Units	Result	Result	(Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

		Percent					
	Reporting	Spike	Recovery	Acceptance			
Analyte	Units	Level	LCS	Criteria			
Benzene	ug/L (ppb)	50	96	65-118			
Toluene	ug/L (ppb)	50	97	72 - 122			
Ethylbenzene	ug/L (ppb)	50	102	73 - 126			
Xylenes	ug/L (ppb)	150	94	74-118			
Gasoline	ug/L (ppb)	1,000	101	69-134			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	112	108	61-133	4

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR pH BY METHOD 150.2

Laboratory Code:	912295-02 (Dup	olicate)		
	Sample	Duplicate	Relative Percent	Acceptance
Analyte	Result	Result	Difference	Criteria
pН	7.5	7.6	1	0-20

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912329-01 (Matrix Spike)

		(Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	< 0.5	95	94	70-130	1
Cadmium	ug/L (ppb)	5	< 0.25	97	95	70-130	2
Chromium	ug/L (ppb)	20	<1	100	98	70 - 130	2
Copper	ug/L (ppb)	20	4.54	94	89	70-130	5
Lead	ug/L (ppb)	10	0.541	98	96	70 - 130	2
Nickel	ug/L (ppb)	20	1.30	97	93	70 - 130	4
Zinc	ug/L (ppb)	50	3.82	91	87	70-130	4

Laboratory Code: Laboratory Control Sample

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	97	85-115
Cadmium	ug/L (ppb)	5	99	85 - 115
Chromium	ug/L (ppb)	20	103	85 - 115
Copper	ug/L (ppb)	20	100	85 - 115
Lead	ug/L (ppb)	10	99	85 - 115
Nickel	ug/L (ppb)	20	102	85 - 115
Zinc	ug/L (ppb)	50	100	85 - 115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8 AND SM 2340B

Laboratory Cod	le: Laboratory (Control Sa	umple			
			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Calcium	mg/L (ppm)	1.0	104	102	85 - 115	2
Magnesium	mg/L (ppm)	1.0	98	96	85 - 115	2

ENVIRONMENTAL CHEMISTS

Date of Report: 12/23/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912329

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: 912329-01 (Matrix Spike)

		···· ·· ·· ·· ·· ·· ·· ·· ·· ·· ·· ·· ·		Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	${ m MS}$	MSD	Criteria	(Limit 20)
Mercury	ug/L (ppb)	0.01	0.0052	97	101	71 - 125	4

Laboratory Code: Laboratory Control Sample

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Mercury	ug/L (ppb)	0.01	99	78-125

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



3600 Fremont Ave. N. Seattle, WA 98103 T: (206) 352-3790 F: (206) 352-7178 info@fremontanalytical.com

Friedman & Bruya Michael Erdahl 3012 16th Ave. W. Seattle, WA 98119

RE: 912329 Work Order Number: 1912325

December 20, 2019

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 12/19/2019 for the analyses presented in the following report.

Hexavalent Chromium by SM 3500 Cr B

This report consists of the following:

- Case Narrative

- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes Project Manager

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005 ORELAP Certification: WA 100009-007 (NELAP Recognized)



CLIENT:	Friedman & Bruya	Work Order S	Sample Summary
Project:	912329		
Work Order:	1912325		
Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1912325-001	DIB	12/18/2019 12:45 PM	12/19/2019 9:29 AM



Case Narrative

WO#: **1912325** Date: **12/20/2019**

CLIENT:Friedman & BruyaProject:912329

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers & Acronyms



WO#: **1912325** Date Reported: **12/20/2019**

Qualifiers:

- * Flagged value is not within established control limits
- B Analyte detected in the associated Method Blank
- D Dilution was required
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- I Analyte with an internal standard that does not meet established acceptance criteria
- J Analyte detected below Reporting Limit
- N Tentatively Identified Compound (TIC)
- Q Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- (<20%RSD, <20% Drift or minimum RRF)
- S Spike recovery outside accepted recovery limits
- ND Not detected at the Reporting Limit
- R High relative percent difference observed

Acronyms:

%Rec - Percent Recovery **CCB** - Continued Calibration Blank CCV - Continued Calibration Verification **DF** - Dilution Factor HEM - Hexane Extractable Material **ICV** - Initial Calibration Verification LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate MB or MBLANK - Method Blank MDL - Method Detection Limit MS/MSD - Matrix Spike / Matrix Spike Duplicate PDS - Post Digestion Spike Ref Val - Reference Value **RL** - Reporting Limit **RPD** - Relative Percent Difference SD - Serial Dilution SGT - Silica Gel Treatment SPK - Spike Surr - Surrogate



Analytical Report

 Work Order:
 1912325

 Date Reported:
 12/20/2019

Client:	Friedman & Bruya				Collection	n Date:	12/18/2019 12:45:00 PM
Project:	912329						
Lab ID:	1912325-001				Matrix: W	/ater	
Client Sa	ample ID: DIB						
Analyses	6	Result	RL	Qual	Units	DF	Date Analyzed
<u>Hexaval</u>	lent Chromium by SM 350	<u>0 Cr B</u>			Batc	h ID: R	56143 Analyst: WF
Chromiu	ım, Hexavalent	ND	0.0450		mg/L	1	12/19/2019 10:49:00 AM



Work Order: CLIENT: Project:	1912325 Friedman & 912329	Bruya				QC SUMMARY REPOR Hexavalent Chromium by SM 3500 Cr
Sample ID: MB-56	5143	SampType: MBLK			Units: mg/L	Prep Date: 12/19/2019 RunNo: 56143
Client ID: MBLK	W	Batch ID: R56143				Analysis Date: 12/19/2019 SeqNo: 1118479
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua
Chromium, Hexava	alent	ND	0.0450			
Sample ID: LCS-5	6143	SampType: LCS			Units: mg/L	Prep Date: 12/19/2019 RunNo: 56143
Client ID: LCSW	1	Batch ID: R56143				Analysis Date: 12/19/2019 SeqNo: 1118480
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua
Chromium, Hexava	alent	0.241	0.0450	0.2500	0	96.6 80.9 115
Sample ID: 19123	25-001ADUP	SampType: DUP			Units: mg/L	Prep Date: 12/19/2019 RunNo: 56143
Client ID: DIB		Batch ID: R56143				Analysis Date: 12/19/2019 SeqNo: 1118482
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua
Chromium, Hexava	alent	ND	0.0450			0 30
Sample ID: 19123	25-001AMS	SampType: MS			Units: mg/L	Prep Date: 12/19/2019 RunNo: 56143
Client ID: DIB		Batch ID: R56143				Analysis Date: 12/19/2019 SeqNo: 1118483
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua
Chromium, Hexava	alent	0.242	0.0450	0.2500	0	96.8 46.2 138
Sample ID: 19123	25-001AMSD	SampType: MSD			Units: mg/L	Prep Date: 12/19/2019 RunNo: 56143
Client ID: DIB		Batch ID: R56143				Analysis Date: 12/19/2019 SeqNo: 1118484
Analyte		Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qua
Chromium, Hexava	alent	0.248	0.0450	0.2500	0	99.1 46.2 138 0.2419 2.41 20



Client Name: FB	Work Order Numb	per: 1912325		
Logged by: Carissa True	Date Received:	12/19/201	9 9:29:00 AM	
Chain of Custody				
1. Is Chain of Custody complete?	Yes 🖌	No 🗌	Not Present	
2. How was the sample delivered?	<u>FedEx</u>			
Loa In				
3. Coolers are present?	Yes	No 🖌		
	No cooler prese	<u>nt</u>		
4. Shipping container/cooler in good condition?	Yes 🔽	No 🗌		
 Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) 	Yes	No 🗹	Not Required	
6. Was an attempt made to cool the samples?	Yes	No 🗹	NA 🗌	
Sample	received at appropria	te temperatur	<u>e</u>	
7. Were all items received at a temperature of $>0^{\circ}C$ to $10.0^{\circ}C^{*}$	Yes 🖌	No 🗌		
8. Sample(s) in proper container(s)?	Yes 🗹	No 🗌		
9. Sufficient sample volume for indicated test(s)?	Yes 🗹	No 🗌		
10. Are samples properly preserved?	Yes 🗹	No 🗌	_	
11. Was preservative added to bottles?	Yes	No 🗹	NA 📖	
12. Is there headspace in the VOA vials?	Yes	No 🗌	NA 🔽	
13. Did all samples containers arrive in good condition(unbroken)	?Yes 🖌	No 🗌		
14. Does paperwork match bottle labels?	Yes 🖌	No 🗌		
15. Are matrices correctly identified on Chain of Custody?	Yes 🖌	No 🗌		
16. Is it clear what analyses were requested?	Yes 🖌	No 🗌		
17. Were all holding times able to be met?	Yes 🖌	No 🗌		
<u>Special Handling (if applicable)</u>			_	
18. Was client notified of all discrepancies with this order?	Yes 🖌	No		
Person Notified: Michael Erdahl Da	ate:	12/18/2019		
By Whom: Carissa True Vi	a: 🗌 eMail 🖌 Ph	one 🗌 Fax [In Person	
Regarding: Confirm sample date and time				
Client Instructions: See updated COC				
19. Additional remarks:				

Item Information

Item #	Temp ⁰C
Sample 1	6.9

^{*} Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 13, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 6, 2019 from the Kosmos 19499-00, F&BI 912125 project. There are 16 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1213R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 6, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos 19499-00, F&BI 912125 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	Hart Crowser
912125 -01	SP2-6
912125 -02	SP2-7
912125 -03	SP1-5

A 6020B internal standard failed the acceptance criteria for samples SP2-6 and SP2-7. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported. In addition, selenium in the matrix spike failed the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the result was due to matrix effect.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912125 Date Extracted: 12/09/19 Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery)</u> (Limit 50-150)
SP2-6 912125-01 1/5	<0.02 j	<0.1	<0.1	<0.3	<25	89
SP2-7 912125-02 1/5	<0.02 j	<0.1	<0.1	<0.3	<25	89
Method Blank 09-2915 MB	< 0.02	< 0.02	< 0.02	< 0.06	<5	88

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912125 Date Extracted: 12/09/19 Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 48-168)
SP2-6 912125-01	660	2,300	99
SP2-7 912125-02	12,000	12,000	117
Method Blank 09-2988 MB	<50	<250	108

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	SP2-6 12/06/19 12/09/19 12/09/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos 19499-00, F&BI 912125 912125-01 912125-01.083 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.81		
Barium	54.8		
Cadmium	<1		
Chromium	$11.0 \mathrm{J}$		
Lead	9.06		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SP2-6	Client:	Hart Crowser
Date Received:	12/06/19	Project:	Kosmos 19499-00, F&BI 912125
Date Extracted:	12/09/19	Lab ID:	912125-01 x5
Date Analyzed:	12/10/19	Data File:	912125-01 x5.058
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	13.5		

13.5

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	SP2-7 12/06/19 12/09/19 12/09/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos 19499-00, F&BI 912125 912125-02 912125-02.084 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	2.18		
Barium	70.1		
Cadmium	<1		
Chromium	$12.0~\mathrm{J}$		
Lead	21.8		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SP2-7	Client:	Hart Crowser
Date Received:	12/06/19	Project:	Kosmos 19499-00, F&BI 912125
Date Extracted:	12/09/19	Lab ID:	912125-02 x5
Date Analyzed:	12/10/19	Data File:	912125-02 x5.059
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analuta	Concentration		
Analyte:	mg/kg (ppm)		
Chromium	15.6		

15.6
ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Unite:	Method Blank NA 12/09/19 12/09/19 Soil mg(kg (npm) Dwy Weight	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos 19499-00, F&BI 912125 I9-777 mb I9-777 mb.081 ICPMS2 SP
Units.	mg/kg (ppm) Dry weight	Operator:	51
Analyte:	Concentration mg/kg (ppm)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-6 12/06/19 12/09/19 12/10/19 Soil mg/kg (ppm	n) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912125 912125-01 1/25 121011.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 119 d 118 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		0.070		
Fluorene		0.14		
Phenanthrene		0.41		
Anthracene		0.11		
Fluoranthene		0.063		
Pyrene		0.66		
Benz(a)anthracene		0.16		
Chrysene		0.30		
Benzo(a)pyrene		0.14		
Benzo(b)fluoranther	ne	< 0.05		
Benzo(k)fluoranthe	ne	< 0.05		
Indeno(1,2,3-cd)pyr	ene	< 0.05		
Dibenz(a,h)anthrac	ene	< 0.05		
Benzo(g,h,i)perylen	е	< 0.05		

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-7 12/06/19 12/09/19 12/09/19 Soil mg/kg (ppm	ı) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 9 912125-02 1/250 120925.D GCMS6 YA	912125
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 376 d 138 d	Lower Limit: 31 24	Upper Limit: 163 168	
Compounds:		Concentration mg/kg (ppm)			
Naphthalene		< 0.5			
Acenaphthylene		< 0.5			
Acenaphthene		< 0.5			
Fluorene		< 0.5			
Phenanthrene		0.90			
Anthracene		< 0.5			
Fluoranthene		< 0.5			
Pyrene		2.1			
Benz(a)anthracene		0.52			
Chrysene		0.96			
Benzo(a)pyrene		0.35			
Benzo(b)fluoranther	ne	< 0.5			
Benzo(k)fluoranthe	ne	< 0.5			
Indeno(1,2,3-cd)pyr	ene	< 0.5			
Dibenz(a,h)anthrac	ene	< 0.5			
Benzo(g,h,i)perylene	е	< 0.5			

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blan Not Applicab 12/09/19 12/09/19 Soil mg/kg (ppm)	k le Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912125 09-2991 mb 1/5 120915.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 88 96	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:	(Concentration mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranther	ne	< 0.01		
Benzo(k)fluoranther	ne	< 0.01		
Indeno(1,2,3-cd)pyre	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylene	9	< 0.01		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912125

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912073-01 (Duplicate)

		Sample	Duplicate	
	Reporting	Result	Result	RPD
Analyte	Units	(Wet Wt)	(Wet Wt)	(Limit 20)
Benzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Toluene	mg/kg (ppm)	< 0.02	< 0.02	nm
Ethylbenzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Xylenes	mg/kg (ppm)	< 0.06	< 0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	mg/kg (ppm)	0.5	89	69-120
Toluene	mg/kg (ppm)	0.5	88	70-117
Ethylbenzene	mg/kg (ppm)	0.5	87	65 - 123
Xylenes	mg/kg (ppm)	1.5	90	66-120
Gasoline	mg/kg (ppm)	20	90	71-131

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912125

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 9	912120-01 (Matrix	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	\mathbf{MS}	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	180	92	94	73-135	2
Laboratory Code: 1	Laboratory Contro	ol Sampl	e				
			Percent				
	Reporting	Spike	Recovery	Acceptan	ice		
Analyte	Units	Level	LCS	Criteria	a		
Diesel Extended	mg/kg (ppm)	5,000	104	74-139)		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912125

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 912132-01 x5 (Matrix Spike)

			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Arsenic	mg/kg (ppm)	10	<5	75	78	75 - 125	4
Barium	mg/kg (ppm)	50	42.5	118	102	75 - 125	15
Cadmium	mg/kg (ppm)	10	<5	98	98	75 - 125	0
Chromium	mg/kg (ppm)	50	10.8	88	86	75 - 125	2
Lead	mg/kg (ppm)	50	10.2	99	103	75 - 125	4
Mercury	mg/kg (ppm	5	<5	93	87	75 - 125	7
Selenium	mg/kg (ppm)	5	<5	71 vo	79	75 - 125	11
Silver	mg/kg (ppm)	10	<5	98	100	75 - 125	2

Laboratory Code: Laboratory Control Sample

		p	Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	mg/kg (ppm)	10	93	80-120
Barium	mg/kg (ppm)	50	110	80-120
Cadmium	mg/kg (ppm)	10	108	80-120
Chromium	mg/kg (ppm)	50	103	80-120
Lead	mg/kg (ppm)	50	112	80-120
Mercury	mg/kg (ppm)	5	90	80-120
Selenium	mg/kg (ppm)	5	103	80-120
Silver	mg/kg (ppm)	10	112	80-120

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912125

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample 1/5

U U	·	-	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	85	90	58-121	6
Acenaphthylene	mg/kg (ppm)	0.17	91	101	54 - 121	10
Acenaphthene	mg/kg (ppm)	0.17	88	95	54 - 123	8
Fluorene	mg/kg (ppm)	0.17	94	99	56 - 127	5
Phenanthrene	mg/kg (ppm)	0.17	88	93	55 - 122	6
Anthracene	mg/kg (ppm)	0.17	88	91	50 - 120	3
Fluoranthene	mg/kg (ppm)	0.17	96	98	54 - 129	2
Pyrene	mg/kg (ppm)	0.17	94	99	53 - 127	5
Benz(a)anthracene	mg/kg (ppm)	0.17	95	99	51 - 115	4
Chrysene	mg/kg (ppm)	0.17	91	96	55 - 129	5
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	88	89	56 - 123	1
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	89	91	54-131	2
Benzo(a)pyrene	mg/kg (ppm)	0.17	83	84	51 - 118	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	71	83	49-148	16
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	68	79	50 - 141	15
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	63	74	52 - 131	16

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.









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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

January 13, 2020

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the additional results from the testing of material submitted on December 9, 2019 from the Kosmos, F&BI 912132 project. There are 8 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR0113R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 9, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912132 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912132 -01	SP2-8
912132 -02	SP2-9
912132 -03	SP2-10
912132 -04	SP2-11

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-8	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	912132-01 x5
Date Analyzed:	12/10/19	Data File:	912132-01 x5.062
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Copper	46.7		
Nickel	15.4		
Zinc	61.8		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-9	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	912132-02 x5
Date Analyzed:	12/10/19	Data File:	912132-02 x5.065
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Copper	51.1		
Nickel	14.8		
Zinc	55.6		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-10	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	912132-03 x5
Date Analyzed:	12/10/19	Data File:	912132-03 x5.074
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Copper	45.0		
Nickel	13.7		
Zinc	53.9		

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-11	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	912132-04 x5
Date Analyzed:	12/10/19	Data File:	912132-04 x5.075
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Copper	54.8		
Nickel	16.4		
Zinc	62.3		

ENVIRONMENTAL CHEMISTS

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	Not Applicable	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	I9-777 mb
Date Analyzed:	12/09/19	Data File:	I9-777 mb.081
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Copper	<5		
Nickel	<1		
Zinc	<5		

ENVIRONMENTAL CHEMISTS

Date of Report: 01/13/20 Date Received: 12/09/19 Project: Kosmos, F&BI 912132

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 912132-01 x5 (Matrix Spike)

			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Copper	mg/kg (ppm)	50	35.0	95	89	75 - 125	7
Nickel	mg/kg (ppm)	25	11.6	95	89	75 - 125	7
Zinc	mg/kg (ppm)	50	46.4	96	89	75 - 125	8

Laboratory Code: Laboratory Control Sample

v	0	1	Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Copper	mg/kg (ppm)	50	103	80-120
Nickel	mg/kg (ppm)	25	110	80-120
Zinc	mg/kg (ppm)	50	112	80-120

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

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c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

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L - The reported concentration was generated from a library search.

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ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Sample Custody Record 912132

HARTCROWSER



Hart Crowser, Inc. 3131 Elliott Avenue, Suite 600 Seattle, Washington 98121 ce: 206.324.9530 • Fax 206.328.5581

Samples Shipped to:						i	<u>, /</u>	A <u>I</u> K		U	NS) = (Office: 206.324.9530 • Fax 206.328.5581
JOB 1949900 LAB NUMBER PROJECT NAME KOSMOS HART CROWSER CONTACT 2Mgi e GOODWin, CMARW KOPOROS SAMPLED BY:			NatpH.Dx	NWAPH-LX/Phr	PA M	RURAR	REQUES	TED A	NAL	YSIS				NO. OF CONTAINERS	BII Coteres USI OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS		
LAB NO. SAMPLE ID	DESCRIPTI	ON DATE	TIME	MATRIX								*					(S-re, AG
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03 507-10	1		1500		\times	X	X	X	69						T		
04 07-11			I SID	Ŧ	X.	X	\times	\times	\otimes							\mathbf{V}	
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COMPANY	<u> </u>	COMPANY			for	Othe	r Co	ntrac	t Reguir	ement	S					U72	

White to Lab Yellow to Project Manager Pink to Sample Custodian

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 13, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 9, 2019 from the Kosmos, F&BI 912132 project. There are 22 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1213R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 9, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912132 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	Hart Crowser
912132 -01	SP2-8
912132 -02	SP2-9
912132 -03	SP2-10
912132 -04	SP2-11

A 6020B internal standard failed the acceptance criteria for all samples. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912132 Date Extracted: 12/09/19 Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery)</u> (Limit 50-150)
SP2-8 912132-01 1/5	<0.02 j	<0.1	<0.1	<0.3	<25	85
SP2-9 912132-02 1/5	<0.02 j	<0.1	0.28	0.88	240	91
SP2-10 912132-03 1/5	<0.02 j	<0.1	<0.1	<0.3	<25	84
SP2-11 912132-04 1/5	<0.02 j	<0.1	< 0.1	<0.3	110	87
Method Blank 09-2915 MB	< 0.02	< 0.02	< 0.02	< 0.06	<5	88

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912132 Date Extracted: 12/09/19 Date Analyzed: 12/09/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 56-165)
SP2-8 912132-01	110 x	<250	88
SP2-9 912132-02	4,300	4,300	86
SP2-10 912132-03	440	870	81
SP2-11 912132-04	1,700	3,000	88
Method Blank	<50	<250	105

ENVIRONMENTAL CHEMISTS

Client ID:	SP2-8	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	912132-01
Date Analyzed:	12/09/19	Data File:	912132-01.087
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	1.61		
Barium	52.5		
Cadmium	<1		
Chromium	11.2 J		
Lead	13.5		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SP2-8	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	912132-01 x5
Date Analyzed:	12/10/19	Data File:	912132-01 x5.062
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	14.3		

 $\mathbf{5}$

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	SP2-9 12/09/19 12/09/19 12/09/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912132 912132-02 912132-02.090 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.59		
Barium	42.6		
Cadmium	<1		
Chromium	10.1 J		
Lead	6.19		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SP2-9	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	912132-02 x5
Date Analyzed:	12/10/19	Data File:	912132-02 x5.065
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	12.4		

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ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	SP2-10 12/09/19 12/09/19 12/09/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912132 912132-03 912132-03.091 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.79		
Barium	56.9		
Cadmium	<1		
Chromium	$11.2 \mathrm{J}$		
Lead	6.45		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SP2-10	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	912132-03 x5
Date Analyzed:	12/10/19	Data File:	912132-03 x5.074
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	13.5		

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ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	SP2-11 12/09/19 12/09/19 12/09/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912132 912132-04 912132-04.092 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.79		
Barium	50.0		
Cadmium	<1		
Chromium	11.4 J		
Lead	4.91		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SP2-11	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912132
Date Extracted:	12/09/19	Lab ID:	912132-04 x5
Date Analyzed:	12/10/19	Data File:	912132-04 x5.075
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	16.1		

16.1
ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank NA 12/09/19 12/09/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912132 I9-777 mb I9-777 mb.081 ICPMS2 SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-8 12/09/19 12/09/19 12/10/19 Soil mg/kg (ppm	ı) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912132 912132-01 1/25 120935.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 110 d 111 d	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		0.050		
Fluorene		0.11		
Phenanthrene		0.36		
Anthracene		0.10		
Fluoranthene		< 0.05		
Pyrene		0.43		
Benz(a)anthracene		0.12		
Chrysene		0.19		
Benzo(a)pyrene		0.071		
Benzo(b)fluoranthe	ne	< 0.05		
Benzo(k)fluoranthe	ne	< 0.05		
Indeno(1,2,3-cd)pyr	ene	< 0.05		
Dibenz(a,h)anthrac	ene	< 0.05		
Benzo(g,h,i)perylen	e	< 0.05		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-9 12/09/19 12/09/19 12/09/19 Soil mg/kg (ppm	ı) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912132 912132-02 1/250 120926.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 226 d 159 d	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.5		
Acenaphthylene		< 0.5		
Acenaphthene		1.2		
Fluorene		2.7		
Phenanthrene		8.5		
Anthracene		2.1		
Fluoranthene		0.60		
Pyrene		4.9		
Benz(a)anthracene		1.6		
Chrysene		2.0		
Benzo(a)pyrene		0.62		
Benzo(b)fluoranthe	ne	< 0.5		
Benzo(k)fluoranthe	ne	< 0.5		
Indeno(1,2,3-cd)pyr	ene	< 0.5		
Dibenz(a,h)anthrac	ene	< 0.5		
Benzo(g,h,i)perylen	e	< 0.5		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-10 12/09/19 12/09/19 12/10/19 Soil mg/kg (ppn	n) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912132 912132-03 1/25 120936.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 109 d 115 d	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		0.058		
Acenaphthylene		< 0.05		
Acenaphthene		0.20		
Fluorene		0.45		
Phenanthrene		1.4		
Anthracene		0.38		
Fluoranthene		0.12		
Pyrene		1.1		
Benz(a)anthracene		0.30		
Chrysene		0.52		
Benzo(a)pyrene		0.16		
Benzo(b)fluoranthe	ne	0.064		
Benzo(k)fluoranthe	ne	< 0.05		
Indeno(1,2,3-cd)pyr	ene	< 0.05		
Dibenz(a,h)anthrac	ene	< 0.05		
Benzo(g,h,i)perylen	e	< 0.05		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	SP2-11 12/09/19 12/09/19 12/09/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912132 912132-04 1/250 120927.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 322 d 143 d	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.5		
Acenaphthylene		< 0.5		
Acenaphthene		< 0.5		
Fluorene		0.71		
Phenanthrene		2.4		
Anthracene		0.66		
Fluoranthene		< 0.5		
Pyrene		3.7		
Benz(a)anthracene		0.93		
Chrysene		1.6		
Benzo(a)pyrene		0.72		
Benzo(b)fluoranthe	ne	< 0.5		
Benzo(k)fluoranthe	ne	< 0.5		
Indeno(1,2,3-cd)pyr	ene	< 0.5		
Dibenz(a,h)anthrac	ene	< 0.5		
Benzo(g,h,i)perylen	e	< 0.5		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank Not Applicable 12/09/19 12/09/19 Soil mg/kg (ppm) Dr	y Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912132 09-2991 mb 1/5 120915.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	% ə-d12	Recovery: 88 96	Lower Limit: 31 24	Upper Limit: 163 168
	Cor	ncentration		
Compounds:	mg	g/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912132

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912073-01 (Duplicate)

		Sample	Duplicate	
	Reporting	Result	Result	RPD
Analyte	Units	(Wet Wt)	(Wet Wt)	(Limit 20)
Benzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Toluene	mg/kg (ppm)	< 0.02	< 0.02	nm
Ethylbenzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Xylenes	mg/kg (ppm)	< 0.06	< 0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	mg/kg (ppm)	0.5	89	69-120
Toluene	mg/kg (ppm)	0.5	88	70-117
Ethylbenzene	mg/kg (ppm)	0.5	87	65 - 123
Xylenes	mg/kg (ppm)	1.5	90	66 - 120
Gasoline	mg/kg (ppm)	20	90	71-131

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912132

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912105-01 (Matri	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	94	94	63-146	0
Laboratory Code:	Laboratory Contr	ol Samp	le				
			Percent	t			
	Reporting	Spike	Recover	y Accep	tance		
Analyte	Units	Level	LCS	Crite	eria		
Diesel Extended	mg/kg (ppm)	5,000	96	79-1	144		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912132

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 912132-01 x5 (Matrix Spike)

			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Arsenic	mg/kg (ppm)	10	<5	75	78	75 - 125	4
Barium	mg/kg (ppm)	50	42.5	118	102	75 - 125	15
Cadmium	mg/kg (ppm)	10	<5	98	98	75 - 125	0
Chromium	mg/kg (ppm)	50	10.8	88	86	75 - 125	2
Lead	mg/kg (ppm)	50	10.2	99	103	75 - 125	4
Mercury	mg/kg (ppm	5	<5	93	87	75 - 125	7
Selenium	mg/kg (ppm)	5	<5	71 vo	79	75 - 125	11
Silver	mg/kg (ppm)	10	<5	98	100	75 - 125	2

Laboratory Code: Laboratory Control Sample

0	0	1	Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	mg/kg (ppm)	10	93	80-120
Barium	mg/kg (ppm)	50	110	80-120
Cadmium	mg/kg (ppm)	10	108	80-120
Chromium	mg/kg (ppm)	50	103	80-120
Lead	mg/kg (ppm)	50	112	80-120
Mercury	mg/kg (ppm)	5	90	80-120
Selenium	mg/kg (ppm)	5	103	80-120
Silver	mg/kg (ppm)	10	112	80-120

ENVIRONMENTAL CHEMISTS

Date of Report: 12/13/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912132

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: Laboratory Control Sample 1/5 $\,$

U U	·	-	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	85	90	58-121	6
Acenaphthylene	mg/kg (ppm)	0.17	91	101	54 - 121	10
Acenaphthene	mg/kg (ppm)	0.17	88	95	54 - 123	8
Fluorene	mg/kg (ppm)	0.17	94	99	56 - 127	5
Phenanthrene	mg/kg (ppm)	0.17	88	93	55 - 122	6
Anthracene	mg/kg (ppm)	0.17	88	91	50 - 120	3
Fluoranthene	mg/kg (ppm)	0.17	96	98	54 - 129	2
Pyrene	mg/kg (ppm)	0.17	94	99	53 - 127	5
Benz(a)anthracene	mg/kg (ppm)	0.17	95	99	51 - 115	4
Chrysene	mg/kg (ppm)	0.17	91	96	55 - 129	5
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	88	89	56 - 123	1
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	89	91	54-131	2
Benzo(a)pyrene	mg/kg (ppm)	0.17	83	84	51 - 118	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	71	83	49-148	16
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	68	79	50 - 141	15
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	63	74	52 - 131	16

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.









7.37.1









v . .

Sample Custody Record 912132

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Hart Crowser, Inc.

ME 12-09-19 3131 Elliott Avenue, Suite 600 Seattle, Washington 98121 Office: 206.324.9530 • Fax 206.328.5581

Samp	les Shipr	ed to:

JOB 4 PROJECT I HART CRC SAMPLED	49900 NAME KOS WSER CONTAC INEW KA BY:	LABI SMOS T ZMQL ZMQL ZMQL ZMOS	NUMBER	win,		NartpH.Dx	N WAPH-LX/BKX	PA W	RURAK		5		NO. OF CONTAINERS	BI 1 -Cot ev-B いちし OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	SAMPLE ID	DESCRIPTIO)N DATE	TIME	MATRIX									
LAD NO.	Col-l		1714	1448	50:1	$\overline{\mathbf{X}}$	x	$\overline{\mathbf{x}}$	$\overline{}$				5	
OLA-E	2010		140	1452	$\frac{1}{1}$	$\overline{\mathbf{x}}$	$\tilde{\mathbf{x}}$	쉿	$\overline{\mathbf{x}}$					
02	502-10			1500		\mathbf{x}	X	$\frac{1}{X}$	X					
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07	Spc-1			V										
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an	\sim	17/8	El-	<u> </u>	12/9/19	ST	ORAG	3E Kt	ZQUI	REMENTS:			SAN	APLE RECEIPT INFORMATION
SIGNATURE	· Jatahan	TIME	500 CUE	mar	TIME					. /	·		ET CC	
PRINT NAMI	HC	1830	PRINT NAME		an			Sar	nple	es received at 4°	°C			YES $\square NO \mathcal{L}^{\mathfrak{d}}$
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RELINQUI	SHED BY	DATE	RECEIVED BY		DATE		0155			CTOB	ACELO	CATION		
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COMPANY							Out		anda	et nequiteriterito				

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 5, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on November 26, 2019 from the Kosmos, F&BI 911412 project. There are 29 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR) HCR1205R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 26, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 911412 project. Samples were logged in under the laboratory ID's listed below.

<u>Hart Crowser</u>
TP-13-2.5
TP-13-5
TP-13-9
TP-14-2.5
TP-14-5
TP-14-10
TP-15-4
TP-15-6
TP-15-11
TP-15-14
TP-2-4
TP-2-8
TP-2-10.5
TP-15-8

A 6020B internal standard failed the acceptance criteria for samples TP-13-2.5, TP-15-4, and TP-2-4. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported.

An 8270D internal standard failed the acceptance criteria for sample TP-15-4. The sample was diluted and reanalyzed with acceptable results. Both data sets were reported.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412 Date Extracted: 11/27/19 Date Analyzed: 11/27/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (<u>% Recovery</u>) (Limit 58-139)
TP-13-2.5 911412-01	<5	91
TP-14-10 911412-06	<5	92
TP-15-8 911412-14	<5	91
Method Blank 09-2742 MB2	<5	81

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412 Date Extracted: 11/27/19 Date Analyzed: 11/27/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery)</u> (Limit 50-132)
TP-15-4 911412-07	< 0.02	< 0.02	< 0.02	< 0.06	<5	80
TP-15-6 911412-08	< 0.02	< 0.02	< 0.02	<0.06	<5	81
TP-15-14 911412-10	< 0.02	< 0.02	< 0.02	< 0.06	<5	81
TP-2-4 911412-11	< 0.02	< 0.02	< 0.02	< 0.06	<5	81
TP-2-8 911412-12	< 0.02	< 0.02	< 0.02	<0.06	<5	81
Method Blank 09-2742 MB2	< 0.02	< 0.02	< 0.02	< 0.06	<5	84

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412 Date Extracted: 12/02/19 Date Analyzed: 12/02/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 48-168)
TP-13-2.5 911412-01	<50	<250	96
TP-14-10 911412-06	<50	<250	96
TP-15-4 911412-07	210 x	2,500	102
TP-15-6 911412-08	<50	<250	99
TP-15-14 911412-10	<50	<250	92
TP-2-4 911412-11	<50	<250	97
TP-2-8 911412-12	<50	<250	97
TP-15-8 911412-14	<50	<250	109
Method Blank	<50	<250	98

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	TP-13-2.5 11/26/19 12/02/19 12/02/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 911412 911412-01 911412-01.035 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	2.67		
Barium	68.3		
Cadmium	<1		
Chromium	14.1 J		
Lead	2.94		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	TP-13-2.5	Client:	Hart Crowser
Date Received:	11/26/19	Project:	Kosmos, F&BI 911412
Date Extracted:	12/02/19	Lab ID:	911412-01 x5
Date Analyzed:	12/02/19	Data File:	911412-01 x5.040
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	16.4		

16.4

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	TP-15-4 11/26/19 12/02/19 12/02/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 911412 911412-07 911412-07.036 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	2.57		
Barium	84.6		
Cadmium	<1		
Chromium	$12.2~\mathrm{J}$		
Lead	51.0		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	TP-15-4	Client:	Hart Crowser
Date Received:	11/26/19	Project:	Kosmos, F&BI 911412
Date Extracted:	12/02/19	Lab ID:	911412-07 x5
Date Analyzed:	12/02/19	Data File:	911412-07 x5.043
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	13.6		

8

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	TP-2-4	Client:	Hart Crowser
Date Received:	11/26/19	Project:	Kosmos, F&BI 911412
Date Extracted:	12/02/19	Lab ID:	911412-11
Date Analyzed:	12/02/19	Data File:	911412-11.037
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.74		
Barium	102		
Cadmium	<1		
Chromium	$16.1 \mathrm{J}$		
Lead	3.21		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	TP-2-4	Client:	Hart Crowser
Date Received:	11/26/19	Project:	Kosmos, F&BI 911412
Date Extracted:	12/02/19	Lab ID:	911412-11 x5
Date Analyzed:	12/02/19	Data File:	911412-11 x5.044
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	19.7		

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ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank NA 12/02/19 12/02/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 911412 I9-761 mb I9-761 mb.033 ICPMS2 SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-15-4 11/26/19 12/02/19 12/02/19 Soil mg/kg (ppm) Dry	Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 911412 911412-07 1/25 120209.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	% R -d12 T	ecovery: 139 d 109 d entration	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:	mg/l	kg (ppm)		
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranther Benzo(k)fluoranther Indeno(1,2,3-cd)pyr	ne ne ene	<0.05 <0.05 <0.05 <0.05 0.067 <0.05 0.23 0.40 0.19 0.21 0.26 J 0.27 J 0.083 J 0.099 J		
Benzo(g,h,i)perylen	9	0.12 J		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-15-4 11/26/19 12/02/19 12/02/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 911412 911412-07 1/250 120210.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 320 d 96 d	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.5		
Acenaphthylene		< 0.5		
Acenaphthene		< 0.5		
Fluorene		< 0.5		
Phenanthrene		< 0.5		
Anthracene		< 0.5		
Fluoranthene		< 0.5		
Pyrene		< 0.5		
Benz(a)anthracene		< 0.5		
Chrysene		< 0.5		
Benzo(a)pyrene		< 0.5		
Benzo(b)fluoranthe	ne	< 0.5		
Benzo(k)fluoranthe	ne	< 0.5		
Indeno(1,2,3-cd)pyr	ene	< 0.5		
Dibenz(a,h)anthrac	ene	< 0.5		
Benzo(g,h,i)perylen	e	< 0.5		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank Not Applicable 12/02/19 12/02/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 911412 09-2905 mb 1/5 120206.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	% Recovery: 99 99	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:	mg/kg (ppm)		
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthe Benzo(b)fluoranthe Benzo(k)fluoranthe Indeno(1,2,3-cd)pyr Dibenz(a,h)anthrac	$\begin{array}{c} < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ = 0.01 \\ ene \\ < $		

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TP-13-2.5		Client:	Hart Crowser	
Date Received:	11/26/19		Project:	Kosmos, F&BI 911412	2
Date Extracted:	12/03/19		Lab ID:	911412-01	
Date Analyzed:	12/03/19		Data File:	120329.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppn	n) Dry Weight	Operator :	MS	
			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1.2-Dichloroethane	-d4	100	62	145	
Toluene-d8		100	55	145	
4-Bromofluorobenz	ene	97	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene)	< 0.05
Methylene chloride	•	< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	ethene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	de	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentane	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TP-14-10		Client:	Hart Crowser	
Date Received:	11/26/19		Project:	Kosmos, F&BI 911412	
Date Extracted:	12/03/19		Lab ID:	911412-06	
Date Analyzed:	12/03/19		Data File:	120330.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppm	n) Dry Weight	Operator :	MS	
	0 0 11	, , ,	T	TT	
C		0/ Decourses	Lower	Upper	
Surrogates:	14	% Recovery:	Limit:		
1,2-Dichloroethane-	α4	103	62 55	145	
1 oluene-d8		102	99 67	140	
4-Bromofluorobenze	ene	96	69	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xvlene		< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	benzene	< 0.05
2,2-Dichloropropane	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	methylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-1	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tri	chloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	toluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	toluene	< 0.05
1,1-Dichloropropene	Э	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	e	< 0.05	1,2,4-Tri	methylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropane	э	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentano	ne	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	chlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	chlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TP-15-8		Client:	Hart Crowser	
Date Received:	11/26/19		Project:	Kosmos, F&BI 911412	
Date Extracted:	12/03/19		Lab ID:	911412-14	
Date Analyzed:	12/03/19		Data File:	120331.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppn	n) Dry Weight	Operator :	MS	
	0 0 11	/ / 0	T	тт	
Comparatas		0/ Decorrorry	Lower	Upper	
Surrogates:	14	% Recovery:			
T,2-Dichloroethane-	.04	104	62 55	145	
1 oluene-a8		101	99 67	145	
4-Bromofluorobenze	ene	98	69	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethvlber	nzene	< 0.05
Acetone		< 0.5	1.1.1.2-7	Tetrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene	2	< 0.05
Methylene chloride		< 0.5	Stvrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1.2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tr	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropene	Э	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tr	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	е	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1.4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1.2-Dich	lorobenzene	< 0.05
4-Methvl-2-pentanc	one	< 0.5	1.2-Dibr	omo-3-chloropropane	< 0.5
cis-1.3-Dichloropror	bene	< 0.05	1.2.4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			
ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bla	ank	Client:	Hart Crowser	
Date Received:	Not Applic	able	Project:	Kosmos, F&BI 911412	2
Date Extracted:	12/03/19		Lab ID:	09-2895 mb	
Date Analyzed:	12/03/19		Data File:	120326.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppn	n) Dry Weight	Operator:	MS	
	0 0 11	, . .	- т	TT	
Sumoratory		0/ D	Lower	Upper	
Surrogates:	4	% Recovery:			
Taluara do	·04	101	62 E E	140	
1 oluene-að		101	00 07	140	
4-Bromofluorobenze	ene	98	69	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	'etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene)	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	benzene	< 0.05
2,2-Dichloropropane	э	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	methylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	chloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	toluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropene	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	е	< 0.05	1,2,4-Tri	methylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropane	Э	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentano	ne	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	chlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroethan	ne	< 0.05	1,2,3-Tri	chlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-15-4 11/26/19 11/27/19 12/02/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 911412 911412-07 1/6 120207.D GC7 IJL
Surrogates: TCMX	% Recovery: 57	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221 Aroclor 1232 Aroclor 1016 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1262 Aroclor 1268	<0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-15-8 11/26/19 11/27/19 12/02/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 911412 911412-14 1/6 120208.D GC7 IJL
Surrogates: TCMX	% Recovery: 52	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221 Aroclor 1232 Aroclor 1016 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1262 Aroclor 1268	<0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Blank	Client:	Hart Crowser
Date Received:	Not Applicable	Project:	Kosmos, F&BI 911412
Date Extracted:	11/27/19	Lab ID:	09-2904 mb 1/6
Date Analyzed:	12/02/19	Data File:	120204.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL
Surrogates: TCMX	% Recovery: 77	Lower Limit: 23	Upper Limit: 127
	Concentration		
Compounds:	mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 911374-10 (Duplicate)

		Sample	Duplicate	
	Reporting	Result	Result	RPD
Analyte	Units	(Wet Wt)	(Wet Wt)	(Limit 20)
Benzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Toluene	mg/kg (ppm)	< 0.02	< 0.02	nm
Ethylbenzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Xylenes	mg/kg (ppm)	< 0.06	< 0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	mg/kg (ppm)	0.5	95	69-120
Toluene	mg/kg (ppm)	0.5	93	70-117
Ethylbenzene	mg/kg (ppm)	0.5	91	65 - 123
Xylenes	mg/kg (ppm)	1.5	94	66-120
Gasoline	mg/kg (ppm)	20	90	71-131

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 9	911412-01 (Matrix	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	96	96	73-135	0
Laboratory Code: I	Laboratory Contro	ol Sampl	e				
			Percent				
	Reporting	Spike	Recovery	Acceptar	nce		
Analyte	Units	Level	LCS	Criteria	a		
Diesel Extended	mg/kg (ppm)	5,000	102	74-139)		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 911412-01 x5 (Matrix Spike)

			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Arsenic	mg/kg (ppm)	10	<5	87	91	75 - 125	4
Barium	mg/kg (ppm)	50	51.6	$65 \mathrm{b}$	66 b	75 - 125	$2 \mathrm{b}$
Cadmium	mg/kg (ppm)	10	<5	97	101	75 - 125	4
Chromium	mg/kg (ppm)	50	12.5	87	95	75 - 125	9
Lead	mg/kg (ppm)	50	<5	99	104	75 - 125	5
Mercury	mg/kg (ppm	5	<5	89	102	75 - 125	14
Selenium	mg/kg (ppm)	5	<5	83	86	75 - 125	4
Silver	mg/kg (ppm)	10	<5	93	100	75 - 125	7

Laboratory Code: Laboratory Control Sample

Laboratory cot	Percent						
	Reporting	Spike	Recovery	Acceptance			
Analyte	Units	Level	LCS	Criteria			
Arsenic	mg/kg (ppm)	10	88	80-120			
Barium	mg/kg (ppm)	50	100	80-120			
Cadmium	mg/kg (ppm)	10	98	80-120			
Chromium	mg/kg (ppm)	50	99	80-120			
Lead	mg/kg (ppm)	50	105	80-120			
Mercury	mg/kg (ppm)	5	93	80-120			
Selenium	mg/kg (ppm)	5	95	80-120			
Silver	mg/kg (ppm)	10	99	80-120			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 911423-01 1/5 (Matrix Spike)

Laboratory Couc. 011120	or no (maining	pinc)			
			Sample	Percent	
	Reporting	Spike	Result	Recovery	Acceptance
Analyte	Units	Level	(Wet wt)	MS	Criteria
Naphthalene	mg/kg (ppm)	0.17	< 0.01	81	44-129
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	80	52 - 121
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	81	51 - 123
Fluorene	mg/kg (ppm)	0.17	< 0.01	80	37-137
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	81	34-141
Anthracene	mg/kg (ppm)	0.17	< 0.01	82	32 - 124
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	90	16-160
Pyrene	mg/kg (ppm)	0.17	< 0.01	72	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	88	23 - 144
Chrysene	mg/kg (ppm)	0.17	< 0.01	83	32 - 149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	75	23 - 176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	77	42 - 139
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	74	21 - 163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	65	23 - 170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	64	31 - 146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	60	37 - 133

Laboratory Code: Laboratory Control Sample 1/5

		-p	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	89	90	58-121	1
Acenaphthylene	mg/kg (ppm)	0.17	87	87	54 - 121	0
Acenaphthene	mg/kg (ppm)	0.17	88	92	54 - 123	4
Fluorene	mg/kg (ppm)	0.17	87	91	56 - 127	4
Phenanthrene	mg/kg (ppm)	0.17	92	94	55 - 122	2
Anthracene	mg/kg (ppm)	0.17	91	91	50 - 120	0
Fluoranthene	mg/kg (ppm)	0.17	89	93	54 - 129	4
Pyrene	mg/kg (ppm)	0.17	82	84	53 - 127	2
Benz(a)anthracene	mg/kg (ppm)	0.17	94	98	51 - 115	4
Chrysene	mg/kg (ppm)	0.17	96	99	55 - 129	3
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	83	90	56 - 123	8
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	89	93	54 - 131	4
Benzo(a)pyrene	mg/kg (ppm)	0.17	75	78	51 - 118	4
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	78	70	49-148	11
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	83	75	50 - 141	10
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	81	73	52 - 131	10

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 911415-05 (Matrix Spike)

e x	1 /		Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	< 0.5	29	21	10-142	32 vo
Chloromethane	mg/kg (ppm)	2.5	< 0.5	55	45	10-126	20
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	59	49	10-138	19
Bromomethane	mg/kg (ppm)	2.5	<0.5	76	64	10-163	17
Trichlorofluoromothene	mg/kg (ppm)	2.0	<0.5	10	59	10-176	10
Acetone	mg/kg (ppm)	12.5	<0.5	95	87	10-163	9
1,1-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	85	74	10-160	14
Hexane	mg/kg (ppm)	2.5	< 0.25	65	54	10-137	18
Methylene chloride	mg/kg (ppm)	2.5	< 0.5	100	91	10-156	9
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	< 0.05	93	83	21-145	11
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	84	77	14-137	9
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	87	79	19-140	10
2,2-Dichloropropane	mg/kg (ppm)	2.0	<0.05	81	70	10-108	12
Chloroform	mg/kg (ppm)	2.5	<0.05	86	79	21.145	8
2-Butanone (MEK)	mg/kg (ppm)	12.5	<0.5	91	86	19-147	6
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	< 0.05	88	80	12-160	10
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	< 0.05	88	78	10-156	12
1,1-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	83	77	17-140	7
Carbon tetrachloride	mg/kg (ppm)	2.5	< 0.05	90	80	9-164	12
Benzene	mg/kg (ppm)	2.5	< 0.03	84	77	29-129	9
Trichloroethene	mg/kg (ppm)	2.5	<0.02	84	77	21-139	9
1,2-Dichloropropane Bromodichloromothano	mg/kg (ppm)	2.0	< 0.05	87	80	30-135	8
Dibromomethane	mg/kg (ppm)	2.5	<0.05	89	80	23-145	11
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	<0.5	94	86	24-155	9
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	96	89	28-144	8
Toluene	mg/kg (ppm)	2.5	< 0.05	84	77	35-130	9
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	93	88	26-149	6
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	< 0.05	87	81	10-205	7
2-Hexanone	mg/kg (ppm)	12.5	<0.5	87	81	15-166	7
1,3-Dichloropropane	mg/kg (ppm)	2.5	<0.05	84	79	31-137	6
Dibromochloromethane	mg/kg (ppm)	2.5	<0.025	94	86	28-150	9
1.2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	<0.05	84	77	28-142	9
Chlorobenzene	mg/kg (ppm)	2.5	< 0.05	83	78	32-129	6
Ethylbenzene	mg/kg (ppm)	2.5	< 0.05	83	77	32-137	7
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	93	85	31-143	9
m,p-Xylene	mg/kg (ppm)	5	<0.1	85	78	34-136	9
o-Xylene	mg/kg (ppm)	2.5	<0.05	86	79	33-134	8
Styrene	mg/kg (ppm)	2.0	<0.05	80	80 70	30-137 21 179	10
Bromoform	mg/kg (ppm)	2.5	<0.05	103	95	21-156	8
n-Propylbenzene	mg/kg (ppm)	2.5	< 0.05	82	78	23-146	5
Bromobenzene	mg/kg (ppm)	2.5	< 0.05	82	77	34-130	6
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	83	78	18-149	6
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	85	80	28-140	6
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	<0.05	81	79	25-144	2
2-Chiorotoluene	mg/kg (ppm)	2.0	< 0.05	81	76	31-134 91 196	5
tert-Butylbenzene	mg/kg (ppm)	2.5	<0.05	81	76	30-137	6
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	82	77	10-182	ĕ
sec-Butylbenzene	mg/kg (ppm)	2.5	< 0.05	82	77	23 - 145	6
p-Isopropyltoluene	mg/kg (ppm)	2.5	< 0.05	82	76	21-149	8
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	81	76	30-131	6
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	79	76	29-129	4
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	81	77	31-132	57
1.2.4.Trichlorohenzene	mg/kg (ppm)	2.0 2.5	<0.0	90 80	01 89	11-101 99,149	1 8
Hexachlorobutadiene	mg/kg (nnm)	2.5	<0.25	83	76	10-142	9
Naphthalene	mg/kg (ppm)	2.5	< 0.05	94	87	14-157	8
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	83	76	20-144	9

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

	-		Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	65	10-146
Chloromethane	mg/kg (ppm)	2.5	85	27-133
Vinyl chloride	mg/kg (ppm)	2.5	91	22-139
Bromomethane	mg/kg (ppm)	2.5	102	38-114
Trichlorofluoromothono	mg/kg (ppm)	2.0	98	9-163
Acetone	mg/kg (ppiii)	12.5	101	52-141
1.1-Dichloroethene	mg/kg (ppm)	2.5	112	47-128
Hexane	mg/kg (ppm)	2.5	96	43-142
Methylene chloride	mg/kg (ppm)	2.5	101	42-132
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	108	60-123
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	106	67-129
1,1-Dichloroethane	mg/kg (ppm)	2.5	106	68-115
2,2-Dichloropropane	mg/kg (ppm)	2.5	103	52-170 79-197
Chloroform	mg/kg (ppm)	2.5	105	66.120
2-Butanone (MEK)	mg/kg (ppm)	12.5	105	72-127
1.2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	106	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	109	62-131
1,1-Dichloropropene	mg/kg (ppm)	2.5	106	69-128
Carbon tetrachloride	mg/kg (ppm)	2.5	111	60-139
Benzene	mg/kg (ppm)	2.5	103	68-114
Trichloroethene	mg/kg (ppm)	2.5	107	64-117
1,2-Dichloropropane	mg/kg (ppm)	2.5	106	72-127
Dibromomethane	mg/kg (ppm)	2.0	115	72-130
4-Mothyl-2-pontanono	mg/kg (ppm)	2.5 12.5	107	45-145
cis-1.3-Dichloropropene	mg/kg (ppm)	2.5	119	75-136
Toluene	mg/kg (ppm)	2.5	105	66-126
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	120	72-132
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	108	75-113
2-Hexanone	mg/kg (ppm)	12.5	106	33-152
1,3-Dichloropropane	mg/kg (ppm)	2.5	107	72-130
Tetrachloroethene	mg/kg (ppm)	2.5	103	72-114
1.2 Dibromochioromethane (FDB)	mg/kg (ppm)	2.0	113	74-120
Chlorobenzene	mg/kg (ppm)	2.5	105	76-111
Ethylbenzene	mg/kg (ppm)	2.5	105	64-123
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	115	69-135
m,p-Xylene	mg/kg (ppm)	5	106	78-122
o-Xylene	mg/kg (ppm)	2.5	106	77-124
Styrene	mg/kg (ppm)	2.5	108	74-126
Isopropylbenzene	mg/kg (ppm)	2.5	108	76-127
Bromotorm	mg/kg (ppm)	2.5	123	56-132 74 194
Bromohenzene	mg/kg (ppm)	2.5	106	74-124
1.3.5-Trimethylbenzene	mg/kg (ppm)	2.5	108	76-126
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	105	56-143
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	105	61-137
2-Chlorotoluene	mg/kg (ppm)	2.5	104	74-121
4-Chlorotoluene	mg/kg (ppm)	2.5	104	75-122
tert-Butylbenzene	mg/kg (ppm)	2.5	108	73-130
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	106	76-125
sec-Butylbenzene p-Isopropyltoluono	mg/kg (ppm)	2.0	107	71-130
1.3-Dichlorobenzene	mg/kg (nnm)	2.5	104	75-121
1.4-Dichlorobenzene	mg/kg (nnm)	2.5	104	74-117
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	107	76-121
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	119	58-138
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	115	64-135
Hexachlorobutadiene	mg/kg (ppm)	2.5	112	50 - 153
Naphthalene	mg/kg (ppm)	2.5	119	63-140
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	110	63-138

ENVIRONMENTAL CHEMISTS

Date of Report: 12/05/19 Date Received: 11/26/19 Project: Kosmos, F&BI 911412

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 911396-02 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Result (Wet Wt)	Recovery MS	Control Limits
Aroclor 1016	mg/kg (ppm)	0.25	< 0.02	86	30-123
Aroclor 1260	mg/kg (ppm)	0.25	0.046	93	26 - 131
Laboratory Code:	Laboratory Control	Sample 1/6			

			Percent	Percent		
	Reporting	Spike Level	Recovery	Recovery	Acceptance	RPD
Analyte	Units		LCS	LCSD	Criteria	(Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	82	80	55 - 137	2
Aroclor 1260	mg/kg (ppm)	0.25	81	83	51 - 150	2

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Ph. (206) 285-8282	Seattle, WA 98119-2029	2019 16h Annue Wast	3 × - - - - - - - - - - - - - - - - - - -	TP-15-1	TP-15-6	17-15-4	TP-14-10	10-14-5	TP-14-2.5	TP-13-9	TP-13-5	TP-13-2.5	77-12-1055	Sample ID		Phone 2010 954 Er	City, State, ZIP_SPAL	Address 3131 511	Company HOLA Cro	Report To Angie C	9119
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Ph. (206) 285-8282 Received by:	3012 16 th Avenue West Received by VOILE TILUUMYS Seattle, WA 98119-2029 Relinquished by:	Friedman & Bruva. Inc. Relinquished by: 1.15 N.	TP-15-8 14 A.E 174	18-2-10.5 13 132	TP-2-8 18 13	TP-2-4 11 13:	TP-15-14 10 A-E 11/200/19/19/19	Sample ID Lab ID Date Ti Sampled Sam		Phone 206 954- Email Angi e coodwin Pr	City, State, ZIP Seattle, WA RI	Address 3131 Elligt PK	COMPANY HartMousser	Report To Angie Goodwin	SAM
Sa	PSHAT THORE FIG	A PRINT WAME COMPA					50 (SN) 1 5 X X X 1 1 (N) 00	Image: Second state Image: Second sta	ANALYSES REGITE	oject specific RLs? - Yes / No	SMARKS INVOICE TO	Kosmos	ROJECT NAME 0 PO #	MPLENS Gignaugre Munth	IPLE CHAIN OF CUSTODY ME 1/24_1
nples received at 400	118] bullow [NY DATE TIME	eddul (B					Notes	GHIS	Other Default: Dispose after 30 days	SAMPLE DISPOSAL	Rush charges authorized by;	1 Standard turnaround	Page # _ C of _	101/10 b)

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 30, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the additional results from the testing of material submitted on December 5, 2019 from the Kosmos 19499-00, F&BI 912095 project. There are 30 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Hart Crowser A/P (HCR), Andrew Kaparos HCR1230R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 5, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos 19499-00, F&BI 912095 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	Hart Crowser
912095 -01	TP-5-2.5
912095 -02	TP-5-5
912095 -03	TP-5-8
912095 -04	TP-5-10
912095 -05	TP-5-12
912095 -06	TP-5-15
912095 -07	TP-5-19
912095 -08	TP-3-8
912095 -09	TP-3-12
912095 -10	TP-3-15
912095 -11	TP-3-20
912095 -12	D-2
912095 -13	U-1
912095 -14	D-1
912095 -15	SP1-1
912095 -16	SP1-3
912095 -17	SP1-4
912095 -18	SP1-2
912095 -19	SP2-1
912095 -20	SP1-5
912095 -21	SP2-2
912095 -22	SP2-5
912095 -23	SP2-4
912095 -24	SP2-3

A 6020B internal standard failed the acceptance criteria for samples TP-5-8, TP-5-10, and TP-3-8. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported.

The NWTPH-Gx/8021B, NWTPH-Dx, 8270D SIM and 8260C analyses were requested outside of the holding time. The data were flagged accordingly.

The 8260C matrix spike and matrix spike duplicate failed the relative percent difference for acetone and 2-butanone. The analytes were not detected in the samples therefore the data were acceptable.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095 Date Extracted: 12/23/19 Date Analyzed: 12/23/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	Gasoline Range	Surrogate (<u>% Recovery</u>) (Limit 58-139)
TP-5-8 ht 912095-03	160	ip
TP-5-10 ht 912095-04 1/10	930	117
TP-5-19 ht 912095-07	<5	85
TP-3-8 ht 912095-08	<5	87
Method Blank ^{09-2939 MB}	<5	87

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095 Date Extracted: 12/23/19 Date Analyzed: 12/23/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-132)
TP-3-12 ht 912095-09	<0.02	< 0.02	< 0.02	<0.06	<5	78
Method Blank 09-2939 MB	< 0.02	< 0.02	< 0.02	< 0.06	<5	77

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095 Date Extracted: 12/20/19 Date Analyzed: 12/20/19 and 12/23/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

Surrogata

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	Motor Oil Range (C25-C36)	<u>(% Recovery)</u> (Limit 56-165)
TP-5-5 ht 912095-02	<50	<250	81
TP-5-8 ht 912095-03	560 x	650	85
TP-5-10 ht 912095-04	610 x	1,600	84
TP-5-12 ht 912095-05	<50	<250	80
TP-5-15 ht 912095-06	<50	<250	80
TP-5-19 ht 912095-07	<50	<250	80
TP-3-8 ht 912095-08	<50	<250	79
TP-3-12 ht 912095-09	<50	<250	80
TP-3-20 ht 912095-11	<50	<250	80
Method Blank ^{09-3091 MB}	<50	<250	88

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-5-8 12/05/19 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-03 912095-03.090 ICPMS2 SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.05		
Barium	104		
Cadmium	<1		
Chromium	$14.8 \mathrm{J}$		
Lead	11.0		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	TP-5-8	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/20/19	Lab ID:	912095-03 x5
Date Analyzed:	12/23/19	Data File:	912095-03 x5.149
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte	Concentration mg/kg (ppm)		
Thirdly be.	ing, ng (ppin)		
Chromium	19.5		

19.5

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	TP-5-10 12/05/19 12/20/19 12/20/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-04 912095-04.091 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.72		
Barium	73.3		
Cadmium	<1		
Chromium	$11.6 \mathrm{J}$		
Lead	15.8		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	TP-5-10	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/20/19	Lab ID:	912095-04 x5
Date Analyzed:	12/23/19	Data File:	912095-04 x5.150
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	15.4		

15.4

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-3-8 12/05/19 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-08 912095-08.092 ICPMS2 SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.02		
Barium	49.1		
Cadmium	<1		
Chromium	$10.7 \mathrm{~J}$		
Lead	1.96		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	TP-3-8	Client:	Hart Crowser
Date Received:	12/05/19	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/20/19	Lab ID:	912095-08 x5
Date Analyzed:	12/23/19	Data File:	912095-08 x5.151
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	14.0		

10

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	Method Blank NA 12/20/19 12/20/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos 19499-00, F&BI 912095 I9-819 mb2 I9-819 mb2.036 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-5-10 ht 12/05/19 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-04 1/5 122009.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 101 124	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration		
Compounds.		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		0.020		
Fluorene		0.064		
Phenanthrene		0.10		
Anthracene		< 0.01		
Fluoranthene		0.011		
Pyrene		0.022		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranther	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyre	ene	< 0.01		
Dibenz(a,h)anthrace	ene	< 0.01		
Benzo(g,h,i)perylene	е	< 0.01		

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-5-19 ht 12/05/19 12/20/19 12/20/19 Soil mg/kg (ppm)) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-07 1/5 122010.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	ə-d12	% Recovery: 102 119	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranther	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyre	ene	< 0.01		
Dibenz(a,h)anthrace	ene	< 0.01		
Benzo(g,h,i)perylene	е	< 0.01		

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blan Not Applicab 12/20/19 12/20/19 Soil mg/kg (ppm)	k le Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 09-3070 mb2 1/5 122007.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 100 115	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:	(Concentration mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranther	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyre	ene	< 0.01		
Dibenz(a,h)anthrace	ene	< 0.01		
Benzo(g,h,i)perylene	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	TP-5-8 ht		Client:	Hart Crowser	
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&	BI 912095
Date Extracted:	12/23/19		Lab ID:	912095-03	
Date Analyzed:	12/24/19		Data File:	122440.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppn	n) Drv Weight	Operator:	MS	
	88	-, = -,8	-		
~			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	103	50	150	
Toluene-d8		110	50	150	
4-Bromofluorobenze	ene	111	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene		< 0.05
Methylene chloride		$0.68 \mathrm{lc}$	Stvrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropylbenzene <(< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromoform		< 0.05
1,1-Dichloroethane		< 0.05	n-Propylbenzene		0.075
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-Tetrachloroethane <		< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tr	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	е	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	0.083
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	е	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	TP-5-10 ht		Client:	Hart Crowser	
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&	2BI 912095
Date Extracted:	12/23/19		Lab ID:	912095-04	
Date Analyzed:	12/27/19		Data File:	122660.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppm) Drv Weight	Operator:	MS	
	88 (FF				
a			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	102	62	145	
Toluene-d8		99	55	145	
4-Bromofluorobenze	ene	97	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobenzene		< 0.05
Trichlorofluoromethane		< 0.5	Ethylbenzene		0.11
Acetone		< 0.5	1,1,1,2-Tetrachloroethane		< 0.05
1,1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		0.25	o-Xylene		< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropylbenzene		0.36
trans-1.2-Dichloroe	thene	< 0.05	Bromoform		< 0.05
1,1-Dichloroethane		< 0.05	n-Propylbenzene		0.52
2.2-Dichloropropan	e	< 0.05	Bromobenzene		< 0.05
cis-1.2-Dichloroethe	ene	< 0.05	1 3 5-Trimethylbenzene		< 0.05
Chloroform		< 0.05	1 1 2 2-Tetrachloroethane		< 0.05
2-Butanone (MEK)		< 0.5	1 2 3-Trichloropropane		< 0.05
1.2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1.1.1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1.1-Dichloropropen	e	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1.2.4-Tr	imethylbenzene	0.061
Benzene		< 0.03	sec-Buty	zlbenzene	0.19
Trichloroethene		< 0.02	p-Isopro	pyltoluene	0.067
1.2-Dichloropropan	e	< 0.05	1.3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1.4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1.2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	me	<0.5	1,2-Dibr	omo-3-chloropropane	<0.5
cis-1.3-Dichloroprou	bene	< 0.05	1.2.4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1.3-Dichloron	ropene	< 0.05	Naphtha	alene	0.079
1.1.2-Trichloroetha	ne	< 0.05	1.2.3-Tr	ichlorobenzene	< 0.25
2-Hexanone		<0.5	_,_,_ 1		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	TP-5-19 ht		Client:	Hart Crowser	
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&	BI 912095
Date Extracted:	12/23/19		Lab ID:	912095-07	
Date Analyzed:	12/24/19		Data File:	122441.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppm) Drv Weight	Operator:	MS	
	8 8 4 1	, ,			
~			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	104	50	150	
Toluene-d8		108	50	150	
4-Bromofluorobenz	ene	109	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene		< 0.05
Methylene chloride		< 0.5	Stvrene <		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropylbenzene <0		< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromoform <		< 0.05
1,1-Dichloroethane		< 0.05	n-Propylbenzene <0		< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-Tetrachloroethane <(< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tr	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	е	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tr	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropror	oene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	TP-3-8 ht		Client:	Hart Crowser	
Date Received:	12/05/19		Project:	Kosmos 19499-00, F&	BI 912095
Date Extracted:	12/23/19		Lab ID:	912095-08	
Date Analyzed:	12/24/19		Data File:	122442.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppm	n) Dry Weight	Operator:	MS	
	0 0 11	/ / 8	- -		
a i			Lower	Upper	
Surrogates:	1.4	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane-	·d4	102	50	150	
Toluene-d8		107	50	150	
4-Bromofluorobenze	ene	108	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xylene		< 0.05
Methylene chloride		$0.53 \mathrm{lc}$	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropylbenzene		< 0.05
trans-1.2-Dichloroe	thene	< 0.05	Bromoform		< 0.05
1.1-Dichloroethane		< 0.05	n-Propylbenzene		< 0.05
2,2-Dichloropropan	е	< 0.05	Bromobenzene		< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1.3.5-Trimethylbenzene <		< 0.05
Chloroform		< 0.05	1 1 2 2-Tetrachloroethane <		< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Trichloropropane		< 0.05
1.2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropene	Э	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1.2.4-Tri	imethvlbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pvltoluene	< 0.05
1.2-Dichloropropan	е	< 0.05	1.3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1.4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1.2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentanc	one	< 0.5	1.2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprog	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5	, ,- =		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bl	ank	Client:	Hart Crowser	
Date Received:	Not Applic	able	Project:	Kosmos 19499-00. F&	BI 912095
Date Extracted:	12/23/19		Lab ID:	09-3082 mb	
Date Analyzed:	12/23/19		Data File:	122311.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Drv Weight	Operator:	MS	
0 111001		, 215 (; eight	operatori		
~			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane-	·d4	101	62	145	
Toluene-d8		103	55	145	
4-Bromofluorobenze	ene	93	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene		< 0.05
Methylene chloride		< 0.5	Stvrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropylbenzene <		< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromoform		< 0.05
1,1-Dichloroethane		< 0.05	n-Propylbenzene		< 0.05
2,2-Dichloropropan	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-1	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropene	Э	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	е	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentanc	ne	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2 Trichloroethan	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-5-10 12/05/19 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-04 1/6 122023.D GC7 IJL
Surrogates: TCMX	% Recovery: 54	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-5-19 12/05/19 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912095 912095-07 1/6 122024.D GC7 IJL
Surrogates: TCMX	% Recovery: 62	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		
ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Blank	Client:	Hart Crowser
Date Received:	Not Applicable	Project:	Kosmos 19499-00, F&BI 912095
Date Extracted:	12/20/19	Lab ID:	09-3074 mb3 1/6
Date Analyzed:	12/20/19	Data File:	122022.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL
Surrogates: TCMX	% Recovery: 85	Lower Limit: 23	Upper Limit: 127
	Concentration		
Compounds:	mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912405-01 (Duplicate)

		Sample	Duplicate	
	Reporting	Result	Result	RPD
Analyte	Units	(Wet Wt)	(Wet Wt)	(Limit 20)
Benzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Toluene	mg/kg (ppm)	< 0.02	< 0.02	nm
Ethylbenzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Xylenes	mg/kg (ppm)	< 0.06	< 0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	mg/kg (ppm)	0.5	82	66-121
Toluene	mg/kg (ppm)	0.5	88	72 - 128
Ethylbenzene	mg/kg (ppm)	0.5	90	69 - 132
Xylenes	mg/kg (ppm)	1.5	87	69-131
Gasoline	mg/kg (ppm)	20	95	61 - 153

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912360-02 (Matri	x Spike)	Sample	Porcont	Porcont		
Analyte	Reporting Units	Spike Level	Result (Wet Wt)	Recovery MS	Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	69	90	88	63-146	2
Laboratory Code:	Laboratory Contr	ol Samp	le Percent	-			
	Reporting	Snike	Recover	v Accen	tance		
Analyte	Units	Level	LCS	Crit	eria		
Diesel Extended	mg/kg (ppm)	5,000	88	79-1	144		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 912286-05 x5 (Matrix Spike)

			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Arsenic	mg/kg (ppm)	10	5.41	84	90	75 - 125	7
Barium	mg/kg (ppm)	50	91.1	108	114	75 - 125	5
Cadmium	mg/kg (ppm)	10	8.16	71 b	36 b	75 - 125	$65 \mathrm{b}$
Chromium	mg/kg (ppm)	50	48.1	107	101	75 - 125	6
Lead	mg/kg (ppm)	50	13.6	101	92	75 - 125	9
Mercury	mg/kg (ppm	5	<5	94	102	75 - 125	8
Selenium	mg/kg (ppm)	5	<5	82	80	75 - 125	2
Silver	mg/kg (ppm)	10	<5	89	89	75 - 125	0

Laboratory Code: Laboratory Control Sample

	Percent							
	Reporting	Spike	Recovery	Acceptance				
Analyte	Units	Level	LCS	Criteria				
Arsenic	mg/kg (ppm)	10	89	80-120				
Barium	mg/kg (ppm)	50	99	80-120				
Cadmium	mg/kg (ppm)	10	98	80-120				
Chromium	mg/kg (ppm)	50	91	80-120				
Lead	mg/kg (ppm)	50	105	80-120				
Mercury	mg/kg (ppm)	5	98	80-120				
Selenium	mg/kg (ppm)	5	99	80-120				
Silver	mg/kg (ppm)	10	97	80-120				

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912123-13 1/5 (Matrix Spike)

Baseratory could 01=1=0	10 1/0 (1/1401111 k	pine)			
			Sample	Percent	
	Reporting	Spike	Result	Recovery	Acceptance
Analyte	Units	Level	(Wet wt)	MS	Criteria
Naphthalene	mg/kg (ppm)	0.17	< 0.01	75	44-129
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	75	52 - 121
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	75	51 - 123
Fluorene	mg/kg (ppm)	0.17	< 0.01	80	37 - 137
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	78	34-141
Anthracene	mg/kg (ppm)	0.17	< 0.01	78	32 - 124
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	85	16-160
Pyrene	mg/kg (ppm)	0.17	< 0.01	80	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	84	23 - 144
Chrysene	mg/kg (ppm)	0.17	< 0.01	79	32 - 149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	81	23 - 176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	71	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	76	21 - 163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	78	23 - 170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	73	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	69	37-133

Laboratory Code: Laboratory Control Sample 1/5

0	0	1	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	83	85	58-121	2
Acenaphthylene	mg/kg (ppm)	0.17	84	84	54 - 121	0
Acenaphthene	mg/kg (ppm)	0.17	84	86	54 - 123	2
Fluorene	mg/kg (ppm)	0.17	88	88	56 - 127	0
Phenanthrene	mg/kg (ppm)	0.17	85	86	55 - 122	1
Anthracene	mg/kg (ppm)	0.17	85	86	50 - 120	1
Fluoranthene	mg/kg (ppm)	0.17	91	90	54 - 129	1
Pyrene	mg/kg (ppm)	0.17	87	91	53 - 127	4
Benz(a)anthracene	mg/kg (ppm)	0.17	90	91	51 - 115	1
Chrysene	mg/kg (ppm)	0.17	86	90	55 - 129	5
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	83	81	56 - 123	2
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	74	79	54-131	7
Benzo(a)pyrene	mg/kg (ppm)	0.17	75	75	51 - 118	0
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	79	84	49-148	6
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	77	85	50 - 141	10
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	73	83	52 - 131	13

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912147-01912147-01 (Matrix Spike)

	11 01 (114011	a opino)	Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	21	23	10-56	9
Chloromethane	mg/kg (ppm)	2.5	< 0.5	45	46	10-90	2
Vinyl chloride	mg/kg (ppm)	2.5	< 0.05	39	39	10-91	0
Bromomethane	mg/kg (ppm)	2.5	< 0.5	53	61	10-110	14
Chloroethane	mg/kg (ppm)	2.5	< 0.5	50	50	10-101	0
Trichlorofluoromethane	mg/kg (ppm)	2.5	< 0.5	36	36	10-95	0
Acetone	mg/kg (ppm)	12.5	< 0.5	81	114	11-141	34 vo
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	42	46	22-107	9
Hexane Mathylana ahlavida	mg/kg (ppm)	2.5	<0.25	37 60 h	41 61 b	10-95	10 2 h
Methylene chloride Methyl t-butyl other (MTBF)	mg/kg (ppiii)	2.5	<0.05	76	78	14-120	20
trans-1 2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	64	66	13.112	3
1.1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	75	79	23-115	5
2.2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	63	61	18-117	3
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	73	74	25-120	1
Chloroform	mg/kg (ppm)	2.5	< 0.05	78	82	29-117	5
2-Butanone (MEK)	mg/kg (ppm)	12.5	< 0.5	97	122	20-133	23 vo
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	< 0.05	88	97	22-124	10
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	< 0.05	67	68	27-112	1
1,1-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	72	77	26-107	7
Carbon tetrachloride	mg/kg (ppm)	2.5	< 0.05	64	64	28-126	0
Benzene	mg/kg (ppm)	2.5	< 0.03	74	80	26-114	8
1 P. Disklassen	mg/kg (ppm)	2.5	<0.02	74	81	30-112	9
1,2-Dichloropropane Bromodiabloromothono	mg/kg (ppm)	2.0	<0.05	84	92	31-119 21 121	10
Dibromomothano	mg/kg (ppiii)	2.5	<0.05	75	83	27-124	9 10
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	<0.05	92	100	16-147	8
cis-1.3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	83	94	28-137	12
Toluene	mg/kg (ppm)	2.5	< 0.05	74	79	34-112	7
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	77	89	30-136	14
1,1,2 Trichloroethane	mg/kg (ppm)	2.5	< 0.05	83	91	32-126	9
2-Hexanone	mg/kg (ppm)	12.5	< 0.5	96	110	17-147	14
1,3-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	80	89	29-125	11
Tetrachloroethene	mg/kg (ppm)	2.5	< 0.025	68	72	25 - 114	6
Dibromochloromethane	mg/kg (ppm)	2.5	<0.05	75	79	32-143	5
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	<0.05	78	86	32-126	10
Chiorobenzene Ethulhongono	mg/kg (ppm)	2.0	<0.05	10	82	37-113	9
1 1 1 2 Totrachloroothano	mg/kg (ppm)	2.0	<0.05	76	04 78	04-110 25 196	2
m. Xylene	mg/kg (ppin)	2.5	<0.05	76	80	25-125	5
o-Xvlene	mg/kg (ppm)	2.5	<0.05	77	80	27-126	4
Styrene	mg/kg (ppm)	2.5	< 0.05	80	84	39-121	5
Isopropylbenzene	mg/kg (ppm)	2.5	< 0.05	77	80	34-123	4
Bromoform	mg/kg (ppm)	2.5	< 0.05	80	82	18-155	2
n-Propylbenzene	mg/kg (ppm)	2.5	< 0.05	77	88	31-120	13
Bromobenzene	mg/kg (ppm)	2.5	< 0.05	74	82	40-115	10
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	76	84	24-130	10
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	<0.05	89	98	27-148	10
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	<0.05	86	96	33-123	11
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	78	86	39-110	10
4-Uniorotoluene	mg/kg (ppm)	2.0	<0.05	76	87	39-111 26 116	13
1.2.4.Trimethylbonzono	mg/kg (ppm)	2.5	<0.05	76	83	35-116	9
sec-Butylbenzene	mg/kg (ppm)	2.5	<0.05	78	84	33.118	7
p-Isopropyltoluene	mg/kg (ppm)	2.5	<0.05	76	82	32-119	8
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	74	83	38-111	11
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	75	82	39-109	9
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	76	82	40-111	8
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	< 0.5	87	92	44-112	6
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	76	82	31-121	8
Hexachlorobutadiene	mg/kg (ppm)	2.5	< 0.25	78	80	24-128	3
Naphthalene	mg/kg (ppm)	2.5	< 0.05	79	82	24-139	4
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	78	82	35-117	5

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

	_		Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	61	10-146
Chloromethane	mg/kg (ppm)	2.5	79	27-133
Vinyl chloride	mg/kg (ppm)	2.5	82	22-139
Bromomethane	mg/kg (ppm)	2.5	90	38-114
Chloroethane	mg/kg (ppm)	2.5	104	9-163
Asstance	mg/kg (ppm)	2.5	99	10-196
Acetone 1 1 Dishloroothono	mg/kg (ppm)	12.0	98	02-141 47 198
Hovono	mg/kg (ppm)	2.0	100	47-120
Methylene chloride	mg/kg (ppm)	2.5	113	42-132
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	103	60-123
trans-1.2-Dichloroethene	mg/kg (ppm)	2.5	113	67-129
1.1-Dichloroethane	mg/kg (ppm)	2.5	111	68-115
2,2-Dichloropropane	mg/kg (ppm)	2.5	109	52-170
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	114	72-127
Chloroform	mg/kg (ppm)	2.5	109	66-120
2-Butanone (MEK)	mg/kg (ppm)	12.5	110	72-127
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	116	56 - 135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	111	62-131
1,1-Dichloropropene	mg/kg (ppm)	2.5	112	69-128
Carbon tetrachloride	mg/kg (ppm)	2.5	115	60-139
Benzene	mg/kg (ppm)	2.5	114	68-114
Trichloroethene	mg/kg (ppm)	2.5	110	64-117
1,2-Dichloropropane	mg/kg (ppm)	2.5	118	72-127
Bromodichloromethane	mg/kg (ppm)	2.5	117	72-130
Dibromomethane	mg/kg (ppm)	2.5	115	70-120
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	118	45-145
Teluene	mg/kg (ppm)	2.0	120	75-156 66 196
trong 1.2 Dichloropropono	mg/kg (ppm)	2.0	105	79 129
1 1 2-Trichloroothano	mg/kg (ppm)	2.5	106	72-132
2.Hovenone	mg/kg (ppm)	12.5	100	33,152
1 3-Dichloropropane	mg/kg (ppm)	2.5	102	72-130
Tetrachloroethene	mg/kg (ppm)	2.5	108	72-114
Dibromochloromethane	mg/kg (ppm)	2.5	115	74-125
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	106	74-132
Chlorobenzene	mg/kg (ppm)	2.5	104	76-111
Ethylbenzene	mg/kg (ppm)	2.5	106	64-123
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	105	69-135
m,p-Xylene	mg/kg (ppm)	5	106	78-122
o-Xylene	mg/kg (ppm)	2.5	102	77-124
Styrene	mg/kg (ppm)	2.5	104	74-126
Isopropylbenzene	mg/kg (ppm)	2.5	101	76-127
Bromoform	mg/kg (ppm)	2.5	118	56-132
n-Propylbenzene	mg/kg (ppm)	2.5	108	74-124
1.2.5 Twimethyllogram	mg/kg (ppm)	2.0	108	72-12Z 76 196
1,5,5-1 Fillethyldenzene	mg/kg (ppm)	2.0	107	70-120 56 149
1.2.3-Trichloropropane	mg/kg (ppm)	2.5	105	61.137
2-Chlorotoluene	mg/kg (ppm)	2.5	106	74-121
4-Chlorotoluene	mg/kg (ppm)	2.5	107	75-122
tert-Butylbenzene	mg/kg (ppm)	2.5	107	73-130
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	104	76-125
sec-Butylbenzene	mg/kg (ppm)	2.5	103	71-130
p-Isopropyltoluene	mg/kg (ppm)	2.5	101	70-132
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	103	75-121
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	102	74-117
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	100	76-121
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	96	58-138
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	97	64-135
Hexachlorobutadiene	mg/kg (ppm)	2.5	94	50-153
Naphthalene	mg/kg (ppm)	2.5	92	63-140
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	93	63-138

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/05/19 Project: Kosmos 19499-00, F&BI 912095

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 912340-01 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Result (Wet Wt)	Recovery MS	Control Limits
Aroclor 1016	mg/kg (ppm)	0.25	< 0.02	68	30-123
Aroclor 1260	mg/kg (ppm)	0.25	< 0.02	67	26 - 131

		~	Percent	Percent			
	Reporting	Spike Level	Recovery	Recovery	Acceptance	RPD	
Analyte	Units		LCS	LCSD	Criteria	(Limit 20)	
Aroclor 1016	mg/kg (ppm)	0.25	93	89	55 - 137	4	
Aroclor 1260	mg/kg (ppm)	0.25	93	92	51 - 150	1	

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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Ph. (206) 285-8282	Seattle, WA 98119-2029 Re	3012 16th Avenue West Re	Friedman & Bruya, Inc.								5-205	42-4	502-5	592-2	Sample ID	2549	Phone (206) 954 Email	City, State, ZIP Seattle	Address 3131 2 Mint	company Hart (WWS	Report To Ahail bot	91209
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 30, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin :

Included are the results from the testing of material submitted on December 6, 2019 from the Kosmos 19499-00, F&BI 912126 project. There are 27 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1230R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 6, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos 19499-00, F&BI 912126 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912126 -01	TP-7-2.5
912126 -02	TP-7-5
912126 -03	TP-7-7.5
912126 -04	TP-7-10
912126 -05	TP-7-15
912126 -06	TP-8-3.5
912126 -07	TP-8-6
912126 -08	TP-8-10
912126 -09	TP-8-15
912126 -10	TP-6-5
912126 -11	TP-6-8
912126 -12	TP-6-12

The motor oil range concentration for sample TP-7-2.5 exceeded the calibration range. The data were flagged accordingly.

A 6020B internal standard failed the acceptance criteria for sample TP-8-3.5. The sample was diluted and reanalyzed with acceptable results. Both data sets were reported.

Methylene chloride and acetone were detected in several samples due to laboratory contamination. The data were flagged accordingly.

2-Butanone and 1,2-dibromo-3-chloropropane in the 8260C matrix spike sample and matrix spike duplicate exceeded the acceptance criteria in. The laboratory control samples met the acceptance criteria, therefore the data were likely due to sample matrix effect.

The 8270D SIM sample TP-6-8 was not logged in for analysis. The data will be submitted as an additional report.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912126 Date Extracted: 12/20/19 Date Analyzed: 12/20/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
TP-7-7.5 912126-03 1/5	570	109
TP-7-15 912126-05	<5	86
TP-8-6 912126-07	14	81
TP-8-15 912126-09	<5	84
TP-6-8 912126-11	38	86
Method Blank ^{09-2935 MB}	<5	87

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912126 Date Extracted: 12/20/19 Date Analyzed: 12/20/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 53-144)
TP-7-2.5 912126-01	39,000	26,000 ve	89
TP-7-7.5 912126-03	12,000	3,100 x	80
TP-7-10 912126-04	6,200	1,900 x	81
TP-7-15 912126-05	230	<250	75
TP-8-3.5 912126-06	78 x	570	84
TP-8-6 912126-07	600	1,500	86
TP-8-15 912126-09	<50	<250	84
TP-6-5 912126-10	520 x	1,600	73
TP-6-8 912126-11	1,300 x	3,900	84
TP-6-12 912126-12	<50	<250	74
Method Blank 09-3092 MB	<50	<250	81

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	TP-8-3.5 12/06/19 12/23/19 12/24/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos 19499-00, F&BI 912126 912126-06 912126-06.089 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.79		
Barium	107		
Cadmium	<1		
Chromium	$13.3 \mathrm{J}$		
Lead	12.0		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	TP-8-3.5	Client:	Hart Crowser
Date Received:	12/06/19	Project:	Kosmos 19499-00, F&BI 912126
Date Extracted:	12/23/19	Lab ID:	912126-06
Date Analyzed:	12/23/19	Data File:	912126-06.179
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	13.9		

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ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank NA 12/24/19 12/24/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912126 I9-828 mb I9-828 mb.073 ICPMS2 SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix:	TP-7-7.5 12/06/19 12/20/19 12/20/19 Soil		Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos 19499-00, F&BI 912126 912126-03 1/25 122016.D GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 126 d 143 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		1.7		
Fluorene		4.6		
Phenanthrene		5.1		
Anthracene		< 0.05		
Fluoranthene		< 0.05		
Pyrene		0.36		
Benz(a)anthracene		0.10		
Chrysene		0.23		
Benzo(a)pyrene		<0.05 J		
Benzo(b)fluoranthe	ne	<0.05 J		
Benzo(k)fluoranthe	ne	<0.05 J		
Indeno(1,2,3-cd)pyr	ene	<0.05 J		
Dibenz(a,h)anthrac	ene	<0.05 J		
Benzo(g,h,i)perylene	e	<0.05 J		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-7-7.5 12/06/19 12/20/19 12/24/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912126 912126-03 1/250 122337.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 130 d 120 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration mg/kg (ppm)		
Naphthalene		< 0.5		
Acenaphthylene		< 0.5		
Acenaphthene		1.6		
Fluorene		4.4		
Phenanthrene		5.3		
Anthracene		< 0.5		
Fluoranthene		< 0.5		
Pyrene		< 0.5		
Benz(a)anthracene		< 0.5		
Chrysene		< 0.5		
Benzo(a)pyrene		< 0.5		
Benzo(b)fluoranther	ne	< 0.5		
Benzo(k)fluoranther	ne	< 0.5		
Indeno(1,2,3-cd)pyre	ene	< 0.5		
Dibenz(a,h)anthrace	ene	< 0.5		
Benzo(g,h,i)perylene	е	< 0.5		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-7-15 12/06/19 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, 912126-05 1/5 122011.D GCMS6 VM	F&BI 912126
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 106 132	Lower Limit: 31 24	Upper Limit: 163 168	
Compounds:		Concentration mg/kg (ppm)			
Naphthalene		< 0.01			
Acenaphthylene		< 0.01			
Acenaphthene		< 0.01			
Fluorene		0.013			
Phenanthrene		0.041			
Anthracene		< 0.01			
Fluoranthene		< 0.01			
Pyrene		< 0.01			
Benz(a)anthracene		< 0.01			
Chrysene		< 0.01			
Benzo(a)pyrene		< 0.01			
Benzo(b)fluoranther	ne	< 0.01			
Benzo(k)fluoranther	ne	< 0.01			
Indeno(1,2,3-cd)pyre	ene	< 0.01			
Dibenz(a,h)anthrace	ene	< 0.01			
Benzo(g,h,i)perylene	е	< 0.01			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blan Not Applicab 12/20/19 12/20/19 Soil mg/kg (ppm)	k le Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912126 09-3070 mb2 1/5 122007.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 100 115	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:	(Concentration mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranther	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyre	ene	< 0.01		
Dibenz(a,h)anthrace	ene	< 0.01		
Benzo(g,h,i)perylene	е	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	TP-7-7.5		Client:	Hart Crowser	
Date Received:	12/06/19		Project:	Kosmos 19499-00. F&	BI 912126
Date Extracted:	12/20/19		Lab ID:	912126-03	
Date Analyzed:	12/20/19		Data File:	122025.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppn	n) Dry Weight	Operator:	MS	
	0 0 11	, v 0	- -		
C I		0/ D	Lower	Upper	
Surrogates:	14	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	·d4	104	62	145	
Toluene-d8		104	55	145	
4-Bromofluorobenze	ene	101	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xvlene	9	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Petrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	Э	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	е	< 0.05	1.3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentanc	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropror	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5	, ,- =		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	TP-7-15		Client:	Hart Crowser	
Date Received:	12/06/19		Project:	Kosmos 19499-00, F&	BI 912126
Date Extracted:	12/20/19		Lab ID:	912126-05	
Date Analyzed:	12/20/19		Data File:	122026.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Drv Weight	Operator:	MS	
a			Lower	Upper	
Surrogates:	1.	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	105	62	145	
Toluene-d8		104	55	145	
4-Bromofluorobenze	ene	98	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethvlber	nzene	< 0.05
Acetone		< 0.5	1.1.1.2-7	Tetrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene	9	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	0.14
trans-1.2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	0.27
2.2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-7	Fetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tri	ichloropropane	< 0.05
1.2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1.1.1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1.1-Dichloropropen	e	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1.2.4-Tr	imethvlbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	0.15
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropror	oene	< 0.05	1.2.4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tr	ichlorobenzene	< 0.25
2-Hexanone		<0.5	, ,- = =		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	TP-8-6		Client:	Hart Crowser	
Date Received:	12/06/19		Project:	Kosmos 19499-00, F&	BI 912126
Date Extracted:	12/20/19		Lab ID:	912126-07	
Date Analyzed:	12/20/19		Data File:	122027.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Drv Weight	Operator:	MS	
			-		
~			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	102	62	145	
Toluene-d8		104	55	145	
4-Bromofluorobenze	ene	97	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		0.51 lc	1.1.1.2-7	Tetrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene	9	< 0.05
Methylene chloride		< 0.5	Stvrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tr	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	е	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tr	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	е	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	TP-8-15		Client:	Hart Crowser	
Date Received:	12/06/19		Project:	Kosmos 19499-00, F&	&BI 912126
Date Extracted:	12/20/19		Lab ID:	912126-09	
Date Analyzed:	12/20/19		Data File:	122038.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppn	n) Dry Weight	Operator:	MS	
	8 8 TF	, , ,			
C .			Lower	Upper	
Surrogates:	1.4	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane-	d4	99	50	150	
Toluene-d8		109	50	150	
4-Bromofluorobenze	ene	107	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-1	'etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	•	< 0.05
Methylene chloride		0.54 lc ca	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propyl	benzene	< 0.05
2,2-Dichloropropane	э	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	methylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-T	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	chloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	toluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	toluene	< 0.05
1,1-Dichloropropene	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	e	< 0.05	1,2,4-Tri	methylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropane	э	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentano	ne	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	chlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	chlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	TP-6-8		Client:	Hart Crowser	
Date Received:	12/06/19		Project:	Kosmos 19499-00, F&	BI 912126
Date Extracted:	12/20/19		Lab ID:	912126-11	
Date Analyzed:	12/20/19		Data File:	122039.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppn	n) Drv Weight	Operator:	MS	
			-		
~			Lower	Upper	
Surrogates:	•	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	102	50	150	
Toluene-d8		108	50	150	
4-Bromofluorobenze	ene	109	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	9	< 0.05
Methylene chloride		1.1 lc ca	Stvrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tr	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	е	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tr	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropror	oene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bl	ank	Client:	Hart Crowser	
Date Received:	Not Applic	able	Project:	Kosmos 19499-00. F&	BI 912126
Date Extracted:	12/20/19		Lab ID:	09-3078 mb	
Date Analyzed:	12/20/19		Data File:	122012.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppr	n) Dry Weight	Operator:	MS	
0 111001		, 215 (Congress)	operatori		
~			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	·d4	100	50	150	
Toluene-d8		104	50	150	
4-Bromofluorobenze	ene	104	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	9	< 0.05
Methylene chloride		< 0.5	Stvrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2.2-Dichloropropan	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tr	ichloropropane	< 0.05
1.2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1.1-Dichloropropen	9	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1.2.4-Tr	imethvlbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	е	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentanc	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-7-7.5 12/06/19 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912126 912126-03 1/60 122025.D GC7 IJL
Surrogates: TCMX	% Recovery: 56	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221	< 0.2		
Aroclor 1232	< 0.2		
Aroclor 1016	< 0.2		
Aroclor 1242	< 0.2		
Aroclor 1248	< 0.2		
Aroclor 1254	< 0.2		
Aroclor 1260	< 0.2		
Aroclor 1262	< 0.2		
Aroclor 1268	< 0.2		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	TP-6-8 12/06/19 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos 19499-00, F&BI 912126 912126-11 1/60 122026.D GC7 IJL
Surrogates: TCMX	% Recovery: 63	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221	< 0.2		
Aroclor 1232	< 0.2		
Aroclor 1016	< 0.2		
Aroclor 1242	< 0.2		
Aroclor 1248	< 0.2		
Aroclor 1254	< 0.2		
Aroclor 1260	< 0.2		
Aroclor 1262	< 0.2		
Aroclor 1268	< 0.2		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Blank	Client:	Hart Crowser
Date Received:	Not Applicable	Project:	Kosmos 19499-00, F&BI 912126
Date Extracted:	12/20/19	Lab ID:	09-3074 mb3 1/6
Date Analyzed:	12/20/19	Data File:	122022.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL
Surrogates: TCMX	% Recovery: 85	Lower Limit: 23	Upper Limit: 127
	Concentration		
Compounds:	mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912126

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code:	912358-01 (Duplic	eate)			
		Samp	le Du	plicate	
	Reporting	Resu	lt F	Result	RPD
Analyte	Units	(Wet V	Vt) (W	Vet Wt)	(Limit 20)
Gasoline	mg/kg (ppm)	11		12	9
Laboratory Code:	Laboratory Contro	ol Sample	e		
			Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	_
Gasoline	mg/kg (ppm)	$\overline{20}$	80	71-131	

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912126

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912361-05 (Matri	x Spike)						
			Sample	Percent	Percent			
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD	
Analyte	Units	Level	(Wet Wt)	\mathbf{MS}	MSD	Criteria	(Limit 20)	
Diesel Extended	mg/kg (ppm)	5,000	<50	86	92	64-133	7	
Laboratory Code:	Laboratory Code: Laboratory Control Sample							
			Percent	5				
	Reporting	Spike	Recover	y Accep	tance			
Analyte	Units	Level	LCS	Crite	eria			
Diesel Extended	mg/kg (ppm)	5.000	98	58-1	147			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912126

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 912404-01 (Matrix Spike)

		Sample	Percent	Percent		
Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
mg/kg (ppm)	10	1.51	85	94	75 - 125	10
mg/kg (ppm)	50	29.8	98	108	75 - 125	10
mg/kg (ppm)	10	<1	92	102	75 - 125	10
mg/kg (ppm)	50	11.4	77	83	75 - 125	7
mg/kg (ppm)	50	3.29	93	102	75 - 125	9
mg/kg (ppm	5	<1	94	108	75 - 125	14
mg/kg (ppm)	5	<1	92	104	75 - 125	12
mg/kg (ppm)	10	<1	94	104	75 - 125	10
	Reporting Units mg/kg (ppm) mg/kg (ppm) mg/kg (ppm) mg/kg (ppm) mg/kg (ppm) mg/kg (ppm) mg/kg (ppm) mg/kg (ppm)	Reporting UnitsSpike Levelmg/kg (ppm)10mg/kg (ppm)50mg/kg (ppm)10mg/kg (ppm)50mg/kg (ppm)50mg/kg (ppm)5mg/kg (ppm)5mg/kg (ppm)10	Reporting Spike Result Units Level (Wet wt) mg/kg (ppm) 10 1.51 mg/kg (ppm) 50 29.8 mg/kg (ppm) 10 <1	Reporting Units Spike Level Result (Wet wt) Percent Recovery mg/kg (ppm) 10 1.51 85 mg/kg (ppm) 10 1.51 85 mg/kg (ppm) 50 29.8 98 mg/kg (ppm) 10 <1	Reporting Units Spike Level Result (Wet wt) Percent Recovery MS Percent Recovery mg/kg (ppm) 10 1.51 85 94 mg/kg (ppm) 50 29.8 98 108 mg/kg (ppm) 10 <1	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

Laboratory Code: Laboratory Control Sample

, i i i i i i i i i i i i i i i i i i i	Deventing	Percent				
	Reporting	Бріке	Recovery	Acceptance		
Analyte	Units	Level	LCS	Criteria		
Arsenic	mg/kg (ppm)	10	100	80-120		
Barium	mg/kg (ppm)	50	109	80-120		
Cadmium	mg/kg (ppm)	10	108	80-120		
Chromium	mg/kg (ppm)	50	105	80-120		
Lead	mg/kg (ppm)	50	113	80-120		
Mercury	mg/kg (ppm)	5	80	80-120		
Selenium	mg/kg (ppm)	5	111	80-120		
Silver	mg/kg (ppm)	10	114	80-120		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912126

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912123-13 1/5 (Matrix Spike)

habilatory code: bibilo is its (matrix spine)						
			Sample	Percent		
	Reporting	Spike	Result	Recovery	Acceptance	
Analyte	Units	Level	(Wet wt)	MS	Criteria	
Naphthalene	mg/kg (ppm)	0.17	< 0.01	75	44-129	
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	75	52 - 121	
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	75	51 - 123	
Fluorene	mg/kg (ppm)	0.17	< 0.01	80	37 - 137	
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	78	34-141	
Anthracene	mg/kg (ppm)	0.17	< 0.01	78	32 - 124	
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	85	16-160	
Pyrene	mg/kg (ppm)	0.17	< 0.01	80	10-180	
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	84	23 - 144	
Chrysene	mg/kg (ppm)	0.17	< 0.01	79	32 - 149	
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	81	23 - 176	
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	71	42-139	
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	76	21 - 163	
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	78	23 - 170	
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	73	31-146	
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	69	37 - 133	

Laboratory Code: Laboratory Control Sample 1/5

		-p	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	83	85	58 - 121	2
Acenaphthylene	mg/kg (ppm)	0.17	84	84	54 - 121	0
Acenaphthene	mg/kg (ppm)	0.17	84	86	54 - 123	2
Fluorene	mg/kg (ppm)	0.17	88	88	56 - 127	0
Phenanthrene	mg/kg (ppm)	0.17	85	86	55 - 122	1
Anthracene	mg/kg (ppm)	0.17	85	86	50 - 120	1
Fluoranthene	mg/kg (ppm)	0.17	91	90	54 - 129	1
Pyrene	mg/kg (ppm)	0.17	87	91	53 - 127	4
Benz(a)anthracene	mg/kg (ppm)	0.17	90	91	51 - 115	1
Chrysene	mg/kg (ppm)	0.17	86	90	55 - 129	5
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	83	81	56 - 123	2
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	74	79	54 - 131	7
Benzo(a)pyrene	mg/kg (ppm)	0.17	75	75	51 - 118	0
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	79	84	49-148	6
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	77	85	50 - 141	10
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	73	83	52 - 131	13
ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912126

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912312-21 (Matrix Spike)

, v	1 /		Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	< 0.5	34	32	10-56	6
Chloromethane	mg/kg (ppm)	2.5	< 0.5	66	62	10-90	6
Vinyl chloride	mg/kg (ppm)	2.5	< 0.05	60	55	10-91	9
Bromomethane	mg/kg (ppm)	2.5	< 0.5	70	80	10-110	13
Chloroethane	mg/kg (ppm)	2.5	< 0.5	72	61	10-101	17
Trichlorofluoromethane	mg/kg (ppm)	2.5	<0.5	55	48	10-95	14
Acetone	mg/kg (ppm)	12.5	<0.5	104	135	11-141	26 V0
I, I-Dichloroethene	mg/kg (ppm)	2.0	<0.05	62	51	22-107	2
Methylene chloride	mg/kg (ppm)	2.5	<0.20	82	90	14-128	9
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	< 0.05	86	90	17-134	5
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	80	80	13-112	0
1,1-Dichloroethane	mg/kg (ppm)	2.5	< 0.05	94	96	23-115	2
2,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	56	50	18-117	11
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	85	87	25-120	2
Chloroform	mg/kg (ppm)	2.5	< 0.05	92	95	29-117	3
2-Butanone (MEK)	mg/kg (ppm)	12.5	<0.5	117	137 vo	20-133	16
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	109	114	22-124	4
1,1,1-1richloroethane	mg/kg (ppm)	2.0	<0.05	84	80	Z7-11Z 26.107	0 1
Carbon totrachlorida	mg/kg (ppm)	2.0	<0.05	95 80	96 77	26-107	1
Benzene	mg/kg (ppm)	2.5	<0.03	92	94	26-114	2
Trichloroethene	mg/kg (ppm)	2.5	< 0.02	106	110	30-112	4
1,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	106	106	31-119	0
Bromodichloromethane	mg/kg (ppm)	2.5	< 0.05	101	102	31-131	1
Dibromomethane	mg/kg (ppm)	2.5	< 0.05	96	95	27-124	1
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	< 0.5	117	115	16-147	2
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	95	98	28-137	3
Toluene	mg/kg (ppm)	2.5	<0.05	91	92	34-112	1
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	89	95 105	30-136	7
2-Hevenone	mg/kg (ppm)	2.5 12.5	<0.05	103	105	17.147	2
1 3-Dichloropropane	mg/kg (ppm)	2.5	<0.0	100	104	29-125	4
Tetrachloroethene	mg/kg (ppm)	2.5	< 0.025	82	83	25-114	1
Dibromochloromethane	mg/kg (ppm)	2.5	< 0.05	86	89	32-143	3
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	< 0.05	99	100	32-126	1
Chlorobenzene	mg/kg (ppm)	2.5	< 0.05	89	92	37-113	3
Ethylbenzene	mg/kg (ppm)	2.5	< 0.05	92	94	34 - 115	2
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	88	84	35-126	5
m,p-Aylene	mg/kg (ppm)	5	<0.1	89	90	25-125	1
0-Aylene Sturrono	mg/kg (ppm)	2.0	<0.05	90	90	27-120	0
Isopropylhenzene	mg/kg (ppm)	2.5	<0.05	91	89	34-123	2
Bromoform	mg/kg (ppm)	2.5	<0.05	87	89	18-155	2
n-Propylbenzene	mg/kg (ppm)	2.5	< 0.05	95	96	31-120	1
Bromobenzene	mg/kg (ppm)	2.5	< 0.05	90	93	40-115	3
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	93	92	24-130	1
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	93	91	27-148	2
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	<0.05	113	114	33-123	1
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	95	96	39-110	1
4-Chiorotoituene tort-Butylhonzono	mg/kg (ppm)	2.0	<0.05	94	90	36-111 36-116	1 9
1.2.4.Trimethylbenzene	mg/kg (ppiii)	2.5	<0.05	92	92	35-116	0
sec-Butylbenzene	mg/kg (ppm)	2.5	<0.05	95	93	33-118	2
p-Isopropyltoluene	mg/kg (ppm)	2.5	< 0.05	92	90	32-119	2
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	89	91	38-111	2
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	90	90	39-109	0
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	91	91	40-111	0
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	< 0.5	113 vo	104	44-112	8
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	<0.25	95	89	31-121	7
nexachiorobutadiene	mg/kg (ppm)	2.5	<0.25	93	83	24-128	11
1.2.3.Trichlorohonzono	mg/kg (ppm)	4.0 9 ⊑	<0.00 <0.95	111	99	24-159 35,117	11
1,2,0-1110110100ell2elle	mg/wg (hhm)	4.0	~0.40	104	50	00-117	11

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912126

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

	_		Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	54	10-76
Chloromethane	mg/kg (ppm)	2.5	76	34-98
Vinyl chloride	mg/kg (ppm)	2.5	71	42-107
Bromomethane	mg/kg (ppm)	2.5	97	46-113
Chloroethane	mg/kg (ppm)	2.5	71	47-115
Trichlorofluoromethane	mg/kg (ppm)	2.5	57	53-112
Acetone	mg/kg (ppm)	12.5	119	39-147
I,I-Dichloroethene	mg/kg (ppm)	2.0	69	65-110 55-107
Methylene chloride	mg/kg (ppm)	2.5	97	50-127
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	89	72-122
trans-1.2-Dichloroethene	mg/kg (ppm)	2.5	85	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	97	74-109
2,2-Dichloropropane	mg/kg (ppm)	2.5	73	63-145
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	87	73-110
Chloroform	mg/kg (ppm)	2.5	93	76-110
2-Butanone (MEK)	mg/kg (ppm)	12.5	115	60-121
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	106	73-111
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	83	72-116
1,1-Dichloropropene	mg/kg (ppm)	2.5	94	72-112
Carbon tetrachloride	mg/kg (ppm)	2.5	80	67-123
Benzene	mg/kg (ppm)	2.5	90	72-106
Trichloroethene	mg/kg (ppm)	2.5	89	72-107
1,2-Dichloropropane	mg/kg (ppm)	2.5	97	74-115
Dibromomethano	mg/kg (ppm)	2.5	34 89	76-116
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	99	80-128
cis-1.3-Dichloropropene	mg/kg (ppm)	2.5	94	71-138
Toluene	mg/kg (ppm)	2.5	87	74-111
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	89	73-124
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	94	76-118
2-Hexanone	mg/kg (ppm)	12.5	105	67-123
1,3-Dichloropropane	mg/kg (ppm)	2.5	92	75-118
Tetrachloroethene	mg/kg (ppm)	2.5	81	73-111
Dibromochloromethane	mg/kg (ppm)	2.5	82	64-152
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	91	77-117
Chlorobenzene	mg/kg (ppm)	2.5	84	76-109
Ethylbenzene	mg/kg (ppm)	2.5	88	75-112
n, 1, 1, 1, 2-1 etrachioroethane	mg/kg (ppm)	2.0	83 97	75-129
o-Yylono	mg/kg (ppm)	25	86	76-115
Styrene	mg/kg (ppm)	2.5	88	76-119
Isopropylbenzene	mg/kg (ppm)	2.5	86	76-120
Bromoform	mg/kg (ppm)	2.5	83	50-174
n-Propylbenzene	mg/kg (ppm)	2.5	91	77-115
Bromobenzene	mg/kg (ppm)	2.5	86	76-112
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	86	77-121
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	99	74-121
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	97	73-117
2-Chlorotoluene	mg/kg (ppm)	2.5	89	75-113
4-Chlorotoluene	mg/kg (ppm)	2.5	88	77-115
tert-Butylbenzene	mg/kg (ppm)	2.5	86	77-123
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	86	77-119
sec-Butylbenzene	mg/kg (ppm)	2.0	81	78-120
1.2 Dishlorohonzono	mg/kg (ppm)	2.0	00 94	76 119
1 4-Dichlorobenzene	mg/kg (ppill)	2.5	83	74-109
1.2-Dichlorobenzene	mg/kg (ppm)	2.5	84	75-114
1.2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	97	68-122
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	85	75-122
Hexachlorobutadiene	mg/kg (ppm)	2.5	83	74-130
Naphthalene	mg/kg (ppm)	2.5	88	73-122
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	86	75-117

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/06/19 Project: Kosmos 19499-00, F&BI 912126

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 912340-01 1/6 (Matrix Spike) 1/6

Analyte	<u>F</u> 88	Spine Lever	(Wet Wt)	MS	Limits
Aroclor 1016 n	ng/kg (ppm)	0.25	< 0.02	68	30-123
Aroclor 1260 n	ng/kg (ppm)	0.25	< 0.02	67	26 - 131

Analyte	Reporting Units	Spike Level	Recovery LCS	Recovery LCSD	Acceptance Criteria	RPD (Limit 20)	
Aroclor 1016	mg/kg (ppm)	0.25	93	89	55 - 137	4	-
Aroclor 1260	mg/kg (ppm)	0.25	93	92	51 - 150	1	

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.













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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 30, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin :

Included are the results from the testing of material submitted on December 9, 2019 from the Kosmos, F&BI 912147 project. There are 17 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1230R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 9, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912147 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912147 -01	TP-10-5
912147 -02	TP-10-10
912147 -03	TP-10-15
912147 -04	TP-10-18
912147 -05	TP-11-5
912147 -06	TP-11-12
912147 -07	TP-11-15
912147 -08	TP-11-16.5
912147 -09	TP-12-2.5
912147 -10	TP-12-4

A 6020B internal standard failed the acceptance criteria for samples TP-10-5 and TP-12-2.5. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported.

Methylene chloride was detected in the 8260C analysis of samples TP-10-5 and TP-12-2.5. The data were flagged as due to laboratory contamination. In addition, the matrix spike and matrix spike duplicate failed the relative percent difference for acetone and 2-butanone. The analytes were not detected in the samples therefore the data were acceptable.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912147 Date Extracted: 12/20/19 Date Analyzed: 12/20/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (<u>% Recovery</u>) (Limit 58-139)
TP-10-5 912147-01	<5	90
TP-12-2.5 912147-09	<5	89
Method Blank ^{09-2936 MB}	<5	94

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912147 Date Extracted: 12/20/19 Date Analyzed: 12/20/19 and 12/23/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 56-165)
TP-10-5 912147-01	<50	<250	80
TP-10-15 912147-03	<50	<250	80
TP-10-18 912147-04	<50	<250	81
TP-11-5 912147-05	<50	<250	80
TP-11-16.5 912147-08	<50	<250	79
TP-12-2.5 912147-09	340 x	2,100	85
TP-12-4 912147-10	<50	<250	80
Method Blank ^{09-3091 MB}	<50	<250	88

ENVIRONMENTAL CHEMISTS

Client ID:	TP-10-5	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912147
Date Extracted:	12/20/19	Lab ID:	912147-01
Date Analyzed:	12/20/19	Data File:	912147-01.093
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	1.53		
Barium	72.7		
Cadmium	<1		
Chromium	12.9 J		
Lead	6.15		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client ID:	TP-10-5	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912147
Date Extracted:	12/19/19	Lab ID:	912147-01 x5
Date Analyzed:	12/23/19	Data File:	912147-01 x5.136
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	16.7		

ENVIRONMENTAL CHEMISTS

Client ID:	TP-12-2.5	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912147
Date Extracted:	12/20/19	Lab ID:	912147-09
Date Analyzed:	12/20/19	Data File:	912147-09.094
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
	Concentration		
Analyte:	mg/kg (ppm)		
Arsenic	3.73		
Barium	82.4		
Cadmium	1.33		
Chromium	11.4 J		
Lead	85.2		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	TP-12-2.5	Client:	Hart Crowser
Date Received:	12/09/19	Project:	Kosmos, F&BI 912147
Date Extracted:	12/19/19	Lab ID:	912147-09 x5
Date Analyzed:	12/23/19	Data File:	912147-09 x5.137
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	14.3		

7

ENVIRONMENTAL CHEMISTS

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank NA 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912147 I9-819 mb2 I9-819 mb2.036 ICPMS2 SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TP-10-5		Client:	Hart Crowser	
Date Received:	12/09/19		Project:	Kosmos, F&BI 912147	,
Date Extracted:	12/23/19		Lab ID:	912147-01	
Date Analyzed:	12/23/19		Data File:	122326.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppn	n) Dry Weight	Operator :	MS	
	8 8 41	, , , , , , , , , , , , , , , , , , , ,	т Т	TT	
C		0/ Decomposition	Lower	Upper	
Surrogates:	14	% Kecovery:		Limit:	
1,2-Dichloroethane-	d 4	103	50 50	150	
10luene-d8		105	50 70	150	
4-Bromofluorobenze	ene	101	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene		< 0.05
Methylene chloride		0.96 lc	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropane	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroethan	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropene	9	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	e	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropane	Э	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentano	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroethan	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TP-12-2.5		Client:	Hart Crowser	
Date Received:	12/09/19		Project:	Kosmos, F&BI 912147	
Date Extracted:	12/23/19		Lab ID:	912147-09	
Date Analyzed:	12/23/19		Data File:	122327.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppm) Dry Weight	Operator:	MS	
	0 0 11	/ / 0	T	TT	
Currentee		0/ Decorrorry	Lower	Upper	
Surrogates:	44	% Recovery:	Limit:	Limit:	
Taluara do	·04	101	50	150	
1 oluene-d8		107	50 50	150	
4-Bromofluorobenze	ene	101	06	190	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene		< 0.05
Methylene chloride		$0.71 \ lc$	Stvrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1.2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropane	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-1	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropene	е	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	e	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropane	e	< 0.05	1.3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentano	ne	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropror	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Bl	ank	Client:	Hart Crowser	
Date Received:	Not Applic	able	Project:	Kosmos, F&BI 912147	7
Date Extracted:	12/23/19		Lab ID:	09-3082 mb	
Date Analyzed:	12/23/19		Data File:	122311.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Dry Weight	Operator :	MS	
	0 0 11	, , ,	T	TT	
Sumoratory		0/ Decorrorry	Lower	Upper	
Surrogates:	14	% Recovery:			
Taluara do	·04	101	62 E E	140	
1 Druene-08		103	00 CE	140	
4-Bromolluorobenze	ene	93	69	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	9	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tr	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	Э	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tr	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	е	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentanc	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropror	oene	< 0.05	1.2.4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912147

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 91	12147-01 (Duplic	eate)			
		Samp	ole Du	plicate	
	Reporting	Resu	lt F	lesult	RPD
Analyte	Units	(Wet V	(Wet Wt) (Wet W		(Limit 20)
Gasoline	mg/kg (ppm)	<5		<5	nm
Laboratory Code: La	aboratory Contro	ol Sample	e		
			Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	
Gasoline	mg/kg (ppm)	$\overline{20}$	90	61-153	—

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912147

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 9	912360-02 (Matri	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	\mathbf{MS}	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	69	90	88	63-146	2
Laboratory Code:	Laboratory Contr	ol Samp	le				
			Percent	,			
	Reporting	Spike	Recover	y Accep	tance		
Analyte	Units	Level	LCS	Crite	eria		
Diesel Extended	mg/kg (ppm)	5,000	88	79-1	44		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912147

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 912286-05 x5 (Matrix Spike)

			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Arsenic	mg/kg (ppm)	10	5.41	84	90	75 - 125	7
Barium	mg/kg (ppm)	50	91.1	108	114	75 - 125	5
Cadmium	mg/kg (ppm)	10	8.16	71 b	36 b	75 - 125	$65 \mathrm{b}$
Chromium	mg/kg (ppm)	50	48.1	107	101	75 - 125	6
Lead	mg/kg (ppm)	50	13.6	101	92	75 - 125	9
Mercury	mg/kg (ppm	5	<5	94	102	75 - 125	8
Selenium	mg/kg (ppm)	5	<5	82	80	75 - 125	2
Silver	mg/kg (ppm)	10	<5	89	89	75 - 125	0

Laboratory Code: Laboratory Control Sample

U U	0	1	Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	mg/kg (ppm)	10	89	80-120
Barium	mg/kg (ppm)	50	99	80-120
Cadmium	mg/kg (ppm)	10	98	80-120
Chromium	mg/kg (ppm)	50	91	80-120
Lead	mg/kg (ppm)	50	105	80-120
Mercury	mg/kg (ppm)	5	98	80-120
Selenium	mg/kg (ppm)	5	99	80-120
Silver	mg/kg (ppm)	10	97	80-120

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912147

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912147-01912147-01 (Matrix Spike)

		a opino)	Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	21	23	10-56	9
Chloromethane	mg/kg (ppm)	2.5	< 0.5	45	46	10-90	2
Vinyl chloride	mg/kg (ppm)	2.5	< 0.05	39	39	10-91	0
Bromomethane	mg/kg (ppm)	2.5	< 0.5	53	61	10-110	14
Chloroethane	mg/kg (ppm)	2.5	< 0.5	50	50	10-101	0
Trichlorofluoromethane	mg/kg (ppm)	2.5	< 0.5	36	36	10-95	0
Acetone	mg/kg (ppm)	12.5	< 0.5	81	114	11-141	34 vo
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	42	46	22-107	9
Hexane Mathylana ahlavida	mg/kg (ppm)	2.5	<0.25	37 60 h	41 61 b	10-95	10 2 h
Methylene chloride Methyl t-butyl other (MTBF)	mg/kg (ppin)	2.5	<0.05	76	78	14-120	20
trans-1 2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	64	66	13.112	3
1.1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	75	79	23-115	5
2.2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	63	61	18-117	3
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	73	74	25-120	1
Chloroform	mg/kg (ppm)	2.5	< 0.05	78	82	29-117	5
2-Butanone (MEK)	mg/kg (ppm)	12.5	< 0.5	97	122	20-133	23 vo
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	< 0.05	88	97	22-124	10
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	< 0.05	67	68	27-112	1
1,1-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	72	77	26-107	7
Carbon tetrachloride	mg/kg (ppm)	2.5	< 0.05	64	64	28-126	0
Benzene	mg/kg (ppm)	2.5	< 0.03	74	80	26-114	8
1 P. Disklassen	mg/kg (ppm)	2.5	<0.02	74	81	30-112	9
1,2-Dichloropropane Bromodiabloromothono	mg/kg (ppm)	2.0	<0.05	84	92	31-119 21 121	10
Dibromomothano	mg/kg (ppin)	2.5	<0.05	75	32 83	27-124	9 10
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	<0.05	92	100	16-147	8
cis-1.3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	83	94	28-137	12
Toluene	mg/kg (ppm)	2.5	< 0.05	74	79	34-112	7
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	77	89	30-136	14
1,1,2 Trichloroethane	mg/kg (ppm)	2.5	< 0.05	83	91	32-126	9
2-Hexanone	mg/kg (ppm)	12.5	< 0.5	96	110	17-147	14
1,3-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	80	89	29-125	11
Tetrachloroethene	mg/kg (ppm)	2.5	< 0.025	68	72	25 - 114	6
Dibromochloromethane	mg/kg (ppm)	2.5	<0.05	75	79	32-143	5
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	<0.05	78	86	32-126	10
Chiorobenzene Ethulhongono	mg/kg (ppm)	2.0	<0.05	10	82	37-113	9
1 1 1 2 Totrachloroothano	mg/kg (ppm)	2.0	<0.05	76	04 78	04-110 25 196	2
m. Xylene	mg/kg (ppin)	2.5	<0.05	76	80	25-125	5
o-Xvlene	mg/kg (ppm)	2.5	<0.05	77	80	27-126	4
Styrene	mg/kg (ppm)	2.5	< 0.05	80	84	39-121	5
Isopropylbenzene	mg/kg (ppm)	2.5	< 0.05	77	80	34-123	4
Bromoform	mg/kg (ppm)	2.5	< 0.05	80	82	18-155	2
n-Propylbenzene	mg/kg (ppm)	2.5	< 0.05	77	88	31-120	13
Bromobenzene	mg/kg (ppm)	2.5	< 0.05	74	82	40-115	10
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	76	84	24-130	10
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	<0.05	89	98	27-148	10
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	<0.05	86	96	33-123	11
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	78	86	39-110	10
4-Uniorotoluene	mg/kg (ppm)	2.0	<0.05	76	81	39-111 26 116	13
1.2.4.Trimethylbonzono	mg/kg (ppin)	2.5	<0.05	76	83	35-116	9
sec-Butylbenzene	mg/kg (ppm)	2.5	<0.05	78	84	33.118	7
p-Isopropyltoluene	mg/kg (ppm)	2.5	<0.05	76	82	32-119	8
1.3-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	74	83	38-111	11
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	75	82	39-109	9
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	76	82	40-111	8
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	< 0.5	87	92	44-112	6
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	76	82	31-121	8
Hexachlorobutadiene	mg/kg (ppm)	2.5	< 0.25	78	80	24-128	3
Naphthalene	mg/kg (ppm)	2.5	< 0.05	79	82	24-139	4
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	78	82	35-117	5

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/09/19 Project: Kosmos, F&BI 912147

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

	_	Percent			
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	
Dichlorodifluoromethane	mg/kg (ppm)	2.5	61	10-146	
Chloromethane	mg/kg (ppm)	2.5	79	27-133	
Vinyl chloride	mg/kg (ppm)	2.5	82	22-139	
Bromomethane	mg/kg (ppm)	2.5	90	38-114	
Chloroethane	mg/kg (ppm)	2.5	104	9-163	
Agotopo	mg/kg (ppm)	2.0	99	10-196	
1 1-Dichloroethene	mg/kg (ppm)	2.5	108	47.128	
Hexane	mg/kg (ppm)	2.5	120	43-142	
Methylene chloride	mg/kg (ppm)	2.5	113	42-132	
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	103	60-123	
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	113	67-129	
1,1-Dichloroethane	mg/kg (ppm)	2.5	111	68-115	
2,2-Dichloropropane	mg/kg (ppm)	2.5	109	52 - 170	
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	114	72-127	
Chloroform	mg/kg (ppm)	2.5	109	66-120	
2-Butanone (MEK)	mg/kg (ppm)	12.5	110	72-127	
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	116	56-135	
1,1,1-1 richloroptnane	mg/kg (ppm)	2.0	111	62-131	
1,1-Dichloropropene	mg/kg (ppm)	2.0	112	69-120	
Benzene	mg/kg (ppm)	2.5	113	68.114	
Trichloroethene	mg/kg (ppm)	2.5	110	64-117	
1.2-Dichloropropane	mg/kg (ppm)	2.5	118	72-127	
Bromodichloromethane	mg/kg (ppm)	2.5	117	72-130	
Dibromomethane	mg/kg (ppm)	2.5	115	70-120	
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	118	45-145	
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	128	75-136	
Toluene	mg/kg (ppm)	2.5	105	66-126	
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	117	72-132	
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	106	75-113	
2-Hexanone	mg/kg (ppm)	12.5	102	33-152	
1,3-Dichloropropane	mg/kg (ppm)	2.5	108	72-130	
Dibromochleromothene	mg/kg (ppm)	2.0	100	74 195	
1.2.Dibromoethano (FDB)	mg/kg (ppm)	2.5	106	74-120	
Chlorohenzene	mg/kg (ppm)	2.5	104	76-111	
Ethylbenzene	mg/kg (ppm)	2.5	106	64-123	
1.1.1.2-Tetrachloroethane	mg/kg (ppm)	2.5	105	69-135	
m,p-Xylene	mg/kg (ppm)	5	106	78-122	
o-Xylene	mg/kg (ppm)	2.5	102	77-124	
Styrene	mg/kg (ppm)	2.5	104	74-126	
Isopropylbenzene	mg/kg (ppm)	2.5	101	76-127	
Bromoform	mg/kg (ppm)	2.5	118	56 - 132	
n-Propylbenzene	mg/kg (ppm)	2.5	108	74-124	
Bromobenzene	mg/kg (ppm)	2.5	108	72-122	
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	107	76-126	
1,1,2,2-1 etrachioroethane	mg/kg (ppm)	2.0	105	00-143 61 197	
2-Chlorotoluono	mg/kg (ppm)	2.5	106	74.191	
4-Chlorotoluene	mg/kg (ppm)	2.5	107	75-122	
tert-Butylbenzene	mg/kg (ppm)	2.5	107	73-130	
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	104	76-125	
sec-Butylbenzene	mg/kg (ppm)	2.5	103	71-130	
p-Isopropyltoluene	mg/kg (ppm)	2.5	101	70-132	
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	103	75-121	
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	102	74-117	
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	100	76-121	
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	96	58-138	
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	97	64-135	
Nephthelene	mg/kg (ppm)	2.5	94	0U-103 69 140	
Naphthalene	mg/kg (ppm)	2.0	92	63-140	
1,2,0-1110H010Delizene	mg/kg (ppm)	2.0	90	09-190	

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.
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(206) 285-8282	the, WA 98119-2029	aman & Bruya, Inc.		P-12-4	P-12-2.5	TP-11-16.5	TP-11-15	TP-11-12-	P-11-5	P-10-18	P-10-15	P-10-10	P-10-5		Sample ID		meEm	7, State, ZIP	lress	npany Hart MO	ort To Angie (
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 30, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 11, 2019 from the Kosmos, F&BI 912193 project. There are 14 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1230R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 11, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912193 project. Samples were logged in under the laboratory ID's listed below.

Hart Crowser
B-10-5
B-10-10
B-10-15
B-10-20
B-10-25
B-10-30
B-10-35
B-10-40
B-3-5
B-3-15
B-3-20
B-3-25
B-3-30
B-3-35
B-3-40
B-8-5
B-8-10
B-8-15
B-8-20
B-8-25
B-8-30
B-8-35
B-8-40

Several compounds in the 8260C laboratory control sample exceeded the acceptance criteria. The analytes were not detected in the sample, therefore the data were acceptable.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912193 Date Extracted: 12/23/19 Date Analyzed: 12/23/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
B-8-10 912193-17	<5	88
Method Blank ^{09-2938 MB}	<5	88

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912193 Date Extracted: 12/23/19 Date Analyzed: 12/23/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery)</u> (Limit 50-150)
B-3-15 912193-10	< 0.02	< 0.02	< 0.02	< 0.06	<5	89
B-3-20 912193-11	< 0.02	< 0.02	< 0.02	< 0.06	<5	89
B-3-35 912193-14	< 0.02	< 0.02	< 0.02	< 0.06	<5	89
Method Blank ^{09-2938 MB}	< 0.02	< 0.02	< 0.02	< 0.06	<5	88

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912193 Date Extracted: 12/20/19 Date Analyzed: 12/20/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 56-165)
B-10-30 912193-06	<50	<250	86
B-10-35 912193-07	<50	<250	78
B-3-15 912193-10	<50	<250	78
B-3-20 912193-11	<50	<250	79
B-3-35 912193-14	<50	<250	79
B-8-5 912193-16	<50	<250	79
B-8-10 912193-17	<50	<250	79
Method Blank 09-3069 MB2	<50	<250	80

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-3-15 12/11/19 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912193 912193-10 1/5 122008.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 100 115	Lower Limit: 31 24	Upper Limit: 163 168
~		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank Not Applicable 12/20/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912193 09-3070 mb2 1/5 122007.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	% Recovery: 100 e-d12 115	Lower Limit: 31 24	Upper Limit: 163 168
	Concentration	ı	
Compounds:	mg/kg (ppm)		
Naphthalene	< 0.01		
Acenaphthylene	< 0.01		
Acenaphthene	< 0.01		
Fluorene	< 0.01		
Phenanthrene	< 0.01		
Anthracene	< 0.01		
Fluoranthene	< 0.01		
Pyrene	< 0.01		
Benz(a)anthracene	< 0.01		
Chrysene	< 0.01		
Benzo(a)pyrene	< 0.01		
Benzo(b)fluoranthe	ne <0.01		
Benzo(k)fluoranthe	ne <0.01		
Indeno(1,2,3-cd)pyr	ene <0.01		
Dibenz(a,h)anthrac	ene <0.01		
Benzo(g,h,i)perylen	e <0.01		

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B-8-10		Client:	Hart Crowser	
Date Received:	12/11/19		Project:	Kosmos, F&BI 912193	}
Date Extracted:	12/23/19		Lab ID:	912193-17	
Date Analyzed:	12/23/19		Data File:	122317.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppn	n) Dry Weight	Operator:	MS	
	8 8 41	, , , , , , , , , , , , , , , , , , , ,	- <u>-</u>		
C I		0/ D	Lower	Upper	
Surrogates:	14	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane-	d4	102	62	145	
Toluene-d8		103	55	145	
4-Bromofluorobenze	ene	95	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethvlber	nzene	< 0.05
Acetone		< 0.5	1.1.1.2-7	Tetrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene	2	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1.2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2.2-Dichloropropane	e	< 0.05	Bromobe	enzene	< 0.05
cis-1.2-Dichloroethe	ene	< 0.05	1.3.5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-7	retrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tr	ichloropropane	< 0.05
1.2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1.1.1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1.1-Dichloropropene	e	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	e	< 0.05	1.2.4-Tr	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1.2-Dichloropropane	e	< 0.05	1.3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1.4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1.2-Dich	lorobenzene	< 0.05
4-Methvl-2-pentano	ne	< 0.5	1.2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropror	bene	< 0.05	1.2.4-Tri	ichlorobenzene	< 0.25
Toluene	-	< 0.05	Hexachl	orobutadiene	< 0.25
trans-1.3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroethau	ne	< 0.05	1.2.3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5	-,-,		

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Bla	ank	Client:	Hart Crowser	
Date Received:	Not Applic	able	Project:	Kosmos, F&BI 912193	3
Date Extracted:	12/23/19		Lab ID:	09-3083 mb	
Date Analyzed:	12/23/19		Data File:	122312.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppn	n) Dry Weight	Operator:	MS	
	0 0 4 1	, , ,	- Tomon	I.I.o.o.ou	
Surrogatos		% Rocovoru:	Lower Limit:	Upper Limit:	
1.9 Dichloroothono	44	70 necovery.	69	145	
Toluono de	u4	102	02 55	145	
1 Bromofluorohong	n 0	105	55 65	140	
4-Dromonuorobenze	ene	94	00	199	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xvlene		< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropane	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropene	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	e	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropane	Э	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentano	ne	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroethan	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912193

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912193-10 (Duplicate)

		Sample	Duplicate	
	Reporting	Result	Result	RPD
Analyte	Units	(Wet Wt)	(Wet Wt)	(Limit 20)
Benzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Toluene	mg/kg (ppm)	< 0.02	< 0.02	nm
Ethylbenzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Xylenes	mg/kg (ppm)	< 0.06	< 0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	mg/kg (ppm)	0.5	90	69-120
Toluene	mg/kg (ppm)	0.5	88	70-117
Ethylbenzene	mg/kg (ppm)	0.5	86	65 - 123
Xylenes	mg/kg (ppm)	1.5	87	66-120
Gasoline	mg/kg (ppm)	20	95	71-131

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912193

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912286-05 (Matrix	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	86	88	73-135	2
Laboratory Code:	Laboratory Contro	ol Sampl	e				
			Percent				
	Reporting	Spike	Recovery	Acceptar	nce		
Analyte	Units	Level	LCS	Criteria	a		
Diesel Extended	mg/kg (ppm)	5,000	88	74-139)		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912193

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912123-13 1/5 (Matrix Spike)

Laboratory Couc. 012120	10 1/0 (11401111 k	pinc)			
			Sample	Percent	
	Reporting	Spike	Result	Recovery	Acceptance
Analyte	Units	Level	(Wet wt)	MS	Criteria
Naphthalene	mg/kg (ppm)	0.17	< 0.01	75	44-129
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	75	52 - 121
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	75	51 - 123
Fluorene	mg/kg (ppm)	0.17	< 0.01	80	37 - 137
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	78	34-141
Anthracene	mg/kg (ppm)	0.17	< 0.01	78	32 - 124
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	85	16-160
Pyrene	mg/kg (ppm)	0.17	< 0.01	80	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	84	23 - 144
Chrysene	mg/kg (ppm)	0.17	< 0.01	79	32 - 149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	81	23 - 176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	71	42 - 139
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	76	21 - 163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	78	23 - 170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	73	31 - 146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	69	37 - 133

Laboratory Code: Laboratory Control Sample 1/5

		-p	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	83	85	58 - 121	2
Acenaphthylene	mg/kg (ppm)	0.17	84	84	54 - 121	0
Acenaphthene	mg/kg (ppm)	0.17	84	86	54 - 123	2
Fluorene	mg/kg (ppm)	0.17	88	88	56 - 127	0
Phenanthrene	mg/kg (ppm)	0.17	85	86	55 - 122	1
Anthracene	mg/kg (ppm)	0.17	85	86	50 - 120	1
Fluoranthene	mg/kg (ppm)	0.17	91	90	54 - 129	1
Pyrene	mg/kg (ppm)	0.17	87	91	53 - 127	4
Benz(a)anthracene	mg/kg (ppm)	0.17	90	91	51 - 115	1
Chrysene	mg/kg (ppm)	0.17	86	90	55 - 129	5
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	83	81	56 - 123	2
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	74	79	54 - 131	7
Benzo(a)pyrene	mg/kg (ppm)	0.17	75	75	51 - 118	0
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	79	84	49-148	6
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	77	85	50 - 141	10
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	73	83	52 - 131	13

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912193

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912317-01 (Matrix Spike)

			Sample	Percent	Percent		
]	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	46	38	10-142	19
Chloromethane	mg/kg (ppm)	2.5	< 0.5	79	69	10-126	14
Vinyl chloride	mg/kg (ppm)	2.5	< 0.05	79	70	10-138	12
Bromomethane	mg/kg (ppm)	2.5	< 0.5	91	86	10-163	6
Chloroethane	mg/kg (ppm)	2.5	< 0.5	103	92	10-176	11
Trichlorofluoromethane	mg/kg (ppm)	2.5	<0.5	93	88	10-176	6
Acetone	mg/kg (ppm)	12.5	<0.0	120	112	10-163	1
Hovano	mg/kg (ppm)	2.0	<0.05	94	90	10-180	0
Methylene chloride	mg/kg (ppm)	2.5	0.52	109 h	107 h	10-156	2 h
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	< 0.05	123	115	21-145	7
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	117	117	14-137	0
1,1-Dichloroethane	mg/kg (ppm)	2.5	< 0.05	116	114	19-140	2
2,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	120	112	10-158	7
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	123	121	25-135	2
Chloroform	mg/kg (ppm)	2.5	<0.05	116	113	21-145	3
2-Butanone (MEK)	mg/kg (ppm)	12.5	<0.5	111	95	19-147	16
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.0	<0.05	117	107	12-160	9
1 1-Dichloropropene	mg/kg (ppm)	2.5	<0.05	113	106	17-140	6
Carbon tetrachloride	mg/kg (ppm)	2.5	<0.05	122	114	9-164	7
Benzene	mg/kg (ppm)	2.5	< 0.03	117	108	29-129	8
Trichloroethene	mg/kg (ppm)	2.5	< 0.02	115	105	21-139	9
1,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	117	107	30-135	9
Bromodichloromethane	mg/kg (ppm)	2.5	< 0.05	118	108	23 - 155	9
Dibromomethane	mg/kg (ppm)	2.5	< 0.05	114	105	23-145	8
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	<0.5	116	104	24-155	11
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	122	110	28-144	10
trang-1 3-Dichloronronono	mg/kg (ppm)	2.5	<0.05	100	88	26-149	10
1.1.2-Trichloroethane	mg/kg (ppm)	2.5	<0.05	93	86	10-205	8
2-Hexanone	mg/kg (ppm)	12.5	< 0.5	94	85	15-166	10
1,3-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	94	84	31-137	11
Tetrachloroethene	mg/kg (ppm)	2.5	< 0.025	102	94	20-133	8
Dibromochloromethane	mg/kg (ppm)	2.5	< 0.05	103	94	28-150	9
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	< 0.05	93	83	28-142	11
Chlorobenzene	mg/kg (ppm)	2.5	<0.05	98	91	32-129	7
1 1 1 2 Totrachloroothano	mg/kg (ppm)	2.0	< 0.05	101	94	32-137	10
m n-Xvlene	mg/kg (ppm)	2.5	<0.05	103	95 95	34-136	6
o-Xvlene	mg/kg (ppm)	2.5	< 0.05	104	96	33-134	8
Styrene	mg/kg (ppm)	2.5	< 0.05	99	92	35-137	7
Isopropylbenzene	mg/kg (ppm)	2.5	< 0.05	105	96	31-142	9
Bromoform	mg/kg (ppm)	2.5	< 0.05	108	97	21-156	11
n-Propylbenzene	mg/kg (ppm)	2.5	< 0.05	99	91	23-146	8
Bromobenzene	mg/kg (ppm)	2.5	<0.05	96	88	34-130	9
1,3,5-1rimethylbenzene	mg/kg (ppm)	2.5	<0.05	104	93	18-149	11
1,1,2,2-1etrachoroethane	mg/kg (ppm)	2.5	<0.05	94 92	86 86	26-140	10
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	99	91	31-134	8
4-Chlorotoluene	mg/kg (ppm)	2.5	< 0.05	97	89	31-136	9
tert-Butylbenzene	mg/kg (ppm)	2.5	< 0.05	104	90	30-137	14
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	101	92	10-182	9
sec-Butylbenzene	mg/kg (ppm)	2.5	< 0.05	101	90	23-145	12
p-lsopropyltoluene	mg/kg (ppm)	2.5	< 0.05	100	90	21-149	11
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	97	91	30-131	6
1,4-Dichlorobenzene	mg/kg (ppm)	2.5 9 5	<0.05	96	88	29-129	9
1.2-Dibromo-3-chloropropana	mg/kg (ppiii)	2.0	<0.05	96	34 87	11.161	0
1.2.4-Trichlorobenzene	mg/kg (ppm)	2.5	<0.25	106	95	22-142	11
Hexachlorobutadiene	mg/kg (ppm)	2.5	<0.25	104	94	10-142	10
Naphthalene	mg/kg (ppm)	2.5	< 0.05	100	91	14-157	9
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	100	92	20-144	8

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/11/19 Project: Kosmos, F&BI 912193

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

ReportingSpikeRecoveryAcceptanceAnalyteUnitsLevelLCSCriteriaChloromsthanemg/kg (pm)2.510627.13Chloromsthanemg/kg (pm)2.511022.139Bromonsthanemg/kg (pm)2.511738.114Chloromsthanemg/kg (pm)2.51139.163Testimomg/kg (pm)2.511312.14Libblocchanemg/kg (pm)2.511243.142Hexanemg/kg (pm)2.511243.142Hexanemg/kg (pm)2.5129 vo47.128Hetylen choridemg/kg (pm)2.5129 vo60.123Inna L2 brichorothanemg/kg (pm)2.51129.8L1 brichorothanemg/kg (pm)2.511766.129Sutanoe (MEK)mg/kg (pm)2.511766.129Sutanoe (MEK)mg/kg (pm)2.511072.127L2 brichorothanemg/kg (pm)2.511072.127L3 brichorothanemg/kg (pm)2.511072.127L4 brichorothanemg/kg (pm)2.511072.127L5 brichorothanemg/kg (pm)2.511072.127L5 brichorothanemg/kg (pm)2.511072.127L5 brichorothanemg/kg (pm)2.511072.127L5 brichorothanemg/kg (pm)2.510074.131L5 brichorothanemg/kg (pm)2.510072.127 <th></th> <th>_</th> <th></th> <th>Percent</th> <th></th>		_		Percent	
Analyte Units Level LCS Criteria Dehrosdifizzoreschare mg/kg (pm) 2.5 91 01-146 Choronschare mg/kg (pm) 2.5 110 22-133 Bromonethare mg/kg (pm) 2.5 117 38-114 Chloroschare mg/kg (pm) 2.5 1129 9-163 Trchlorofluoromethare mg/kg (pm) 2.5 113 01-99 Asctone mg/kg (pm) 2.5 113 01-99 Astene mg/kg (pm) 2.5 129 9-163 Trahomethare mg/kg (pm) 2.5 129 04-132 Methyl-bartyl cher (MTBE) mg/kg (pm) 2.5 129 06-123 Trans 1.3 Dichlorosthare mg/kg (pm) 2.5 129 06-123 Trans 1.3 Dichlorosthare mg/kg (pm) 2.5 110 06-133 Trans 1.3 Dichlorosthare mg/kg (pm) 2.5 110 72-127 2.3 Dichloroproproate mg/kg (pm) 2.5 100 76-133 </th <th></th> <th>Reporting</th> <th>Spike</th> <th>Recovery</th> <th>Acceptance</th>		Reporting	Spike	Recovery	Acceptance
Dehlordifluoromethane mg/kg (ppm) 2.5 91 10-146 Chloromethane mg/kg (ppm) 2.5 110 22-133 Wayl choride mg/kg (ppm) 2.5 117 vo 38-114 Chloromethane mg/kg (ppm) 2.5 117 vo 38-114 Chloromethane mg/kg (ppm) 2.5 129 9-163 7 Trichlorofloromethane mg/kg (ppm) 2.5 129 vo 60-123 Hexane mg/kg (ppm) 2.5 129 vo 60-123 trans.1.2.Dichloroethane mg/kg (ppm) 2.5 129 vo 60-123 1.1.Dichloroethane mg/kg (ppm) 2.5 129 vo 60-123 1.1.Dichloroethane mg/kg (ppm) 2.5 129 vo 66-135 2.2.Dichloroethane mg/kg (ppm) 2.5 117 76-120 2.4.Dichloroethane mg/kg (ppm) 2.5 112 66-135 1.1.Dichloropropene mg/kg (ppm) 2.5	Analyte	Units	Level	LCS	Criteria
Chlorosethane mg/kg (ppm) 2.5 106 27:133 Bromomethane mg/kg (ppm) 2.5 117 vo 28:114 Chorosethane mg/kg (ppm) 2.5 112 99 163 Trobhorothonromethane mg/kg (ppm) 2.5 112 99 163 113 10:141 11.0°chlorosethane mg/kg (ppm) 2.5 112 43:142 Methylenechene mg/kg (ppm) 2.5 129 vo 67:128 Methylenechene mg/kg (ppm) 2.5 129 vo 67:128 Methylenechene mg/kg (ppm) 2.5 129 vo 67:128 11.0°chlorosethane mg/kg (ppm) 2.5 129 vo 67:128 11.0°chlorosethane mg/kg (ppm) 2.5 129 vo 67:128 11.0°chlorosethane mg/kg (ppm) 2.5 129 vo 68:115 2.2°chlorosethane mg/kg (ppm) 2.5 128 vo 68:115 2.2°chlorosethane mg/kg (ppm) 2.5 128 vo 68:115 2.2°chlorosethane mg/kg (ppm) 2.5 109 vo 68:135 11.0°chlorosethane mg/kg (ppm) 2.5 109 vo 68:135 11.0°chlorosethane mg/kg (ppm) 2.5 100 vo 68:135 11.1°chlorosethane mg/kg (ppm) 2.5 112 vo 68:114 11.0°chlorosethane mg/kg (ppm) 2.5 110 vo 68:131 11.0°chlorosethane mg/kg (ppm) 2.5 110 vo 138 Benzene mg/kg (ppm) 2.5 100 vo 138 Benzene mg/kg (ppm)	Dichlorodifluoromethane	mg/kg (ppm)	2.5	91	10-146
Vayle choridemg/kg (ppm)2.511722-180Bramomethanemg/kg (ppm)2.51171022-181Chloroschhanemg/kg (ppm)2.51299.166Actionemg/kg (ppm)2.51299.166Actionemg/kg (ppm)2.511243-142Methylene chloridemg/kg (ppm)2.51299.66Methylene chloridemg/kg (ppm)2.51299.6123Attrast 2.4 Dichloroschenemg/kg (ppm)2.512867-1291.1 Dichloroschenemg/kg (ppm)2.512867-1291.2 Dichloroschenemg/kg (ppm)2.511766-1202.4 Dichloroschenemg/kg (ppm)2.511766-1202.4 Dichloroschenemg/kg (ppm)2.511066-1312.4 Dichloroschenemg/kg (ppm)2.511066-1312.4 Dichloroschenemg/kg (ppm)2.511066-1311.1, Dichloroschenemg/kg (ppm)2.511066-1311.1, Dichloroschenemg/kg (ppm)2.511072-1302.5 Dichloroschenemg/kg (ppm)2.511072-1302.6 Arbon tetrachloridemg/kg (ppm)2.511072-1302.7 Dichloroschenemg/kg (ppm)2.511072-1302.8 Dichlorospropenemg/kg (ppm)2.511072-1302.9 Dichloroschenemg/kg (ppm)2.510074-1321.9 Dichlorospropenemg/kg (ppm) <td< td=""><td>Chloromethane</td><td>mg/kg (ppm)</td><td>2.5</td><td>106</td><td>27-133</td></td<>	Chloromethane	mg/kg (ppm)	2.5	106	27-133
Bromonethane mg/kg (ppm) 2.5 11 / 10 49-114 Colorecthane mg/kg (ppm) 2.5 113 10-10 Anothom connecthane mg/kg (ppm) 2.5 113 10-10 Anothom connecthane mg/kg (ppm) 2.5 112 43-142 Methyl chord 1.5 100 42-132 43-142 Methyl chord 1.5 110 42-132 43-142 Methyl chord 1.5 120 63-132 42-132 Methyl chord 1.6 1.6 1.20 63-132 1.1 Oblichorechane mg/kg (ppm) 2.5 120 63-72-127 2.3 Dichlorochane mg/kg (ppm) 2.5 110 72-127 2.3 Dichlorochane mg/kg (ppm) 2.5 110 61-133 1.4 Dichlorochane mg/kg (ppm) 2.5 110 61-132 1.2 Dichlorochane mg/kg (ppm) 2.5 110 72-127 1.2 Dichlorochane mg/kg (ppm) 2.5 110 73-133	Vinyl chloride	mg/kg (ppm)	2.5	110	22-139
Choose Laborethanemg/kg (ppm) mp/kg (ppm)2.51.139.14.01.1. Dichlorothenemg/kg (ppm)2.511310.1411.1. Dichlorothenemg/kg (ppm)2.511243.142Methylene chloridemg/kg (ppm)2.5129 vo46.142Methylene chloridemg/kg (ppm)2.5129 vo60.123trans. 1.2. Dichlorothenemg/kg (ppm)2.512867.1291.1. Dichlorothenemg/kg (ppm)2.512867.1292.2. Dichlorothenemg/kg (ppm)2.512672.127Choroformmg/kg (ppm)2.511766.1202.2. Dichlorothenemg/kg (ppm)2.511260.1282.2. Dichloropropanemg/kg (ppm)2.511266.1202.2. Dichlorothenemg/kg (ppm)2.511266.1281.1. Dichloropropanemg/kg (ppm)2.511266.1281.2. Dichloropropanemg/kg (ppm)2.511067.1281.3. Dichloropropanemg/kg (ppm)2.511072.127Benzenemg/kg (ppm)2.511072.127Dirbonomethanemg/kg (ppm)2.511072.127Bronotechhanemg/kg (ppm)2.510074.1421.3. Dichloropropenemg/kg (ppm)2.510074.1421.4. Dichloropropenemg/kg (ppm)2.510074.1421.5. Dichloropropenemg/kg (ppm)2.510374.1251.6. Dichloropr	Ghlamathane	mg/kg (ppm)	2.5	117 vo	38-114
Acctrone mar fix (ppm) 12.5 113 55-141 1.1 Dichlorovethene mar fix (ppm) 2.5 112 43-142 Methyl echloride mar fix (ppm) 2.5 112 43-142 Methyl echloride mar fix (ppm) 2.5 120 60-123 Intra-1.2.Dichlorovethane mg/kg (ppm) 2.5 121 vo 68-115 2.Dichloropropane mg/kg (ppm) 2.5 124 62-712 Chordorm mg/kg (ppm) 2.5 126 72-127 2.Dichlorovethane mg/kg (ppm) 2.5 128 62-151 2.Dichlorovethane mg/kg (ppm) 2.5 130 69-182 2.Dichlorovethane mg/kg (ppm) 2.5 130 69-182 2.Dichlorovethane mg/kg (ppm) 2.5 130 69-182 2.Dichlorovethane mg/kg (ppm) 2.5 130 69-183 2.Dichlorovethane mg/kg (ppm) 2.5 110 72-130 Dichorovepane mg/kg (ppm) 2.5 110	Trichlorofluoromothano	mg/kg (ppm)	2.0	129	9-165 10-196
1.1-Dichloroschene mg/kg (ppm) 2.5 129 47-128 Metaylene chloride mg/kg (ppm) 2.5 130 42132 Methyl-betyl tehr (MTBE) mg/kg (ppm) 2.5 128 67-129 1.1-Dichloroschene mg/kg (ppm) 2.5 128 67-129 2.1-Dichloroschene mg/kg (ppm) 2.5 128 67-129 2.1-Dichloroschene mg/kg (ppm) 2.5 127 68-115 2.2-Dichloroschene mg/kg (ppm) 2.5 117 68-120 Chloroschene mg/kg (ppm) 2.5 117 68-120 Chloroschene mg/kg (ppm) 2.5 112 69-128 2.1-Dichloroschene mg/kg (ppm) 2.5 112 69-128 Carbon tetrachloride mg/kg (ppm) 2.5 113 69-139 Benzane mg/kg (ppm) 2.5 110 72-132 Dibronoroschane mg/kg (ppm) 2.5 110 72-132 Dibronoroschane mg/kg (ppm) 2.5 100	Acetone	mg/kg (ppm)	12.5	113	52-141
Hexane mg/rg (ppn) 2.5 112 43.142 Methyl chor(MTBE) mg/rg (ppn) 2.5 130 42.132 Methyl chor(MTBE) mg/rg (ppn) 2.5 128 67.129 1,1-Dichloroethane mg/rg (ppn) 2.5 128 67.129 1,1-Dichloroethane mg/rg (ppn) 2.5 128 67.129 2.Dichloropropane mg/rg (ppn) 2.5 128 72.127 Choroform mg/rg (ppn) 2.5 100 66.135 1.1. Dichloroethane (EDC) mg/rg (ppn) 2.5 100 66.136 1.1. Dichloroethane mg/rg (ppn) 2.5 110 61.130 1.1. Frichloroethane mg/rg (ppn) 2.5 110 72.130 Benzene mg/rg (ppn) 2.5 110 72.130 Benzene mg/rg (ppn) 2.5 110 72.130 Dibromonethane mg/rg (ppn) 2.5 100 75.145 1.2. Dichloroepopene mg/rg (ppn) 2.5 100 75.1	1,1-Dichloroethene	mg/kg (ppm)	2.5	129 vo	47-128
Methylene chloride mg/kg (ppm) 2.5 130 42.132 trans.1.2.Dichloroethene mg/kg (ppm) 2.5 128 67.129 1.1.Dichloroethane mg/kg (ppm) 2.5 121 06.8115 2.2.Dichloroethane mg/kg (ppm) 2.5 120 68.115 2.3.Dichloroethane mg/kg (ppm) 2.5 120 66.120 2.4.Dichloroethane (MEK) mg/kg (ppm) 2.5 130 66.133 1.2.Dichloroethane (MEK) mg/kg (ppm) 2.5 112 69.128 1.1.Dichloroethane mg/kg (ppm) 2.5 110 67.131 1.1.Dichloroethane mg/kg (ppm) 2.5 110 67.131 1.1.Dichloroethane mg/kg (ppm) 2.5 110 72.130 Denceme mg/kg (ppm) 2.5 110 72.130 Dencemethane mg/kg (ppm) 2.5 110 75.136 Dencomothane mg/kg (ppm) 2.5 90 72.132 Dencomothane mg/kg (ppm) 2.5 <t< td=""><td>Hexane</td><td>mg/kg (ppm)</td><td>2.5</td><td>112</td><td>43-142</td></t<>	Hexane	mg/kg (ppm)	2.5	112	43-142
Methyl i-butyl ether (MTBE) mg/kg (ppm) 2.5 128 60-123 1,1-Dichloroethane mg/kg (ppm) 2.5 128 67-129 1,1-Dichloroethane mg/kg (ppm) 2.5 129 62-170 cis-1.2-Dichloroethane mg/kg (ppm) 2.5 126 72-127 2.Dichloropropane mg/kg (ppm) 2.5 133 72-127 2.Dichloroethane(EDC) mg/kg (ppm) 2.5 109 66-135 1,1.1-Trichloroethane mg/kg (ppm) 2.5 112 66-128 1,1.1-Trichloroethane mg/kg (ppm) 2.5 114 68-114 Trichloroeppane mg/kg (ppm) 2.5 110 72-129 Carbon tetrachloride mg/kg (ppm) 2.5 110 72-130 Dirbonomethane mg/kg (ppm) 2.5 110 72-130 Dirbonomethane mg/kg (ppm) 2.5 100 72-130 Dirbonomethane mg/kg (ppm) 2.5 90 64-132 1,1-Drichoroeppane mg/kg (ppm) 2	Methylene chloride	mg/kg (ppm)	2.5	130	42-132
trans.1.3.Dichloropethene mg/kg (ppm) 2.5 128 67.129 1.4.Dichloropethane mg/kg (ppm) 2.5 121 vo 68.115 2.3.Dichloropethane mg/kg (ppm) 2.5 129 62.170 Chloroform mg/kg (ppm) 2.5 126 72.127 Chloroform mg/kg (ppm) 2.5 109 66.133 1.2.Dichloropethane mg/kg (ppm) 2.5 109 66.138 1.1.Dichloropethane mg/kg (ppm) 2.5 110 68.141 Trichloropethane mg/kg (ppm) 2.5 110 67.120 Dichloropethane mg/kg (ppm) 2.5 110 72.127 Bromodichloromethane mg/kg (ppm) 2.5 110 72.130 Dichloropethane mg/kg (ppm) 2.5 110 75.136 Dichloropethane mg/kg (ppm) 2.5 90 62.130 Dichloropethane mg/kg (ppm) 2.5 90 72.132 1.1.2.Dichloropethopenene mg/kg (ppm) 2.5	Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	129 vo	60-123
1,1.9.Indication marks (ppm) 2.5 121 vo 68-110 cis-1,2.2) Dichloropepane mg/kg (ppm) 2.5 126 72-127 Chloroform mg/kg (ppm) 2.5 117 66-120 2.3 Dichloropepane mg/kg (ppm) 2.5 117 66-120 2.3 Dichloropetane (EDC) mg/kg (ppm) 2.5 109 56-135 1.1, 1-Trichloropetane mg/kg (ppm) 2.5 112 63-138 Carbon tetrachloride mg/kg (ppm) 2.5 110 64-134 Bensene mg/kg (ppm) 2.5 110 64-117 Thobhoropropane mg/kg (ppm) 2.5 110 72-130 Dishomohoropropane mg/kg (ppm) 2.5 106 71-130 Dishomohoropropane mg/kg (ppm) 2.5 100 75-143 Dishomohoropropane mg/kg (ppm) 2.5 100 75-143 Dishomohoropropane mg/kg (ppm) 2.5 90 76-143 Dishomohoropropane mg/kg (ppm) 2.5 91 33-152 1.3.2.Dichloropropane mg/kg (ppm) 2.5	trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	128	67-129
2.4.9 Unit or propose mg/kg (ppm) 2.5 129 52-110 Chloroform mg/kg (ppm) 2.5 117 66-120 2 Butanone (MEK) mg/kg (ppm) 2.5 93 72-127 1.2 Dichloroethane (BDC) mg/kg (ppm) 2.5 128 62-131 1.1 Dichloroptopene mg/kg (ppm) 2.5 128 62-131 Carbon tetracholride mg/kg (ppm) 2.5 130 60-139 Benzene mg/kg (ppm) 2.5 110 72-130 Benzene mg/kg (ppm) 2.5 110 72-130 Dibromonethane mg/kg (ppm) 2.5 100 72-130 Dibromonethane mg/kg (ppm) 2.5 100 72-130 Dibromonethane mg/kg (ppm) 2.5 90 62-145 Care 1.3 Dichloropropene mg/kg (ppm) 2.5 90 72-132 1.1.2 Trichloroethane mg/kg (ppm) 2.5 90 72-132 1.1.3 Dichloropropene mg/kg (ppm) 2.5 90	1,1-Dichloroethane	mg/kg (ppm)	2.5	121 vo	68-115
1.1.1. Control 1.1.2.5 1.1.7 1.6.1.50 1.2. Dishlorsethane (BCC) mg/kg (ppm) 2.5 1.0.9 6.6.1.35 1.3. Dishlorsethane (BCC) mg/kg (ppm) 2.5 1.0.9 6.6.1.35 1.1. Dishlorsethane (BCC) mg/kg (ppm) 2.5 1.1.2 6.6.1.35 1.1. Dishlorsethane mg/kg (ppm) 2.5 1.1.4 68-1.1.41 1.1. Dishlorsethane mg/kg (ppm) 2.5 1.1.4 68-1.1.41 1.2. Dishlorsethane mg/kg (ppm) 2.5 1.0 72-1.2.7 Parace mg/kg (ppm) 2.5 1.0 72-1.2.7 Brandelhorsethane mg/kg (ppm) 2.5 1.0 72-1.3.0 Dibromorethane mg/kg (ppm) 2.5 1.0 75-1.4.6 cicl.3. Dishloropropene mg/kg (ppm) 2.5 9.0 72-1.3.0 Dibromorethane mg/kg (ppm) 2.5 9.0 72-1.3.0 Dishloropropene mg/kg (ppm) 2.5 9.0 72-1.3.0 Dibromorethane mg/kg (ppm)	2,2-Dichloropropane	mg/kg (ppm)	2.0	129	02-170 72 127
2-Bittanone (MEK) mg/kg (ppm) 12.5 93 72-197 2-Dichlowschhane (EDC) mg/kg (ppm) 2.5 128 62-131 1.1-Dichlorypropene mg/kg (ppm) 2.5 128 62-131 1.1-Dichlorypropene mg/kg (ppm) 2.5 130 60-139 Benzzene mg/kg (ppm) 2.5 107 64-117 1.2-Dichlorypropane mg/kg (ppm) 2.5 100 72-127 Benzzene mg/kg (ppm) 2.5 100 72-130 Dichorypropane mg/kg (ppm) 2.5 100 72-130 Dichorypropane mg/kg (ppm) 2.5 100 75-136 Dichorypropene mg/kg (ppm) 2.5 90 66-126 trans-1,3Dichloropropene mg/kg (ppm) 2.5 91 75-113 Dichorypropane mg/kg (ppm) 2.5 90 74-125 Dichorypropane mg/kg (ppm) 2.5 100 72-131 Dichorypropane mg/kg (ppm) 2.5 100 7	Chloroform	mg/kg (ppm)	2.5	117	66-120
1.2-Dichloroethane $mg/kg (pm)$ 2.51095-1351.1-Drichloropropene $mg/kg (pm)$ 2.511269-1381.1-Drichloropropene $mg/kg (pm)$ 2.511269-139Carbon tetrachhoride $mg/kg (pm)$ 2.511468-114Trichloroethane $mg/kg (pm)$ 2.511072-127Bronzone $mg/kg (pm)$ 2.511072-130Diromomethane $mg/kg (pm)$ 2.511072-130Diromomethane $mg/kg (pm)$ 2.511073-136Diromomethane $mg/kg (pm)$ 2.510671-120A+Methyl-2-pentanone $mg/kg (pm)$ 2.59066-126trans-1,3-Dichloropropene $mg/kg (pm)$ 2.59173-1182-Hexanone $mg/kg (pm)$ 2.59173-1182-Hexanone $mg/kg (pm)$ 2.59074-1321,3-Dichloropropane $mg/kg (pm)$ 2.59074-1321,3-Dichloropropane $mg/kg (pm)$ 2.59074-1321,3-Dichloropropane $mg/kg (pm)$ 2.59074-1321,3-Dichloropropane $mg/kg (pm)$ 2.510464-1231,3-Dichloropropane $mg/kg (pm)$ 2.510464-1231,3-Dichloropropane $mg/kg (pm)$ 2.510474-1241,3-Dichloropropane $mg/kg (pm)$ 2.510474-1251,3-Dichloropropane $mg/kg (pm)$ 2.510474-1261,3-Dichloropropane $mg/kg (pm)$ </td <td>2-Butanone (MEK)</td> <td>mg/kg (ppm)</td> <td>12.5</td> <td>93</td> <td>72-127</td>	2-Butanone (MEK)	mg/kg (ppm)	12.5	93	72-127
1,1.1-Trichloropopane mg/kg (ppm) 2.5 128 62-131 1.1-Dichloropopane mg/kg (ppm) 2.5 112 63-128 Carbon tetrachloride mg/kg (ppm) 2.5 110 63-139 Benzzene mg/kg (ppm) 2.5 107 64-117 1.2-Dichloropropane mg/kg (ppm) 2.5 110 72-127 Bromodichloromethane mg/kg (ppm) 2.5 110 72-130 Dibromomethane mg/kg (ppm) 2.5 100 72-130 Mathyl-2-partanone mg/kg (ppm) 2.5 910 73-136 Toluene mg/kg (ppm) 2.5 910 75-131 2-Hexanone mg/kg (ppm) 2.5 91 75-131 2-Hexanone mg/kg (ppm) 2.5 90 74-132 1.2-Dichloropropane mg/kg (ppm) 2.5 102 72-114 Dibromochoroptane mg/kg (ppm) 2.5 103 74-125 2-Hexanone mg/kg (ppm) 2.5 104 64-123 1.2-Dichloropropane mg/kg (ppm) 2.5 104 <t< td=""><td>1,2-Dichloroethane (EDC)</td><td>mg/kg (ppm)</td><td>2.5</td><td>109</td><td>56-135</td></t<>	1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	109	56-135
1.1-Dichloropropene mg/kg (ppm) 2.5 112 60-139 Benzene mg/kg (ppm) 2.5 114 66-1139 Benzene mg/kg (ppm) 2.5 110 72-127 Trichloroptehne mg/kg (ppm) 2.5 110 72-130 Dibromodichoromethane mg/kg (ppm) 2.5 110 72-130 Dibromodichoromethane mg/kg (ppm) 2.5 109 46-145 (a'k-Hely)-pertanone mg/kg (ppm) 2.5 99 66-126 trans-1,3-Dichloropropene mg/kg (ppm) 2.5 91 75-136 Tolucane mg/kg (ppm) 2.5 90 72-132 1,12-Trichloroptane mg/kg (ppm) 2.5 91 75-136 1,3-Dichloropropane mg/kg (ppm) 2.5 90 72-132 1,3-Dichloropropane mg/kg (ppm) 2.5 102 72-114 Dibromochloromethane mg/kg (ppm) 2.5 103 74-132 1,3-Dichloropropane mg/kg (ppm) 2.5 104 64-123 1,3-Dichloropropane mg/kg (ppm) 2.5	1,1,1-Trichloroethane	mg/kg (ppm)	2.5	128	62-131
Carbon tetrachloride mg/kg (ppm) 2.5 130 60-139 Benzene mg/kg (ppm) 2.5 114 68-114 Trichloroethene mg/kg (ppm) 2.5 107 64-117 1.2-Dichloropropane mg/kg (ppm) 2.5 110 72-130 Dibromomethane mg/kg (ppm) 2.5 106 70-120 4.Methyl-2-pentanone mg/kg (ppm) 2.5 106 70-120 4.Methyl-2-pentanone mg/kg (ppm) 2.5 99 66-126 trans-1,3-Dichloropropene mg/kg (ppm) 2.5 91 73-131 2-Hexanone mg/kg (ppm) 2.5 90 72-130 Tetrachloroethane mg/kg (ppm) 2.5 90 72-130 Tetrachloroethane mg/kg (ppm) 2.5 90 72-130 Tetrachloroethane mg/kg (ppm) 2.5 90 74-132 1,2-Dichoropopane mg/kg (ppm) 2.5 90 74-132 1,2-Dichoropopane mg/kg (ppm) 2.5 104	1,1-Dichloropropene	mg/kg (ppm)	2.5	112	69-128
Benzenemg/kg (ppm)2.511468-1141/2horboropthanemg/kg (ppm)2.510764-1171,2-Dichloropropanemg/kg (ppm)2.511072-127Bromodichloromethanemg/kg (ppm)2.511072-130Dibromomethanemg/kg (ppm)2.510670-1204/Methyl2-pentanonemg/kg (ppm)2.510946-145cis-1,3-Dichloropropenemg/kg (ppm)2.59966-126Trans-1,3-Dichloropropenemg/kg (ppm)2.59175-1131,12-Trichloroethanemg/kg (ppm)2.59175-1131,2-Dichloropropanemg/kg (ppm)2.59072-1302-Hexanonemg/kg (ppm)2.59072-1301,3-Dichloropropanemg/kg (ppm)2.510272-114Dibromochloromethanemg/kg (ppm)2.510374-1251,2-Dibromochlaroethanemg/kg (ppm)2.510374-1251,1,2-Tetrachloroethanemg/kg (ppm)2.510464-1231,1,12-Tetrachloroethanemg/kg (ppm)2.510464-1231,1,12-Tetrachloroethanemg/kg (ppm)2.510464-1231,1,2-Tetrachloroethanemg/kg (ppm)2.510476-124Styrenemg/kg (ppm)2.510476-124LoporopHenzenemg/kg (ppm)2.59974-124Bromodichunemg/kg (ppm)2.59375-124LoporopHenzenemg/kg (ppm) <td>Carbon tetrachloride</td> <td>mg/kg (ppm)</td> <td>2.5</td> <td>130</td> <td>60-139</td>	Carbon tetrachloride	mg/kg (ppm)	2.5	130	60-139
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Benzene	mg/kg (ppm)	2.5	114	68-114
1.2-Diffunctopropanemg/kg (ppm)2.511012-12Dibromodichloromethanemg/kg (ppm)2.511072-130Dibromodichloromethanemg/kg (ppm)2.510670-1204.Methyl-2-pentanonemg/kg (ppm)2.510945-145cis-1,3-Dichloropropenemg/kg (ppm)2.59966-126trans-1,3-Dichloropropenemg/kg (ppm)2.59175-1132.Hexanonemg/kg (ppm)2.59133-1521,3-Dichloropropanemg/kg (ppm)2.59072-130Tetrachloroethanemg/kg (ppm)2.59074-1321,2-DirbomochlaroetBanemg/kg (ppm)2.59074-132Chlorobenzenemg/kg (ppm)2.59074-132Chlorobenzenemg/kg (ppm)2.59074-132Chlorobenzenemg/kg (ppm)2.510464-1231,1,2-Tetrachloroethanemg/kg (ppm)2.510464-1231,1,2-Tetrachloroethanemg/kg (ppm)2.510777-124Styrenemg/kg (ppm)2.510777-124Styrenemg/kg (ppm)2.510076-112Enorophilenzenemg/kg (ppm)2.59974-126Loprophilenzenemg/kg (ppm)2.510476-127Bromodioffmg/kg (ppm)2.510476-127Bromodioffmg/kg (ppm)2.59974-126Loprophilenzenemg/kg (ppm)2.59074-126	1 2 Dishlarananana	mg/kg (ppm)	2.5	107	64-117
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Bromodichloromethane	mg/kg (ppm)	2.5	110	72-127
4-Methyl-2-pentanonemg/kg (ppm)12.510.945.145cis-1,3-Dichloropropenemg/kg (ppm)2.51075.136Toluenemg/kg (ppm)2.59672.132trans-1,3-Dichloropropenemg/kg (ppm)2.59175.1132-Hexanonemg/kg (ppm)2.59072.1302-Hexanonemg/kg (ppm)2.59072.1302-Hexanonemg/kg (ppm)2.59072.1302-Hexanonemg/kg (ppm)2.510272.114Dibromochloromethanemg/kg (ppm)2.59074.1321,2-Dirbomochloromethane (DB)mg/kg (ppm)2.59074.1321,1,2-Tetrachloroethanemg/kg (ppm)2.510464.1231,1,1,2-Tetrachloroethanemg/kg (ppm)2.510464.1231,1,1,2-Tetrachloroethanemg/kg (ppm)2.510476.127Styrenemg/kg (ppm)2.510476.127Styrenemg/kg (ppm)2.510076.127Bromoformmg/kg (ppm)2.510076.127Bromoformmg/kg (ppm)2.59372.1241,1,2-2-Tetrachloroethanemg/kg (ppm)2.510476.127Bromoformmg/kg (ppm)2.59374.126Loporopylenzenemg/kg (ppm)2.59374.124Bromoformmg/kg (ppm)2.59374.124Bromoformmg/kg (ppm)2.59376.127Bromoform<	Dibromomethane	mg/kg (ppm)	2.5	106	70-120
cis-1,3-Dichloropropene mg/kg (ppm) 2.5 110 75-136 Toluene mg/kg (ppm) 2.5 99 66-126 Tunns-1,3-Dichloropropene mg/kg (ppm) 2.5 91 75-132 1,1,2-Trichloroethane mg/kg (ppm) 2.5 91 75-133 1,3-Dichloropropane mg/kg (ppm) 2.5 90 72-132 1,3-Dichloropropane mg/kg (ppm) 2.5 90 72-132 Dibromochloromethane mg/kg (ppm) 2.5 90 74-132 L/2-Dibromochloromethane (EDB) mg/kg (ppm) 2.5 90 74-132 Chlorobenzene mg/kg (ppm) 2.5 104 64-123 1,1,1,2-Tetrakloroethane mg/kg (ppm) 2.5 104 78-122 Chlorobenzene mg/kg (ppm) 2.5 104 78-122 Styrene mg/kg (ppm) 2.5 104 78-122 Styrene mg/kg (ppm) 2.5 104 76-127 Bromoform mg/kg (ppm) 2.5 104	4-Methyl-2-pentanone	mg/kg (ppm)	12.5	109	45-145
Toluene mg/kg (ppm) 2.5 99 66-126 trans-1.3-Dichoropropene mg/kg (ppm) 2.5 96 72-132 1,1.2-Trichloroethane mg/kg (ppm) 2.5 91 75-113 2-Hexanone mg/kg (ppm) 2.5 91 33-152 1,3-Dichloropropane mg/kg (ppm) 2.5 90 72-130 Tetrachloroethene mg/kg (ppm) 2.5 102 72-114 Dibromochloromethane mg/kg (ppm) 2.5 90 74-132 1,2-Dibromoethane (EDB) mg/kg (ppm) 2.5 90 74-132 Chlorobenzene mg/kg (ppm) 2.5 104 64-123 1,1,1,2-Tetrachloroethane mg/kg (ppm) 2.5 107 77-124 Syrene mg/kg (ppm) 2.5 104 76-132 o-Xylene mg/kg (ppm) 2.5 107 77-124 Styrene mg/kg (ppm) 2.5 104 76-132 Isopropylbenzene mg/kg (ppm) 2.5 98 74-124 Bromoform mg/kg (ppm) 2.5 93 56-132 <td>cis-1,3-Dichloropropene</td> <td>mg/kg (ppm)</td> <td>2.5</td> <td>110</td> <td>75-136</td>	cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	110	75-136
trans-1,3-Dichloropropene mg/kg (ppm) 2.5 96 72-132 1,1.2-Trichloroethane mg/kg (ppm) 12.5 91 73-113 2-Hexanone mg/kg (ppm) 2.5 90 72-130 1,3-Dichloropropane mg/kg (ppm) 2.5 90 72-130 Dibromochloromethane mg/kg (ppm) 2.5 102 72-114 Dibromochloromethane mg/kg (ppm) 2.5 90 74-132 (La)Dibromochloromethane mg/kg (ppm) 2.5 90 74-132 (La)Dibromochlane (EDB) mg/kg (ppm) 2.5 104 64-123 (La)Dibromochlane mg/kg (ppm) 2.5 104 78-122 eXylene mg/kg (ppm) 2.5 107 77-124 Styrene mg/kg (ppm) 2.5 109 76-127 Isopropylbenzene mg/kg (ppm) 2.5 100 76-127 Bromobenzene mg/kg (ppm) 2.5 98 74-124 Styrene mg/kg (ppm) 2.5 100 74-124 Isopropylbenzene mg/kg (ppm) 2.5 93	Toluene	mg/kg (ppm)	2.5	99	66-126
1,1,2-Trichloroethanemg/kg (ppm)2.59175-1132-Hexanonemg/kg (ppm)12.59133-1521,3-Dichloropropanemg/kg (ppm)2.59072-130Tetrachloroethenemg/kg (ppm)2.510272-114Dibromochhane (EDB)mg/kg (ppm)2.59074-1321,2-Dibromoethane (EDB)mg/kg (ppm)2.59976-111Ethylbenzenemg/kg (ppm)2.510464-1231,1,1.2-Tetrachloroethanemg/kg (ppm)510478-122c-Kylenemg/kg (ppm)2.510777-124Styrenemg/kg (ppm)2.510976-127Styrenemg/kg (ppm)2.510976-127Bromochranemg/kg (ppm)2.510976-127Bromobenzenemg/kg (ppm)2.510976-127Bromoberzenemg/kg (ppm)2.510476-1261,3.5-Trinethylbenzenemg/kg (ppm)2.59874-124Styrenemg/kg (ppm)2.59356-1431,2.3-Trithloroporpanemg/kg (ppm)2.59356-1431,2.3-Trithloroporpanemg/kg (ppm)2.59971-1244-Chlorotoluenemg/kg (ppm)2.59973-1301,2.4-Trithylbenzenemg/kg (ppm)2.59973-1301,2.3-Trithloroporpanemg/kg (ppm)2.59973-1301,2.4-Trithylbenzenemg/kg (ppm)2.59973-130	trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	96	72-132
2-Hexanonemg/kg (ppm)12.591 $33-152$ 1,3-Dichloropropanemg/kg (ppm)2.59072-130Tetrachloroethenemg/kg (ppm)2.510272-114Dibromochloromethanemg/kg (ppm)2.510374-1251,2-Dibromochlane (EDB)mg/kg (ppm)2.59976-111Ethylbenzenemg/kg (ppm)2.510464-1231,1,1,2-Tetrachloroethanemg/kg (ppm)2.510464-1231,1,1,2-Tetrachloroethanemg/kg (ppm)2.510478-122 \sim Xylenemg/kg (ppm)2.510777-124Styrenemg/kg (ppm)2.510976-127Bromoformmg/kg (ppm)2.510976-127Bromoformmg/kg (ppm)2.59974-126Isopropylbenzenemg/kg (ppm)2.511056-132In-Propylbenzenemg/kg (ppm)2.59372-1221,3,5-Trimethylbenzenemg/kg (ppm)2.59372-1221,2,3-Tetrachloroethanemg/kg (ppm)2.59161-1372-Chlorotoluenemg/kg (ppm)2.59973-1301,2,4-Trimethylbenzenemg/kg (ppm)2.59973-1221,3,5-Trimethylbenzenemg/kg (ppm)2.59973-1301,2,4-Trimethylbenzenemg/kg (ppm)2.59973-1301,2,4-Trimethylbenzenemg/kg (ppm)2.59973-1301,2,4-Trimethylbenzenemg/kg (ppm)2.5 </td <td>1,1,2-Trichloroethane</td> <td>mg/kg (ppm)</td> <td>2.5</td> <td>91</td> <td>75-113</td>	1,1,2-Trichloroethane	mg/kg (ppm)	2.5	91	75-113
1,3-Diction/propaneIng/kg (ppm)2.539012-130Tetrachloroethanemg/kg (ppm)2.510272-114Dibromochloromethanemg/kg (ppm)2.510374-1251,2-Dibromochlaromethanemg/kg (ppm)2.59976-111Ethylbenzenemg/kg (ppm)2.510464-1231,1,1,2-Tetrachloroethanemg/kg (ppm)2.510464-1231,1,1,2-Tetrachloroethanemg/kg (ppm)510478-122o-Xylenemg/kg (ppm)2.59974-126Styrenemg/kg (ppm)2.59974-126Isopropylbenzenemg/kg (ppm)2.59974-124Bromoformmg/kg (ppm)2.510976-127Bromoformmg/kg (ppm)2.59874-124Bromoformmg/kg (ppm)2.59372-1221,3,5-Trimethylbenzenemg/kg (ppm)2.59376-127Bromobenzenemg/kg (ppm)2.59372-1221,3,5-Trimethylbenzenemg/kg (ppm)2.59356-1431,2,2-Tetrachloroethanemg/kg (ppm)2.59161-1372-Chlorotoluenemg/kg (ppm)2.59973-1301,2,4-Trimethylbenzenemg/kg (ppm)2.59973-1301,2,4-Trimethylbenzenemg/kg (ppm)2.59970-1321,3-Dichlorobenzenemg/kg (ppm)2.59970-1321,3-Dichlorobenzenemg/kg (ppm)2.5102 <t< td=""><td>2-Hexanone</td><td>mg/kg (ppm)</td><td>12.5</td><td>91</td><td>33-152</td></t<>	2-Hexanone	mg/kg (ppm)	12.5	91	33-152
TerminotochloromethaneIng/kg (pph)2.510217111,2-Dibromochloromethanemg/kg (pph)2.510374-1251,2-Dibromochloromethanemg/kg (pph)2.59074-1321,1,1,2-Tetrachloroethanemg/kg (pph)2.510464-1231,1,1,2-Tetrachloroethanemg/kg (pph)510478-122o-Xylenemg/kg (pph)2.510777-124Styrenemg/kg (pph)2.510777-124Isopropylbenzenemg/kg (pph)2.510976-117Bromoformmg/kg (pph)2.510976-127Bromoformmg/kg (pph)2.510976-127Bromoformmg/kg (pph)2.59874-124Bromoformmg/kg (pph)2.59874-124Bromoformmg/kg (pph)2.59372-1221,3.5-Trimethylbenzenemg/kg (pph)2.59372-1221,3.2-Tetrachloroethanemg/kg (pph)2.59161-1372.2.3-Trichloropropanemg/kg (pph)2.59161-1372.4.1-Timethylbenzenemg/kg (pph)2.59973-1301,2.4-Trimethylbenzenemg/kg (pph)2.59971-130p-Isopropylcluenemg/kg (pph)2.59971-130p-Isopropylcluenemg/kg (pph)2.59971-130p-Isopropylcluenemg/kg (pph)2.59574-1171,2-Dichlorobenzenemg/kg (pph)2.595 <td< td=""><td>Tetrachloroethene</td><td>mg/kg (ppm)</td><td>2.5</td><td>90 102</td><td>72-130</td></td<>	Tetrachloroethene	mg/kg (ppm)	2.5	90 102	72-130
1.2-Dibromoethane (EDB)mg/kg (ppm)2.59074.132Chlorobenzenemg/kg (ppm)2.59976.111Ethylbenzenemg/kg (ppm)2.510464.1231,1,2-Tetrachloroethanemg/kg (ppm)2.511569.135m.p-Xylenemg/kg (ppm)2.510478.122o-Xylenemg/kg (ppm)2.510777.124Styrenemg/kg (ppm)2.510976.127Bromoformmg/kg (ppm)2.510976.127n-Propylbenzenemg/kg (ppm)2.59874.126Bromoformmg/kg (ppm)2.59874.124Bromobenzenemg/kg (ppm)2.59372.1221,3.5-Trinethylbenzenemg/kg (ppm)2.59356.1431,2.3-Trichloropropanemg/kg (ppm)2.59356.1432.4-Chorotoluenemg/kg (ppm)2.59575.1224-Chlorotoluenemg/kg (ppm)2.59971.130p-Isopropyltoluenemg/kg (ppm)2.59971.130p-Isopropyltoluenemg/kg (ppm)2.59775.1211,4-Dichorobenzenemg/kg (ppm)2.59971.130p-Isopropyltoluenemg/kg (ppm)2.59574.1171,2.4-Trinethylbenzenemg/kg (ppm)2.59971.130p-Isopropyltoluenemg/kg (ppm)2.59971.130p-Isopropyltoluenemg/kg (ppm)2.59574.1171,2.D	Dibromochloromethane	mg/kg (ppm)	2.5	102	74-125
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	90	74-132
Ethylbenzene mg/kg (ppm) 2.5 104 64.123 1,1,1,2-Tetrachloroethane mg/kg (ppm) 2.5 115 69.135 m.p-Xylene mg/kg (ppm) 2.5 104 78.122 o-Xylene mg/kg (ppm) 2.5 107 77.124 Styrene mg/kg (ppm) 2.5 99 74.126 Isopropylbenzene mg/kg (ppm) 2.5 99 74.124 Bromoform mg/kg (ppm) 2.5 98 74.124 Bromobenzene mg/kg (ppm) 2.5 93 72.122 1,3.5-Trimethylbenzene mg/kg (ppm) 2.5 93 72.122 1,3.5-Trimethylbenzene mg/kg (ppm) 2.5 93 76.126 1,2.3-Trichloropane mg/kg (ppm) 2.5 91 61.137 2.Chlorotoluene mg/kg (ppm) 2.5 91 61.137 2.4-Trimethylbenzene mg/kg (ppm) 2.5 99 73.130 1,2.4-Trimethylbenzene mg/kg (ppm) 2.5 99 71.130 1,2.4-Trimethylbenzene mg/kg (ppm) 2.5 97	Chlorobenzene	mg/kg (ppm)	2.5	99	76-111
1,1,1,2-Tetrachloroethanemg/kg (ppm)2.5115 69.135 m,p-Xylenemg/kg (ppm)510478.122o-Xylenemg/kg (ppm)2.510777.124Styrenemg/kg (ppm)2.59974.126Isopropylbenzenemg/kg (ppm)2.510976.127Bromoformmg/kg (ppm)2.59874.124n-Propylbenzenemg/kg (ppm)2.59372.1221,3,5-Trimethylbenzenemg/kg (ppm)2.59372.1221,3,5-Trimethylbenzenemg/kg (ppm)2.59356.1431,2,3-Trichloroptopanemg/kg (ppm)2.59161.1372-Chlorotoluenemg/kg (ppm)2.59161.1372-Chlorotoluenemg/kg (ppm)2.59973.1301,2,4-Trimethylbenzenemg/kg (ppm)2.59973.1301,2,4-Trimethylbenzenemg/kg (ppm)2.59971.130p-Isopropyltoluenemg/kg (ppm)2.59971.130p-Isopropyltoluenemg/kg (ppm)2.59775.1211,4-Dichlorobenzenemg/kg (ppm)2.59775.1211,4-Dichlorobenzenemg/kg (ppm)2.510258.1381,2,4-Trichlorobenzenemg/kg (ppm)2.510258.1381,2-Dichlorobenzenemg/kg (ppm)2.510258.1381,2-Dichlorobenzenemg/kg (ppm)2.510258.1381,2-A-Trichlorobenzenemg/kg (ppm)2.5 <t< td=""><td>Ethylbenzene</td><td>mg/kg (ppm)</td><td>2.5</td><td>104</td><td>64-123</td></t<>	Ethylbenzene	mg/kg (ppm)	2.5	104	64-123
m.p. Xylenemg/kg (ppm)510478-122C-Xylenemg/kg (ppm)2.510777-124Styrenemg/kg (ppm)2.59974-126Isoproylbenzenemg/kg (ppm)2.510976-127Bromoformmg/kg (ppm)2.511056-132n-Propylbenzenemg/kg (ppm)2.59874-124Bromobenzenemg/kg (ppm)2.59372-1221,3.5-Trimethylbenzenemg/kg (ppm)2.59356-1431,2.3-Trichloropropanemg/kg (ppm)2.59161-1372-Chlorotoluenemg/kg (ppm)2.59575-1224-Chlorotoluenemg/kg (ppm)2.59973-1301,2.4-Trimethylbenzenemg/kg (ppm)2.59973-1301,2.4-Trimethylbenzenemg/kg (ppm)2.59971-130p-Isopropyltoluenemg/kg (ppm)2.59775-1211,4-Dichlorobenzenemg/kg (ppm)2.59775-1211,4-Dichlorobenzenemg/kg (ppm)2.59775-1211,4-Dichlorobenzenemg/kg (ppm)2.59775-1211,2-Dichlorobenzenemg/kg (ppm)2.510276-1211,2-Dichlorobenzenemg/kg (ppm)2.510258-1381,2-A-Trichlorobenzenemg/kg (ppm)2.510258-1381,2-A-Trichlorobenzenemg/kg (ppm)2.510258-1381,2-Dichlorobenzenemg/kg (ppm)2.510663-	1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	115	69-135
0-Ayienemg/kg (ppm)2.5107 $1/124$ Styrenemg/kg (ppm)2.5109 76.127 Isopropylbenzenemg/kg (ppm)2.5109 76.127 Bromoformmg/kg (ppm)2.598 74.124 Bromobenzenemg/kg (ppm)2.598 72.122 1,3.5.Trimethylbenzenemg/kg (ppm)2.593 72.122 1,3.5.Trimethylbenzenemg/kg (ppm)2.593 66.133 1,2,3.Trichloropanemg/kg (ppm)2.591 61.137 2-Chlorotoluenemg/kg (ppm)2.595 75.122 tert-Butylbenzenemg/kg (ppm)2.599 73.130 1,2,4.Trimethylbenzenemg/kg (ppm)2.599 73.130 1,2,4.Trimethylbenzenemg/kg (ppm)2.599 70.132 1,3.Dichlorobenzenemg/kg (ppm)2.599 70.132 1,3.Dichlorobenzenemg/kg (ppm)2.599 70.132 1,3.Dichlorobenzenemg/kg (ppm)2.597 75.121 1,4.Dichlorobenzenemg/kg (ppm)2.595 74.117 1,2.Dichlorobenzenemg/kg (ppm)2.5102 58.138 1,2.4.Trichloropanemg/kg (ppm)2.5102 58.138 1,2.4.Trichlorobenzenemg/kg (ppm)2.5102 58.138 1,2.4.Trichlorobenzenemg/kg (ppm)2.5102 58.138 1,2.4.Trichlorobenzenemg/kg (ppm)2.5102 58.138 1,2.4.Trichlo	m,p-Xylene	mg/kg (ppm)	5	104	78-122
StyleneIngrkg (ppn) 2.5 35 $14+120$ Isopropylbenzenemg/kg (ppn) 2.5 109 $76+127$ Bromoformmg/kg (ppn) 2.5 110 $56+132$ n-Propylbenzenemg/kg (ppn) 2.5 98 $74+124$ Bromobenzenemg/kg (ppn) 2.5 93 $72+122$ $1,3,5-Trimethylbenzenemg/kg (ppn)2.59376+1261,1,2,2-Tetrachloroethanemg/kg (ppn)2.59356+1431,2,3-Trichloropopanemg/kg (ppn)2.59161+1372-Chlorotoluenemg/kg (ppn)2.59575+122tert-Butylbenzenemg/kg (ppn)2.59973+1301,2,4-Trimethylbenzenemg/kg (ppn)2.59971+130p-Isopropylduenemg/kg (ppn)2.59971-130p-Isopropylduenemg/kg (ppn)2.59775+1211,4-bichlorobenzenemg/kg (ppn)2.59775+1211,4-bichlorobenzenemg/kg (ppn)2.59574+1171,2-Dichlorobenzenemg/kg (ppn)2.510276+1211,2-Hrichlorobenzenemg/kg (ppn)2.510258+1381,2,4-Trichlorobenzenemg/kg (ppn)2.510258+1381,2,4-Trichlorobenzenemg/kg (ppn)2.510258+1381,2,4-Trichlorobenzenemg/kg (ppn)2.510258+1381,2,3-Trichl$	0-Aylene Sturiono	mg/kg (ppm)	2.0	107	77.124
Inclusionmg/kg (ppm)2.51056-132n-Propylbenzenemg/kg (ppm)2.59874-124Bromobenzenemg/kg (ppm)2.59372-1221,3.5-Trimethylbenzenemg/kg (ppm)2.59376-1261,2.2-Tetrachloroethanemg/kg (ppm)2.59356-1431,2.3-Trichloropopanemg/kg (ppm)2.59161-1372-Chlorotoluenemg/kg (ppm)2.59575-122tert-Butylbenzenemg/kg (ppm)2.59973-1301,2.4-Trimethylbenzenemg/kg (ppm)2.59973-1301,2.4-Trimethylbenzenemg/kg (ppm)2.59971-130p-Isopropylouenemg/kg (ppm)2.59775-1211,4-Dichlorobenzenemg/kg (ppm)2.59775-1211,4-Dichlorobenzenemg/kg (ppm)2.59574-1171,2-Dichlorobenzenemg/kg (ppm)2.510276-1211,2-Dichlorobenzenemg/kg (ppm)2.510258-1881,2,4-Trichlorobenzenemg/kg (ppm)2.510258-1881,2,4-Trichlorobenzenemg/kg (ppm)2.510258-1831,2,4-Trichlorobenzenemg/kg (ppm)2.510464-1351,2-Dirborobenzenemg/kg (ppm)2.510763-1341,2,3-Trichlorobenzenemg/kg (ppm)2.510763-1341,2,3-Trichlorobenzenemg/kg (ppm)2.510763-138	Isopropylhenzene	mg/kg (ppiii)	2.5	109	76-127
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bromoform	mg/kg (ppm)	2.5	110	56-132
Bromobenzene mg/kg (ppm) 2.5 93 72.122 $1,3,5$ -Trimethylbenzene mg/kg (ppm) 2.5 104 76.126 $1,1,2,2$ -Terachloroethane mg/kg (ppm) 2.5 93 56.143 $1,2,3$ -Trichloroppane mg/kg (ppm) 2.5 91 61.137 2-Chlorotoluene mg/kg (ppm) 2.5 91 61.137 2-Chlorotoluene mg/kg (ppm) 2.5 95 75.122 4-Chlorotoluene mg/kg (ppm) 2.5 99 73.130 $1,2,4$ -Trimethylbenzene mg/kg (ppm) 2.5 99 70.132 $1,2,4$ -Trimethylbenzene mg/kg (ppm) 2.5 99 70.132 $1,3$ -Dichlorobenzene mg/kg (ppm) 2.5 99 70.132 $1,3$ -Dichlorobenzene mg/kg (ppm) 2.5 97 75.121 $1,4$ -Dichlorobenzene mg/kg (ppm) 2.5 97 75.121 $1,2$ -Dichlorobenzene mg/kg (ppm) 2.5 102 76.121 $1,2$ -Dichlorobenzene mg/kg (ppm) 2.5 102 76.121 $1,2$ -Dichlorobenzene mg/kg (ppm) 2.5 102 58.138 $1,2,4$ -Trichlorobenzene mg/kg (ppm) 2.5 102 58.138 $1,2,4$ -Trichlorobenzene mg/kg (ppm) 2.5 102 58.138 $1,2,4$ -Trichlorobenzene mg/kg (ppm) 2.5 107 63.130 Hexachlorobutadiene mg/kg (ppm) 2.5 107 63.136 $1,2,3$ -Trichlorobenzene <t< td=""><td>n-Propylbenzene</td><td>mg/kg (ppm)</td><td>2.5</td><td>98</td><td>74-124</td></t<>	n-Propylbenzene	mg/kg (ppm)	2.5	98	74-124
1,3.5-Trimethylbenzenemg/kg (ppm)2.510476-1261,1,2,2-Tetrachloroethanemg/kg (ppm)2.59356-1431,2,3-Trichloroppanemg/kg (ppm)2.59161-1372-Chlorotoluenemg/kg (ppm)2.59575-1224-Chlorotoluenemg/kg (ppm)2.59973-1301,2,4-Trimethylbenzenemg/kg (ppm)2.59973-1301,2,4-Trimethylbenzenemg/kg (ppm)2.59971-130p-Isopropyltoluenemg/kg (ppm)2.59970-1321,3-Dichlorobenzenemg/kg (ppm)2.59775-1211,4-Dichlorobenzenemg/kg (ppm)2.59574-1171,2-Dichlorobenzenemg/kg (ppm)2.510258-1381,2,4-Trinchorobenzenemg/kg (ppm)2.510258-1381,2,2-Hrichlorobenzenemg/kg (ppm)2.510258-1381,2,2-Trichlorobenzenemg/kg (ppm)2.510258-1381,2,4-Trichlorobenzenemg/kg (ppm)2.510258-1381,2,4-Trichlorobenzenemg/kg (ppm)2.510258-1381,2,4-Trichlorobenzenemg/kg (ppm)2.510464-1351,2,3-Trichlorobenzenemg/kg (ppm)2.510750-1531,2,3-Trichlorobenzenemg/kg (ppm)2.510863-1401,2,3-Trichlorobenzenemg/kg (ppm)2.510763-138	Bromobenzene	mg/kg (ppm)	2.5	93	72-122
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	104	76-126
1,2,3-Trichloropropanemg/kg (ppm)2.591 $61\cdot13^7$ 2-Chlorotoluenemg/kg (ppm)2.510074\cdot1214-Chlorotoluenemg/kg (ppm)2.59575\cdot122tert-Butylbenzenemg/kg (ppm)2.59973·1301,2,4-Trimethylbenzenemg/kg (ppm)2.59971·130p-Isopropyltoluenemg/kg (ppm)2.59970·1321,3-Dichlorobenzenemg/kg (ppm)2.59775·1211,4-Dichlorobenzenemg/kg (ppm)2.59574·1171,2-Dichlorobenzenemg/kg (ppm)2.510276·1211,2-Dichlorobenzenemg/kg (ppm)2.510258·1381,2,4-Trichlorobenzenemg/kg (ppm)2.510258·1381,2,4-Trichlorobenzenemg/kg (ppm)2.510064·1351,2,3-Trichlorobenzenemg/kg (ppm)2.510750·1531,2,3-Trichlorobenzenemg/kg (ppm)2.510863·140	1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	93	56-143
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1,2,3-Trichloropropane	mg/kg (ppm)	2.5	91	61-137
FrementiationIng/kg (ppm)2.55010 122tert-Butylbenzenemg/kg (ppm)2.59973 1301,2,4-Trimethylbenzenemg/kg (ppm)2.59970 123sec-Butylbenzenemg/kg (ppm)2.59970 1321,3-Dichlorobenzenemg/kg (ppm)2.59970 1321,3-Dichlorobenzenemg/kg (ppm)2.59775 1211,4-Dichlorobenzenemg/kg (ppm)2.510276 1211,2-Dichlorobenzenemg/kg (ppm)2.510258 1381,2-Liromo-3-chloropropanemg/kg (ppm)2.510258 1381,2,4-Trichlorobenzenemg/kg (ppm)2.510064 135Hexachlorobutadienemg/kg (ppm)2.510750 -153Naphthalenemg/kg (ppm)2.510863 -1401,2,3-Trichlorobenzenemg/kg (ppm)2.510763 -138	4-Chlorotoluono	mg/kg (ppm)	2.0	95	74-121 75-199
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	tert-Butylbenzene	mg/kg (ppm)	2.5	99	73-122
sec-Butylbenzene mg/kg (ppm) 2.5 99 71-130 p-Isopropyltoluene mg/kg (ppm) 2.5 99 70-132 1,3-Dichlorobenzene mg/kg (ppm) 2.5 97 75-121 1,4-Dichlorobenzene mg/kg (ppm) 2.5 95 74-117 1,2-Dichlorobenzene mg/kg (ppm) 2.5 102 76-121 1,2-Dichlorobenzene mg/kg (ppm) 2.5 102 58-138 1,2-Dichlorobenzene mg/kg (ppm) 2.5 102 58-138 1,2-Dichlorobenzene mg/kg (ppm) 2.5 101 64-135 1,2-A-Trichlorobenzene mg/kg (ppm) 2.5 107 50-153 Naphthalene mg/kg (ppm) 2.5 108 63-140 1,2,3-Trichlorobenzene mg/kg (ppm) 2.5 107 63-138	1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	101	76-125
p-Isopropyltoluene mg/kg (ppm) 2.5 99 70-132 1,3-Dichlorobenzene mg/kg (ppm) 2.5 97 75-121 1,4-Dichlorobenzene mg/kg (ppm) 2.5 95 74-117 1,2-Dichlorobenzene mg/kg (ppm) 2.5 102 76-121 1,2-Dichlorobenzene mg/kg (ppm) 2.5 102 76-121 1,2-Diblorono-3-chloropropane mg/kg (ppm) 2.5 102 58-138 1,2.4-Trichlorobenzene mg/kg (ppm) 2.5 100 64-135 Hexachlorobutadiene mg/kg (ppm) 2.5 107 50-153 Naphthalene mg/kg (ppm) 2.5 108 63-140 1,2,3-Trichlorobenzene mg/kg (ppm) 2.5 107 63-138	sec-Butylbenzene	mg/kg (ppm)	2.5	99	71-130
1,3-Dichlorobenzene mg/kg (ppm) 2.5 97 75-121 1,4-Dichlorobenzene mg/kg (ppm) 2.5 95 74-117 1,2-Dichlorobenzene mg/kg (ppm) 2.5 102 76-121 1,2-Dichlorobenzene mg/kg (ppm) 2.5 102 58-138 1,2-L'Trichlorobenzene mg/kg (ppm) 2.5 110 64-135 Hexachlorobutadiene mg/kg (ppm) 2.5 107 50-153 Naphthalene mg/kg (ppm) 2.5 108 63-140 1,2,3-Trichlorobenzene mg/kg (ppm) 2.5 107 63-138	p-Isopropyltoluene	mg/kg (ppm)	2.5	99	70-132
1,4-Dichlorobenzene mg/kg (ppm) 2.5 95 74-117 1,2-Dichlorobenzene mg/kg (ppm) 2.5 102 76-121 1,2-Dichlorobenzene mg/kg (ppm) 2.5 102 58-138 1,2.4-Trichlorobenzene mg/kg (ppm) 2.5 110 64-135 Hexachlorobutadiene mg/kg (ppm) 2.5 107 50-153 Naphthalene mg/kg (ppm) 2.5 108 63-140 1,2.3-Trichlorobenzene mg/kg (ppm) 2.5 107 63-138	1,3-Dichlorobenzene	mg/kg (ppm)	2.5	97	75-121
1,2-Dichlorobonzene mg/kg (ppm) 2.5 102 76-121 1,2-Dibromo-3-chloropropane mg/kg (ppm) 2.5 102 58-138 1,2,4-Trichlorobenzene mg/kg (ppm) 2.5 110 64-135 Hexachlorobutadiene mg/kg (ppm) 2.5 107 50-153 Naphthalene mg/kg (ppm) 2.5 108 63-140 1,2,3-Trichlorobenzene mg/kg (ppm) 2.5 107 63-138	1,4-Dichlorobenzene	mg/kg (ppm)	2.5	95	74-117
1,2-bit onto-scient op opane ing xg (ppin) 2.5 102 58-138 1,2,4-Trichlorobenzene mg/kg (ppm) 2.5 110 64-135 Hexachlorobutadiene mg/kg (ppm) 2.5 107 50-153 Naphthalene mg/kg (ppm) 2.5 108 63-140 1,2,3-Trichlorobenzene mg/kg (ppm) 2.5 107 63-138	1,2-Dichiorobenzene	mg/kg (ppm)	2.5 9.5	102	70-121 58 128
Increasion Increasion <thincreasion< th=""> Increasion Increasi</thincreasion<>	1.2.4-Trichlorobenzene	mg/kg (ppm)	2.0 2.5	102	64.135
Naphthalene mg/kg (ppm) 2.5 108 63.140 1,2,3-Trichlorobenzene mg/kg (ppm) 2.5 107 63.138	Hexachlorobutadiene	mg/kg (ppm)	2.5	107	50-153
1,2,3-Trichlorobenzene mg/kg (ppm) 2.5 107 63-138	Naphthalene	mg/kg (ppm)	2.5	108	63-140
	1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	107	63-138

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



















Ph. (206) 285-8282	Seattle, WA 98119-2029	3012 16th Avenue West	Friedman & Bruya, Inc.		B- 3- 15	6-2-5	B-10-40	8-10-35	12-10-5	8-10-25	8-10-20	R-10-15	R-10-10	B-10-5	Sample ID		Phone Em	City State ZIP	Company 7 X	Neport 10	- Andio	90 02
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Ph. (206) 285-8282	3012 16 th Avenue West Re Seattle, WA 98119-2029 Re	Friedman & Bruya, Inc.						B-8-40	B-8-35	B-8-30	Sample ID		Phone Ema	City, State, ZIP	Address	Company HART	Report To	b b
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 30, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 12, 2019 from the Kosmos, F&BI 912214 project. There are 20 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1230R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 12, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912214 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Hart Crowser
912214 -01	B-9-W
912214 -02	B-6-W
912214 -03	B-7-W

A 6020B internal standard failed the acceptance criteria for sample B-6-W. The sample was diluted and reanalyzed with acceptable results. Both data sets were reported.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912214 Date Extracted: 12/23/19 Date Analyzed: 12/23/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Gasoline Range	Surrogate (<u>% Recovery)</u> (Limit 51-134)
B-9-W 912214-01	<100	88
B-6-W 912214-02	<100	89
B-7-W 912214-03	<100	85
Method Blank 09-2937 MB	<100	93

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912214 Date Extracted: 12/23/19 Date Analyzed: 12/23/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	Motor Oil Range (C25-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
B-9-W 912214-01 1/1.4	<70	<350	78
B-6-W 912214-02	<50	<250	83
B-7-W 912214-03	<50	<250	89
Method Blank ^{09-3103 MB}	<50	<250	83

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	B-6-W		Client:	Hart Crowser
Date Received:	12/12/19		Project:	Kosmos, F&BI 912214
Date Extracted:	12/20/19		Lab ID:	912214-02
Date Analyzed:	12/20/19		Data File:	912214-02.134
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		11.6		
Barium		242		
Cadmium		<1		
Chromium		18.4 J		
Lead		8.69		
Mercury		<1		
Selenium		<1		
Silver		<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	B-6-W		Client:	Hart Crowser
Date Received:	12/12/19		Project:	Kosmos, F&BI 912214
Date Extracted:	12/20/19		Lab ID:	912214-02 x10
Date Analyzed:	12/23/19		Data File:	912214-02 x10.131
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Chromium		40.8		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank NA 12/20/19 12/20/19 Water ug/L (ppb)	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912214 I9-817 mb2 I9-817 mb2.132 ICPMS2 SP
Analyte:	Concentration ug/L (ppb)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-9-W 12/12/19 12/23/19 12/24/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912214 912214-01 1/2 122407.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene-d12		% Recovery: 73 70	Lower Limit: 31 25	Upper Limit: 160 165
Compounds:		Concentration ug/L (ppb)		
Naphthalene		<0.4		
Acenaphthylene		< 0.04		
Acenaphthene		< 0.04		
Fluorene		< 0.04		
Phenanthrene		0.072		
Anthracene		< 0.04		
Fluoranthene		< 0.04		
Pyrene		0.043		
Benz(a)anthracene		< 0.04		
Chrysene		< 0.04		
Benzo(a)pyrene		< 0.04		
Benzo(b)fluoranthene		< 0.04		
Benzo(k)fluoranthene		< 0.04		
Indeno(1,2,3-cd)pyrene		< 0.04		
Dibenz(a,h)anthracene		< 0.04		
Benzo(g,h,i)perylene		< 0.04		
ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-6-W 12/12/19 12/23/19 12/24/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912214 912214-02 1/2 122408.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 75 61	Lower Limit: 31 25	Upper Limit: 160 165
Compounds:		Concentration ug/L (ppb)		
Naphthalene		<0.4		
Acenaphthylene		< 0.04		
Acenaphthene		< 0.04		
Fluorene		< 0.04		
Phenanthrene		0.19		
Anthracene		< 0.04		
Fluoranthene		0.18		
Pyrene		0.23		
Benz(a)anthracene		< 0.04		
Chrysene		0.047		
Benzo(a)pyrene		< 0.04		
Benzo(b)fluoranthe	ne	< 0.04		
Benzo(k)fluoranthe	ne	< 0.04		
Indeno(1,2,3-cd)pyr	ene	< 0.04		
Dibenz(a,h)anthrac	ene	< 0.04		
Benzo(g,h,i)perylen	e	< 0.04		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-7-W 12/12/19 12/23/19 12/24/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912214 912214-03 1/2 122409.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 81 78	Lower Limit: 31 25	Upper Limit: 160 165
Compounds:		Concentration ug/L (ppb)		
Naphthalene		< 0.4		
Acenaphthylene		< 0.04		
Acenaphthene		< 0.04		
Fluorene		< 0.04		
Phenanthrene		< 0.04		
Anthracene		< 0.04		
Fluoranthene		< 0.04		
Pyrene		< 0.04		
Benz(a)anthracene		< 0.04		
Chrysene		< 0.04		
Benzo(a)pyrene		< 0.04		
Benzo(b)fluoranthe	ne	< 0.04		
Benzo(k)fluoranthe	ne	< 0.04		
Indeno(1,2,3-cd)pyr	ene	< 0.04		
Dibenz(a,h)anthrac	ene	< 0.04		
Benzo(g,h,i)perylen	e	< 0.04		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Bla Not Applica 12/23/19 12/23/19 Water ug/L (ppb)	nk ble	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912214 09-3099 mb 122322.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 82 90	Lower Limit: 31 25	Upper Limit: 160 165
Compounds:		Concentration ug/L (ppb)		
Naphthalene		< 0.2		
Acenaphthylene		< 0.02		
Acenaphthene		< 0.02		
Fluorene		< 0.02		
Phenanthrene		< 0.02		
Anthracene		< 0.02		
Fluoranthene		< 0.02		
Pyrene		< 0.02		
Benz(a)anthracene		< 0.02		
Chrysene		< 0.02		
Benzo(a)pyrene		< 0.02		
Benzo(b)fluoranthe	ne	< 0.02		
Benzo(k)fluoranthe	ne	< 0.02		
Indeno(1,2,3-cd)pyr	ene	< 0.02		
Dibenz(a,h)anthrac	ene	< 0.02		
Benzo(g,h,i)perylen	e	< 0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-9-W		Client:	Hart Crowser	
Date Received:	12/12/19		Project:	Kosmos, F&BI 912214	1
Date Extracted:	12/23/19		Lab ID:	912214-01	
Date Analyzed:	12/26/19		Data File:	122634.D	
Matrix:	Water		Instrument:	GCMS4	
Units:	ug/L (ppb)		Operator:	MS	
			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	103	57	121	
Toluene-d8		102	63	127	
4-Bromofluorobenz	ene	99	60	133	
		Concentration			Concentration
Compounds:		ug/L (ppb)	Compou	nds:	ug/L (ppb)
Dichlorodifluorome	thane	<1	1,3-Dich	loropropane	<1
Chloromethane		<10	Tetrachl	loroethene	<1
Vinyl chloride		< 0.2	Dibromo	ochloromethane	<1
Bromomethane		<1	1,2-Dibr	omoethane (EDB)	<1
Chloroethane		<1	Chlorob	enzene	<1
Trichlorofluoromet	hane	<1	Ethylbe	nzene	<1
Acetone		<50	1,1,1,2-7	Tetrachloroethane	<1
1,1-Dichloroethene		<1	m,p-Xyle	ene	<2
Hexane		<1	o-Xylene	<u>)</u>	<1
Methylene chloride	2	<5	Styrene		<1
Methyl t-butyl ethe	er (MTBE)	<1	Isopropy	lbenzene	<1
trans-1,2-Dichloroe	ethene	<1	Bromofo	rm	<1
1,1-Dichloroethane		<1	n-Propy	lbenzene	<1
2,2-Dichloropropan	e	<1	Bromobe	enzene	<1
cis-1,2-Dichloroeth	ene	<1	1,3,5-Tr	imethylbenzene	<1
Chloroform		<1	1,1,2,2-7	Tetrachloroethane	<1
2-Butanone (MEK)		<10	1,2,3-Tri	ichloropropane	<1
1,2-Dichloroethane	(EDC)	<1	2-Chloro	otoluene	<1
1,1,1-Trichloroetha	ne	<1	4-Chloro	otoluene	<1
1,1-Dichloropropen	e	<1	tert-But	ylbenzene	<1
Carbon tetrachlorio	de	<1	1,2,4-Tri	imethylbenzene	<1
Benzene		<0.35	sec-Buty	lbenzene	<1
Trichloroethene		<1	p-Isopro	pyltoluene	<1
1,2-Dichloropropan	e	<1	1,3-Dich	lorobenzene	<1
Bromodichlorometh	nane	<1	1,4-Dich	lorobenzene	<1
Dibromomethane		<1	1,2-Dich	lorobenzene	<1
4-Methyl-2-pentan	one	<10	1,2-Dibr	omo-3-chloropropane	<10
cis-1,3-Dichloropro	pene	<1	1,2,4-Tri	ichlorobenzene	<1
Ioluene		<1	Hexachl	orobutadiene	<1
trans-1,3-Dichlorop	oropene	<1	Naphtha	alene	<1
1,1,2-Trichloroetha	ne	<1	1,2,3-Tr	ichlorobenzene	<1
z-Hexanone		<10			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-6-W		Client:	Hart Crowser	
Date Received:	12/12/19		Project:	Kosmos, F&BI 912214	1
Date Extracted:	12/23/19		Lab ID:	912214-02	
Date Analyzed:	12/23/19		Data File:	122319.D	
Matrix:	Water		Instrument:	GCMS9	
Units:	ug/L (ppb)		Operator:	MS	
			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	102	50	150	
Toluene-d8		107	50	150	
4-Bromofluorobenz	ene	103	50	150	
		Concentration			Concentration
Compounds:		ug/L (ppb)	Compou	nds:	ug/L (ppb)
Dichlorodifluorome	thane	<1	1,3-Dich	loropropane	<1
Chloromethane		<10	Tetrachl	loroethene	<1
Vinyl chloride		< 0.2	Dibromo	ochloromethane	<1
Bromomethane		<1	1,2-Dibr	omoethane (EDB)	<1
Chloroethane		<1	Chlorobe	enzene	<1
Trichlorofluoromet	hane	<1	Ethylber	nzene	<1
Acetone		<50	1,1,1,2-T	Tetrachloroethane	<1
1,1-Dichloroethene		<1	m,p-Xyle	ene	<2
Hexane		<1	o-Xylene	<u>)</u>	<1
Methylene chloride		<5	Styrene		<1
Methyl t-butyl ethe	r (MTBE)	<1	Isopropy	lbenzene	<1
trans-1,2-Dichloroe	thene	<1	Bromofo	orm	<1
1,1-Dichloroethane		<1	n-Propy	lbenzene	<1
2,2-Dichloropropan	e	<1	Bromobe	enzene	<1
cis-1,2-Dichloroethe	ene	<1	1,3,5-Tri	imethylbenzene	<1
Chloroform		<1	1,1,2,2-T	Tetrachloroethane	<1
2-Butanone (MEK)		<10	1,2,3-Tri	ichloropropane	<1
1,2-Dichloroethane	(EDC)	<1	2-Chloro	otoluene	<1
1,1,1-Trichloroetha	ne	<1	4-Chloro	otoluene	<1
1,1-Dichloropropen	e	<1	tert-But	ylbenzene	<1
Carbon tetrachloric	le	<1	1,2,4-Tri	imethylbenzene	<1
Benzene		< 0.35	sec-Buty	lbenzene	<1
Trichloroethene		<1	p-Isopro	pyltoluene	<1
1,2-Dichloropropan	e	<1	1,3-Dich	lorobenzene	<1
Bromodichlorometh	nane	<1	1,4-Dich	lorobenzene	<1
Dibromomethane		<l< td=""><td>1,2-Dich</td><td>lorobenzene</td><td><1</td></l<>	1,2-Dich	lorobenzene	<1
4-Methyl-2-pentance	one	<10	1,2-Dibr	omo-3-chloropropane	<10
cis-1,3-Dichloroproj	pene	<1	1,2,4-Tri	ichlorobenzene	<1
1 oluene		<1	Hexachl	orobutadiene	<1
trans-1,3-Dichlorop	ropene	<1	Naphtha	alene	<1
1,1,2-1richloroetha	ne	<1	1,2,3-1ri	ichioropenzene	<1
z-Hexanone		<10			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-7-W		Client:	Hart Crowser	
Date Received:	12/12/19		Project:	Kosmos, F&BI 912214	1
Date Extracted:	12/23/19		Lab ID:	912214-03	
Date Analyzed:	12/23/19		Data File:	122320.D	
Matrix:	Water		Instrument:	GCMS9	
Units:	ug/L (ppb)		Operator:	MS	
			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	100	50	150	
Toluene-d8		108	50	150	
4-Bromofluorobenze	ene	105	50	150	
		Concentration			Concentration
Compounds:		ug/L (ppb)	Compou	nds:	ug/L (ppb)
Dichlorodifluoromo	thana	-1	1 2 Dich	loronronono	-1
Chloromothano	ulalle	<10	Totroch	loroothono	<1
Vinyl chlorido		<10	Dibromo	achloromothono	<1
Promomothono		<0.2	1 2 Dibr	omoothono (EDP)	<1
Chloroothano		<1	Chloroby		<1
Trichlorofluoromot	hano	<1	Ethylbo	nzono	<1
Acetone	liane	<50	1 1 1 9-T	Tatrachloroothano	<1
1 1-Dichloroethene		<00	1, 1, 1, 2	ano	<1
Hexane		<1	o-Xvlene		<1
Methylene chloride		<5	Styrene		<1
Methyl t-butyl ethe	er (MTBE)	<1	Isopropy	lbenzene	<1
trans-1 2-Dichloroe	thene	<1	Bromofo	rm	<1
1.1-Dichloroethane		<1	n-Propy	lbenzene	<1
2.2-Dichloropropan	е	<1	Bromobe	enzene	<1
cis-1.2-Dichloroethe	ene	<1	1.3.5-Tri	imethvlbenzene	<1
Chloroform		<1	1,1,2,2-7	Tetrachloroethane	<1
2-Butanone (MEK)		<10	1,2,3-Tri	ichloropropane	<1
1,2-Dichloroethane	(EDC)	<1	2-Chloro	otoluene	<1
1,1,1-Trichloroetha	ne	<1	4-Chloro	otoluene	<1
1,1-Dichloropropen	e	<1	tert-But	ylbenzene	<1
Carbon tetrachlorid	le	<1	1,2,4-Tri	imethylbenzene	<1
Benzene		< 0.35	sec-Buty	lbenzene	<1
Trichloroethene		<1	p-Isopro	pyltoluene	<1
1,2-Dichloropropan	e	<1	1,3-Dich	lorobenzene	<1
Bromodichlorometh	nane	<1	1,4-Dich	lorobenzene	<1
Dibromomethane		<1	1,2-Dich	lorobenzene	<1
4-Methyl-2-pentance	one	<10	1,2-Dibr	omo-3-chloropropane	<10
cis-1,3-Dichloroprop	pene	<1	1,2,4-Tri	ichlorobenzene	<1
Toluene		<1	Hexachl	orobutadiene	<1
trans-1,3-Dichlorop	ropene	<1	Naphtha	alene	<1
1,1,2-Trichloroetha	ne	<1	1,2,3-Tri	ichlorobenzene	<1
2-Hexanone		<10			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bla	nk	Client:	Hart Crowser	
Date Received:	Not Applica	able	Project:	Kosmos, F&BI 912214	1
Date Extracted:	12/23/19		Lab ID:	09-3081 mb	
Date Analyzed:	12/23/19		Data File:	122314.D	
Matrix:	Water		Instrument:	GCMS4	
Units:	ug/L (ppb)		Operator:	MS	
			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	99	57	121	
Toluene-d8		104	63	127	
4-Bromofluorobenz	ene	93	60	133	
		Concentration			Concentration
Compounds:		ug/L (ppb)	Compou	nds:	ug/L (ppb)
Dichlorodifluorome	thang	~1	1 3-Dich	loropropape	<1
Chloromethane	thane	<10	Totrachl	oroothono	<1
Vinyl chlorido		< 0.2	Dibromo	chloromothano	<1
Bromomothano		<0.2	1 2 Dibr	omoothana (FDR)	<1
Chloroothana		<1	1,2-DIDI Chloroby		<1
Trichlonofluonomot	hono	<1	Ethylbo		<1
Acotopo	liane	<1		atrachlaraathana	<1
Acetone 1 1 Dichlonoothono		< 30	$1, 1, 1, 2^{-1}$	etracilioroetilaile	<1
Lovono		<1	ni,p-Ayie		<2.
Mathylana chlarida		<1	0-Aylene Styropo		<1
Methyl t butyl otho		< 1	Joonnon	lhonzono	<1
trong 1 2 Dishlaroo	thene	<1	Bromofo	ndenzene	<1
1 1 Dichloroothono	thene	<1	n Propy	III	<1
1,1-Dicilioroetilalle	0	<1	n-Propyl	idenzene	<1
2,2-Dicition opt opan	e	<1		methylhenzene	<1
Chloroform	ene	<1	1,3,3-11	InternyiDenzene Satraablaraathana	<1
2 Dutanana (MEK)		<1	$1, 1, 2, 2^{-1}$ 1 9 9 Tm	etracinoroetnane	<1
2-Dutalione (MEK)	(EDC)	<10	1,2,3-11 2 Chlore	taluana	<1
1,2-Dicilioroeulalle	(EDC)	<1	2-Cilloro	toluene	<1
1,1,1-111010etha	ne	<1	4-CIII0IU	ullengene	<1
Carbon totrachloric		<1	1.2.4 Tr	yndenzene	<1
Carbon tetracinorit	le	<1	1,2,4-11	lhenzene	<1
Trichloroothono		< 0.35	set-Duty	nultaluana	<1
1 2 Dichloropropon	0	<1	1 2 Dich	lorohonzono	<1
Promodichloromoth	e	<1	1,3-Dich	lorobonzono	<1
Dibromomothono	lalle	<1	1,4-Ditli 1.9 Diah	lorohonzono	<1
A Mothyl 2 poptop	200	<1	1,2-Ditii 1 2 Dibr	ama 2 chloronronana	<1
4-Methyl-2-pentalic		<10	1,2-DIDI 1.9.4 Tm	onio-o-chioropropane	<10
Teluene	pene	<1	1, 2, 4-1 F		<1
trong 1 2 Dishlaran	nonono	<1	Nonhth		<1
1 1 2 Trichlangetha	nopene	<1	inapritha	alene	<1
2 Hoveners	ne	<1 <10	1,2,3-11	icinorobenzene	<1
2-mexamone		<10			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912214

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 912380-01 (Duplicate)								
	Reporting	Samp	le Dı	ıplicate	RPD			
Analyte	Units	Resul	t F	Result	(Limit 20)			
Gasoline	ug/L (ppb)	<100	1	<100	nm			
Laboratory Code: Labo	oratory Contro	l Sample						
			Percent					
	Reporting	Spike	Recovery	Acceptance				
Analyte	Units	Level	LCS	Criteria	_			
Gasoline	ug/L (ppb)	1,000	93	69-134	-			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912214

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	112	63-142	15

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912214

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 912329-01 (Matrix Spike)

Laboratory Cou			(IRC)	Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Arsenic	ug/L (ppb)	10	<1	95	94	75-125	1
Barium	ug/L (ppb)	50	5.68	99	97	75-125	2
Cadmium	ug/L (ppb)	5	<1	97	95	75-125	2
Chromium	ug/L (ppb)	20	<1	100	98	75-125	2
Lead	ug/L (ppb)	10	<1	98	96	75-125	2
Mercury	ug/L (ppb)	5	<1	92	91	75-125	1
Selenium	ug/L (ppb)	5	<1	91	92	75-125	1
Silver	ug/L (ppb)	5	<1	92	89	75-125	3

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	97	80-120
Barium	ug/L (ppb)	50	99	80-120
Cadmium	ug/L (ppb)	5	99	80-120
Chromium	ug/L (ppb)	20	103	80-120
Lead	ug/L (ppb)	10	99	80-120
Mercury	ug/L (ppb)	5	95	80-120
Selenium	ug/L (ppb)	5	94	80-120
Silver	ug/L (ppb)	5	96	80-120

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912214

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Ū.	U U	•	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	ug/L (ppb)	1	82	80	57-114	2
Acenaphthylene	ug/L (ppb)	1	84	83	65-119	1
Acenaphthene	ug/L (ppb)	1	84	84	66-118	0
Fluorene	ug/L (ppb)	1	83	82	64-125	1
Phenanthrene	ug/L (ppb)	1	86	85	67-120	1
Anthracene	ug/L (ppb)	1	84	83	65-122	1
Fluoranthene	ug/L (ppb)	1	83	84	65-127	1
Pyrene	ug/L (ppb)	1	88	88	62-130	0
Benz(a)anthracene	ug/L (ppb)	1	90	89	60-118	1
Chrysene	ug/L (ppb)	1	89	89	66-125	0
Benzo(b)fluoranthene	ug/L (ppb)	1	73	73	55-135	0
Benzo(k)fluoranthene	ug/L (ppb)	1	75	75	62-125	0
Benzo(a)pyrene	ug/L (ppb)	1	73	73	58-127	0
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	71	72	36-142	1
Dibenz(a,h)anthracene	ug/L (ppb)	1	68	69	37-133	1
Benzo(g,h,i)perylene	ug/L (ppb)	1	69	70	34-135	1

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912214

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

-			Percent	Percent		
	Reporting	Spike	Recoverv	Recoverv	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	50	122	140	25-158	14
Chloromethane	ug/L (ppb)	50	122	127	45-156	4
Vinyl chloride	ug/L (ppb)	50	116	123	50-154	6
Bromomethane	ug/L (ppb)	50	127	137	55-143	8
Chloroethane	ug/L (ppb)	50	121	129	58-146	6
Trichlorofluoromethane	ug/L (ppb)	250	117	123	50-150	5
Acetone	ug/L (ppb)	250	99	98	53-131	1
Hevane	ug/L (ppb)	50	109	108	57-137	5 1
Methylene chloride	ug/L (ppb)	50	118	122	39-148	3
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	118	121	64-147	3
trans-1,2-Dichloroethene	ug/L (ppb)	50	116	117	68-128	1
1,1-Dichloroethane	ug/L (ppb)	50	114	116	79-121	2
2,2-Dichloropropane	ug/L (ppb)	50	105	112	55-143	6
cis-1,2-Dichloroethene	ug/L (ppb)	50	116	119	80-123	3
Chloroform	ug/L (ppb)	50	111	113	80-121	2
2-Butanone (MEK)	ug/L (ppb)	250	106	107	57-149	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	114	117	73-132	3
1,1,1-1 richloroethane	ug/L (ppb)	50	117	121	81-125	3
Carbon tetrachloride	ug/L (ppb)	50	120	114	75-158	2
Benzene	ug/L (ppb)	50	114	117	69-134	3
Trichloroethene	ug/L (ppb)	50	109	112	79-113	3
1,2-Dichloropropane	ug/L (ppb)	50	114	117	77-123	3
Bromodichloromethane	ug/L (ppb)	50	115	119	81-133	3
Dibromomethane	ug/L (ppb)	50	112	113	82-125	1
4-Methyl-2-pentanone	ug/L (ppb)	250	114	116	65-138	2
cis-1,3-Dichloropropene	ug/L (ppb)	50	123	125	82-132	2
Toluene	ug/L (ppb)	50	99	102	72-122	3
trans-1,3-Dichloropropene	ug/L (ppb)	50	109	111	80-136	2
2-Hevanone	ug/L (ppb)	50 250	100	101	75-124 60-136	1
1 3-Dichloropropane	ug/L (ppb)	50	101	101	76-126	3
Tetrachloroethene	ug/L (ppb)	50	99	103	76-121	4
Dibromochloromethane	ug/L (ppb)	50	110	113	84-133	3
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	101	103	82-115	2
Chlorobenzene	ug/L (ppb)	50	100	104	83-114	4
Ethylbenzene	ug/L (ppb)	50	102	106	77-124	4
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	107	112	84-127	5
m,p-Xylene	ug/L (ppb)	100	101	104	81-112	3
0-Aylene	ug/L (ppb)	50	101	105	81-121	4
Isopropylbenzene	ug/L (ppb)	50	101	106	80-117	5
Bromoform	ug/L (ppb)	50	117	120	74-136	3
n-Propylbenzene	ug/L (ppb)	50	98	101	74-126	3
Bromobenzene	ug/L (ppb)	50	100	102	80-121	2
1,3,5-Trimethylbenzene	ug/L (ppb)	50	101	104	78-123	3
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	100	102	66-126	2
1,2,3-Trichloropropane	ug/L (ppb)	50	98	100	67-124	2
2-Chlorotoluene	ug/L (ppb)	50	99	102	77-127	3
4-Chlorotoluene	ug/L (ppb)	50	99	102	78-128	3
tert-Butylbenzene	ug/L (ppb)	50	101	105	80-123	4
sec-Butylbenzene	ug/L (ppb)	50	99	103	80-116	4
n-Isopropyltoluene	ug/L (ppb)	50	97	101	81-123	4
1.3-Dichlorobenzene	ug/L (ppb)	50	99	102	83-113	3
1,4-Dichlorobenzene	ug/L (ppb)	50	97	100	83-107	3
1,2-Dichlorobenzene	ug/L (ppb)	50	100	104	84-112	4
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	100	107	57-141	7
1,2,4-Trichlorobenzene	ug/L (ppb)	50	101	106	72-130	5
Hexachlorobutadiene	ug/L (ppb)	50	94	98	53-141	4
Naphthalene	ug/L (ppb)	50	102	107	64-133	5
1,2,3-1 richlorobenzene	ug/L (ppb)	50	100	106	65-136	6

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.











Friedman & Bruya, Inc. 3012 16 th Avenue West Seattle, WA 98119-2029 Ph. (206) 285-8282	B-1-20 B-1-25 B-1-30	13-7-15 B-1-10 B-1-5 B-1-5	B-q-W Relation	Sample ID	City, State, ZIPEn	Report To HIAIL
SIGNATUR Relinquished by: Received by: Relinquished by: Received by:		03 A-J 12/11	01A-4 12/17	Lab ID Date Lab ID Sample	หม่ไ	14 boodhin CRDWSSER
H. MÁ	1445	1440	5/12/ 5/11/2 5/11/2	od Sampled	Project sp	SAMPLE SAMPLE
John Derc (Sample # of Type Jars	S ecific RLs? - Ye	CHAIN OF C
POUND				NWTPH-Dx NWTPH-Gx BTEX EPA 8021 NWTPH-HC1D	s / No	CUSTODY
THC:				VOCs EPA 8260 PAHs EPA 8270 PCBs EPA 8082	NVOICE TO	ME 12/1
MPANY	Samples rece			KUKTY O	SA: Archive Other_ Default:	2/19 Page TUP TUP RUSH RUSH Rush char
DATE TI 12/12 20 12/17 21	ived at 4.	X Hadud	Asee Org	Notes	MPLE DISPOSAL samples <u>Dispose after 30</u>	.# AT3/of C

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 30, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 12, 2019 from the Kosmos, F&BI 912215 project. There are 28 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1230R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 12, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912215 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912215 -01	B-6-5
912215 -02	B-6-10
912215 -03	B-6-15
912215 -04	B-6-20
912215 -05	B-6-25
912215 -06	B-6-30
912215 -07	B-6-35
912215 -08	B-6-40
912215 -09	B-7-5
912215 -10	B-7-10
912215 -11	B-7-15
912215 -12	B-7-20
912215 -13	B-7-25
912215 -14	B-7-30
912215 -15	B-7-35
912215 -16	B-7-40
912215 -17	B-9-5
912215 -18	B-9-10
912215 -19	B-9-15
912215 -20	B-9-20
912215 -21	B-9-25
912215 -22	B-9-30
912215 -23	B-9-35
912215 -24	B-9-40
912215 -25	B-1-5
912215 -26	B-1-10
912215 -27	B-1-15
912215 -28	B-1-20
912215 -29	B-1-25
912215 -30	B-1-30
912215 -31	B-1-35
912215 -32	B-1-40
912215 -33	B-5-5
912215 -34	B-5-15
912215 -35	B-5-20

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE (CONTINUED)

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912215 -36	B-5-25
912215 -37	B-5-30
912215 -38	B-5-35
912215 -39	B-5-40
912215 -40	B-4-5
912215 -41	B-4-15
912215 -42	B-4-20
912215 -43	B-4-25
912215 -44	B-4-30
912215 -45	B-4-35
912215 -46	B-4-40
912215 -47	B-4-45
912215 -48	B-4-50
912215 -49	B-2-5
912215 -50	B-2-10
912215 -51	B-2-15
912215 -52	B-2-20
912215 -53	B-2-25
912215 -54	B-2-30
912215 -55	B-2-35
912215 -56	B-2-40

The 8260C matrix spike and matrix spike duplicate failed the relative percent difference for acetone and 2-butanone. The analytes were not detected in the samples therefore the data were acceptable.

Methylene chloride was detected in sample B-5-5. The data were qualified as due to laboratory contamination.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215 Date Extracted: 12/23/19 Date Analyzed: 12/23/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
B-6-5 912215-01 1/5	93	90
B-5-5 912215-33 1/5	82	91
B-4-15 912215-41	12	92
B-4-35 ₉₁₂₂₁₅₋₄₅	7.3	85
B-2-5 912215-49	8.7	86
Method Blank ^{09-2938 MB}	<5	88

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215 Date Extracted: 12/23/19 Date Analyzed: 12/23/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	Ethyl <u>Benzene</u>	Total <u>Xylenes</u>	Gasoline <u>Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
B-6-35 912215-07	< 0.02	< 0.02	< 0.02	< 0.06	<5	85
B-6-40 912215-08	< 0.02	< 0.02	< 0.02	< 0.06	<5	85
B-7-5 912215-09	< 0.02	< 0.02	< 0.02	< 0.06	<5	84
B-9-40 912215-24	< 0.02	< 0.02	< 0.02	< 0.06	<5	88
B-1-5 912215-25	< 0.02	< 0.02	< 0.02	< 0.06	<5	88
B-5-15 912215-34	< 0.02	< 0.02	< 0.02	< 0.06	<5	85
B-4-40 912215-46	< 0.02	< 0.02	< 0.02	< 0.06	<5	84
B-2-10 912215-50	< 0.02	< 0.02	< 0.02	< 0.06	<5	83
B-2-35 912215-55	< 0.02	< 0.02	< 0.02	<0.06	<5	84
Method Blank 09-2938 MB	< 0.02	< 0.02	< 0.02	< 0.06	<5	88

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215 Date Extracted: 12/23/19 Date Analyzed: 12/23/19 and 12/24/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 53-144)
B-6-5 912215-01	2,000 x	5,600	81
B-6-35 912215-07	<50	<250	83
B-6-40 912215-08	<50	<250	84
B-7-5 912215-09	<50	<250	88
B-7-10 912215-10	<50	<250	74
B-9-5 912215-17	<50	<250	86
B-9-15 912215-19	<50	<250	84
B-9-25 912215-21	<50	<250	84
B-9-40 912215-24	<50	<250	84
B-1-5 912215-25	<50	<250	86

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215 Date Extracted: 12/23/19 Date Analyzed: 12/23/19 and 12/24/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 53-144)
B-1-10 912215-26	<50	<250	87
B-1-15 912215-27	<50	<250	86
B-1-35 912215-31	<50	<250	82
B-5-5 912215-33	730 x	2,800	82
B-5-15 912215-34	<50	<250	84
B-4-5 912215-40	<50	<250	84
B-4-15 912215-41	<50	<250	80
B-4-25 912215-43	<50	<250	86
B-4-35 912215-45	<50	<250	89
B-4-40 912215-46	<50	<250	85

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215 Date Extracted: 12/23/19 Date Analyzed: 12/23/19 and 12/24/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 53-144)
B-2-5 912215-49	<50	<250	85
B-2-10 912215-50	<50	<250	85
B-2-20 912215-52	<50	<250	88
B-2-35 912215-55	<50	<250	75
B-2-40 912215-56	<50	<250	86
Method Blank ^{09-3096 MB}	<50	<250	80
Method Blank ^{09-3101 MB}	<50	<250	75

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-6-5 12/12/19 12/23/19 12/25/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912215 912215-01 1/250 122423.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 128 d 69 d	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.5		
Acenaphthylene		< 0.5		
Acenaphthene		< 0.5		
Fluorene		< 0.5		
Phenanthrene		< 0.5		
Anthracene		< 0.5		
Fluoranthene		< 0.5		
Pyrene		1.8		
Benz(a)anthracene		< 0.5		
Chrysene		0.97		
Benzo(a)pyrene		0.56		
Benzo(b)fluoranthe	ne	< 0.5		
Benzo(k)fluoranthe	ne	< 0.5		
Indeno(1,2,3-cd)pyr	ene	< 0.5		
Dibenz(a,h)anthrac	ene	< 0.5		
Benzo(g,h,i)perylen	e	< 0.5		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-6-35 12/12/19 12/23/19 12/24/19 Soil mg/kg (ppm)) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912215 912215-07 1/5 122411.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 74 81	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-1-10 12/12/19 12/23/19 12/24/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912215 912215-26 1/5 122413.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 74 84	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-1-15 12/12/19 12/23/19 12/24/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912215 912215-27 1/5 122414.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 69 80	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-4-15 12/12/19 12/23/19 12/24/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912215 912215-41 1/5 122415.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 72 81	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-4-35 12/12/19 12/23/19 12/24/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912215 912215-45 1/5 122416.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 72 81	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-2-20 12/12/19 12/23/19 12/24/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912215 912215-52 1/5 122417.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 73 80	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank Not Applicable 12/23/19 12/23/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Coperator:	Hart Crowser Kosmos, F&BI 912215 09-3100 mb 1/5 122321.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	% Recovery 75 e-d12 88	7: Lower Limit: 31 24	Upper Limit: 163 168
	Concentrati	on	
Compounds:	mg/kg (ppn	1)	
Naphthalene	< 0.01		
Acenaphthylene	< 0.01		
Acenaphthene	< 0.01		
Fluorene	< 0.01		
Phenanthrene	< 0.01		
Anthracene	< 0.01		
Fluoranthene	< 0.01		
Pyrene	< 0.01		
Benz(a)anthracene	< 0.01		
Chrysene	< 0.01		
Benzo(a)pyrene	< 0.01		
Benzo(b)fluoranthe	ne <0.01		
Benzo(k)fluoranthe	ne <0.01		
Indeno(1,2,3-cd)pyr	ene <0.01		
Dibenz(a,h)anthrac	ene <0.01		
Benzo(g,h,i)perylen	e <0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-6-5		Client:	Hart Crowser	
Date Received:	12/12/19		Project:	Kosmos, F&BI 912213	5
Date Extracted:	12/23/19		Lab ID:	912215-01	
Date Analyzed:	12/23/19		Data File:	122318.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Dry Weight	Operator :	MS	
			Lower	Unner	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	100	62	145	
Toluene-d8		103	55	145	
4-Bromofluorobenz	ene	93	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	9	< 0.05
Methylene chloride	1	< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tr	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentane	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			
ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-5-5		Client:	Hart Crowser	
Date Received:	12/12/19		Project:	Kosmos, F&BI 912213	5
Date Extracted:	12/23/19		Lab ID:	912215-33	
Date Analyzed:	12/26/19		Data File:	122617.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Dry Weight	Operator :	MS	
			Lower	Unner	
Surrogates:		% Recovery:	Limit:	Limit:	
1.2-Dichloroethane	-d4	98	62	145	
Toluene-d8		97	55	145	
4-Bromofluorobenz	ene	95	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	ethane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	9	< 0.05
Methylene chloride	•	$0.51 \ lc$	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	ethene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	ie	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorie	de	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	ie	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentan	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-4-15		Client:	Hart Crowser	
Date Received:	12/12/19		Project:	Kosmos, F&BI 91221	5
Date Extracted:	12/23/19		Lab ID:	912215-41	
Date Analyzed:	12/23/19		Data File:	122320.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Dry Weight	Operator:	MS	
			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	106	62	145	
Toluene-d8		107	55	145	
4-Bromofluorobenz	ene	97	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene)	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentane	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-4-35		Client:	Hart Crowser	
Date Received:	12/12/19		Project:	Kosmos, F&BI 912213	5
Date Extracted:	12/23/19		Lab ID:	912215-45	
Date Analyzed:	12/23/19		Data File:	122321.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Dry Weight	Operator :	MS	
			Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	103	62	145	
Toluene-d8		106	55	145	
4-Bromofluorobenz	ene	96	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	e e	< 0.05
Methylene chloride	:	< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tr	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tr	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentane	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-2-5		Client:	Hart Crowser	
Date Received:	12/12/19		Project:	Kosmos, F&BI 912213	5
Date Extracted:	12/23/19		Lab ID:	912215-49	
Date Analyzed:	12/23/19		Data File:	122323.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Dry Weight	Operator :	MS	
			Lower	Unner	
Surrogates:		% Recovery:	Limit:	Limit:	
1.2-Dichloroethane	-d4	104	62	145	
Toluene-d8	u I	101	55	145	
4-Bromofluorobenz	ene	98	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	'etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene)	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	'etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentane	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bla	nk	Client:	Hart Crowser	
Date Received:	Not Applica	ble	Project:	Kosmos, F&BI 91221	5
Date Extracted:	12/23/19		Lab ID:	09-3082 mb	
Date Analyzed:	12/23/19		Data File:	122311.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	ug/L (ppb)		Operator:	MS	
	0 11 /		- T	TT	
Sumoratory		0/ Decorroration	Lower	Upper Limit:	
Surrogates:	44	% Recovery:			
1,2-Dichloroethane	-04	101	62 F F	145	
1 Druene-08		103	00 CF	140	
4-bromolluorobenz	ene	93	69	139	
		Concentration			Concentration
Compounds:		ug/L (ppb)	Compou	nds:	ug/L (ppb)
Dichlorodifluorome	thane	< 0.5	1.3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethvlber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-1	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	•	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propyl	benzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-T	'etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	chloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	toluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	methylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	pene	< 0.05	1,2,4-Tri	chlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	chlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 912193-10 (Duplicate)

		Sample	Duplicate	
	Reporting	Result	Result	RPD
Analyte	Units	(Wet Wt)	(Wet Wt)	(Limit 20)
Benzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Toluene	mg/kg (ppm)	< 0.02	< 0.02	nm
Ethylbenzene	mg/kg (ppm)	< 0.02	< 0.02	nm
Xylenes	mg/kg (ppm)	< 0.06	< 0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Benzene	mg/kg (ppm)	0.5	90	69-120
Toluene	mg/kg (ppm)	0.5	88	70-117
Ethylbenzene	mg/kg (ppm)	0.5	86	65 - 123
Xylenes	mg/kg (ppm)	1.5	87	66-120
Gasoline	mg/kg (ppm)	20	95	71-131

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912400-01 (Matri	ix Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	90	90	63-146	0
Laboratory Code:	Laboratory Conti	rol Samp	le				
			Percent	t			
	Reporting	Spike	Recover	y Accep	tance		
Analyte	Units	Level	LCS	Crit	eria		
Diesel Extended	mg/kg (ppm)	5,000	88	79-1	144		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 9	912215-07 (Matri	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	200	85	83	64-133	2
Laboratory Code: 1	Laboratory Contr	ol Samp	le				
			Percent	-			
	Reporting	Spike	Recover	y Accep	tance		
Analyte	Units	Level	LCS	Crite	eria		
Diesel Extended	mg/kg (ppm)	5,000	98	58-1	47		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912215-07 1/5 (Matrix Spike)

U U	× ·	1 /	Sample	Percent	
	Reporting	Spike	Result	Recovery	Acceptance
Analyte	Units	Level	(Wet wt)	MS	Criteria
Naphthalene	mg/kg (ppm)	0.17	< 0.01	74	44-129
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	77	52 - 121
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	76	51 - 123
Fluorene	mg/kg (ppm)	0.17	< 0.01	79	37 - 137
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	76	34 - 141
Anthracene	mg/kg (ppm)	0.17	< 0.01	73	32 - 124
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	77	16-160
Pyrene	mg/kg (ppm)	0.17	< 0.01	89	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	78	23 - 144
Chrysene	mg/kg (ppm)	0.17	< 0.01	78	32 - 149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	68	23 - 176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	68	42 - 139
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	64	21 - 163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	52	23 - 170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	55	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	45	37-133

Laboratory Code: Laboratory Control Sample 1/5

		-p	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	82	80	58-121	2
Acenaphthylene	mg/kg (ppm)	0.17	84	83	54 - 121	1
Acenaphthene	mg/kg (ppm)	0.17	84	84	54 - 123	0
Fluorene	mg/kg (ppm)	0.17	83	82	56 - 127	1
Phenanthrene	mg/kg (ppm)	0.17	86	85	55 - 122	1
Anthracene	mg/kg (ppm)	0.17	84	83	50 - 120	1
Fluoranthene	mg/kg (ppm)	0.17	83	84	54 - 129	1
Pyrene	mg/kg (ppm)	0.17	88	88	53 - 127	0
Benz(a)anthracene	mg/kg (ppm)	0.17	90	89	51 - 115	1
Chrysene	mg/kg (ppm)	0.17	89	89	55 - 129	0
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	73	73	56 - 123	0
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	75	75	54 - 131	0
Benzo(a)pyrene	mg/kg (ppm)	0.17	73	73	51 - 118	0
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	71	72	49-148	1
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	68	69	50 - 141	1
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	69	70	52 - 131	1

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912147-01912147-01 (Matrix Spike)

		1/	Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	21	23	10-56	9
Chloromethane	mg/kg (ppm)	2.5	< 0.5	45	46	10-90	2
Vinyl chloride	mg/kg (ppm)	2.5	< 0.05	39	39	10-91	0
Bromomethane	mg/kg (ppm)	2.5	< 0.5	53	61	10-110	14
Chloroethane	mg/kg (ppm)	2.5	<0.5	50	50	10-101	0
Acotomo	mg/kg (ppm)	2.5	<0.5	36	36	10-95	0
1 1-Dichloroothono	mg/kg (ppm)	2.5	<0.5	49	114	22-107	04 VU
Herane	mg/kg (ppm)	2.5	<0.05	37	40	10.95	10
Methylene chloride	mg/kg (ppm)	2.5	0.80	60 b	61 b	14-128	2 b
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	< 0.05	76	78	17-134	3
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	64	66	13-112	3
1,1-Dichloroethane	mg/kg (ppm)	2.5	< 0.05	75	79	23-115	5
2,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	63	61	18-117	3
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	73	74	25-120	1
Chloroform	mg/kg (ppm)	2.5	<0.05	78	82	29-117	5
2-Butanone (MEK) 1.2 Diablorecthone (FDC)	mg/kg (ppm)	12.0	<0.0	97	122	20-133	23 V0 10
1.1.1.Trichloroethane	mg/kg (ppm)	2.5	<0.05	00 67	97 68	22-124	10
1 1-Dichloropropene	mg/kg (ppm)	2.5	<0.05	72	77	26-107	7
Carbon tetrachloride	mg/kg (ppm)	2.5	<0.05	64	64	28-126	0
Benzene	mg/kg (ppm)	2.5	< 0.03	74	80	26-114	8
Trichloroethene	mg/kg (ppm)	2.5	< 0.02	74	81	30-112	9
1,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	83	92	31-119	10
Bromodichloromethane	mg/kg (ppm)	2.5	< 0.05	84	92	31-131	9
Dibromomethane	mg/kg (ppm)	2.5	<0.05	75	83	27-124	10
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	<0.5	92	100	16-147	8
Toluono	mg/kg (ppm)	2.0	<0.05	00 74	94 70	20-137	12
trans-1.3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	74	89	30-136	14
1.1.2-Trichloroethane	mg/kg (ppm)	2.5	<0.05	83	91	32-126	9
2-Hexanone	mg/kg (ppm)	12.5	< 0.5	96	110	17-147	14
1,3-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	80	89	29-125	11
Tetrachloroethene	mg/kg (ppm)	2.5	< 0.025	68	72	25-114	6
Dibromochloromethane	mg/kg (ppm)	2.5	< 0.05	75	79	32 - 143	5
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	<0.05	78	86	32-126	10
Chlorobenzene	mg/kg (ppm)	2.5	<0.05	75	82	37-113	9
1 1 1 2 Totrachloroothano	mg/kg (ppm)	2.0	<0.05	76	02 78	35-126	3
m n-Xylene	mg/kg (ppm)	5	<0.00	76	80	25-125	5
o-Xvlene	mg/kg (ppm)	2.5	<0.05	77	80	27-126	4
Styrene	mg/kg (ppm)	2.5	< 0.05	80	84	39-121	5
Isopropylbenzene	mg/kg (ppm)	2.5	< 0.05	77	80	34-123	4
Bromoform	mg/kg (ppm)	2.5	< 0.05	80	82	18-155	2
n-Propylbenzene	mg/kg (ppm)	2.5	< 0.05	77	88	31-120	13
Bromobenzene	mg/kg (ppm)	2.5	<0.05	74	82	40-115	10
1,3,5-1 rimetnyibenzene	mg/kg (ppm)	2.0	<0.05	76	84	24-130	10
1.2.3-Trichloropropane	mg/kg (ppm)	2.5	<0.05	86	96	33-123	10
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	78	86	39-110	10
4-Chlorotoluene	mg/kg (ppm)	2.5	< 0.05	76	87	39-111	13
tert-Butylbenzene	mg/kg (ppm)	2.5	< 0.05	76	85	36-116	11
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	76	83	35-116	9
sec-Butylbenzene	mg/kg (ppm)	2.5	< 0.05	78	84	33-118	7
p-Isopropyltoluene	mg/kg (ppm)	2.5	< 0.05	76	82	32-119	8
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	74	83	38-111	11
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	75 76	82	39-109	9
1.2-Dibromo-3-chloropropano	mg/kg (ppm)	2.0 9.5	<0.00	10	04	40-111 44.119	o B
1.2.4-Trichlorobenzene	mg/kg (ppm)	2.5	<0.5	76	82	31-121	8
Hexachlorobutadiene	mg/kg (ppm)	2.5	<0.25	78	80	24-128	3
Naphthalene	mg/kg (ppm)	2.5	< 0.05	79	82	24-139	4
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	78	82	35-117	5

ENVIRONMENTAL CHEMISTS

Date of Report: 12/30/19 Date Received: 12/12/19 Project: Kosmos, F&BI 912215

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

	-		Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	61	10-146
Chloromethane	mg/kg (ppm)	2.5	79	27-133
Vinyl chloride	mg/kg (ppm)	2.5	82	22-139
Bromomethane	mg/kg (ppm)	2.5	90	38-114
Chloroethane	mg/kg (ppm)	2.5	104	9-163
Trichlorofluoromethane	mg/kg (ppm)	2.5	99	10-196
1 1 Diabloroothono	mg/kg (ppm)	12.0	90 109	02-141 47 199
Hovano	mg/kg (ppm)	2.5	108	47-120
Methylene chloride	mg/kg (ppm)	2.5	113	42-132
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	103	60-123
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	113	67-129
1,1-Dichloroethane	mg/kg (ppm)	2.5	111	68-115
2,2-Dichloropropane	mg/kg (ppm)	2.5	109	52 - 170
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	114	72-127
Chloroform	mg/kg (ppm)	2.5	109	66-120
2-Butanone (MEK)	mg/kg (ppm)	12.5	110	72-127
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	116	56-135 69-191
1,1,1-1 richloropropopo	mg/kg (ppm)	2.0	111	69-128
Carbon tetrachloride	mg/kg (ppm)	2.5	115	60-139
Benzene	mg/kg (ppm)	2.5	114	68-114
Trichloroethene	mg/kg (ppm)	2.5	110	64-117
1,2-Dichloropropane	mg/kg (ppm)	2.5	118	72-127
Bromodichloromethane	mg/kg (ppm)	2.5	117	72-130
Dibromomethane	mg/kg (ppm)	2.5	115	70-120
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	118	45-145
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	128	75-136
Toluene	mg/kg (ppm)	2.5	105	66-126
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	117	72-132
2-Hovenono	mg/kg (ppm)	12.5	100	33-159
1 3-Dichloropropane	mg/kg (ppm)	2.5	102	72-130
Tetrachloroethene	mg/kg (ppm)	2.5	108	72-114
Dibromochloromethane	mg/kg (ppm)	2.5	115	74-125
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	106	74-132
Chlorobenzene	mg/kg (ppm)	2.5	104	76-111
Ethylbenzene	mg/kg (ppm)	2.5	106	64-123
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	105	69-135
m,p-Xylene	mg/kg (ppm)	5	106	78-122
o-Aylene Starron	mg/kg (ppm)	2.5	102	77-124
Isopropulhonzono	mg/kg (ppm)	2.0	104	74-120
Bromoform	mg/kg (ppm)	2.5	118	56-132
n-Propylbenzene	mg/kg (ppm)	2.5	108	74-124
Bromobenzene	mg/kg (ppm)	2.5	108	72-122
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	107	76-126
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	105	56-143
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	106	61-137
2-Chlorotoluene	mg/kg (ppm)	2.5	106	74-121
4-Chlorotoluene	mg/kg (ppm)	2.5	107	75-122
tert-Butylbenzene	mg/kg (ppm)	2.5	107	73-130
1,2,4-1 rimetnylbenzene	mg/kg (ppm)	2.0	104	76-120
p-Isopropyltoluene	mg/kg (ppm)	2.5	105	71-130
1.3-Dichlorobenzene	mg/kg (nnm)	2.5	103	75-121
1.4-Dichlorobenzene	mg/kg (ppm)	2.5	102	74-117
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	100	76-121
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	96	58-138
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	97	64-135
Hexachlorobutadiene	mg/kg (ppm)	2.5	94	50-153
Naphthalene	mg/kg (ppm)	2.5	92	63-140
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	93	63-138

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



















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				\frown	\sim		\ge	X			1976	>	49	-2-5	J
										3 1,00	1205 3	11/21	4/8 A.E	5-4-50	EN
Notes		PUBS EPA 8082	PAHS EPA 8270	VOCs EPA 8260	NWTPH-HCID	BTEX EPA 8021	NWTPH-Gx	NWTPH-Dx	t of ars	Sample #	Time Sampled	Date Sampled	Lab ID	. Sample ID	
D	UESTEI	REQ	SES	IALY	Ð	$\left \right $	$\left \right $								
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 24, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 13, 2019 from the Kosmos, F&BI 912244 project. There are 16 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1224R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 13, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912244 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	Hart Crowser
912244 -01	Creekbed 1

Sample Creekbed 1 could not be analyzed for gasoline without a dilution due to a foamy matrix.

1,1-Dichloroethane and 1,2-dichloroethane in the 8260C laboratory control sample exceeded the acceptance criteria. The analytes were not detected in the sample, therefore the data were acceptable.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912244 Date Extracted: 12/17/19 Date Analyzed: 12/17/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
Creekbed 1 912244-01 1/5	<25	85
Method Blank ^{09-2926 MB}	<5	82

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912244 Date Extracted: 12/16/19 Date Analyzed: 12/16/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	Motor Oil Range (C25-C36)	Surrogate <u>(% Recovery)</u> (Limit 56-165)
Creekbed 1 912244-01	6,100 x	7,600	82
Method Blank	<50	<250	77

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Creekbed 1 12/13/19 12/17/19 12/17/19 Soil mg/kg (ppm)) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912244 912244-01 1/500 121713.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 361 d 136 d	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		<1		
Acenaphthylene		<1		
Acenaphthene		3.4		
Fluorene		5.7		
Phenanthrene		19		
Anthracene		5.2		
Fluoranthene		2.2		
Pyrene		19		
Benz(a)anthracene		5.9		
Chrysene		9.5		
Benzo(a)pyrene		3.0		
Benzo(b)fluoranthe	ne	1.1		
Benzo(k)fluoranthe	ne	<1		
Indeno(1,2,3-cd)pyr	ene	<1		
Dibenz(a,h)anthrac	ene	<1		
Benzo(g,h,i)perylen	e	<1		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank Not Applicable 12/17/19 12/17/19 Soil mg/kg (ppm) Dry	Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912244 09-3047 mb 1/5 121708.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	% R ∻-d12	ecovery: 95 104	Lower Limit: 31 24	Upper Limit: 163 168
	Conce	entration		
Compounds:	mg/l	xg (ppm)		
Naphthalene	<	< 0.01		
Acenaphthylene	<	< 0.01		
Acenaphthene	<	< 0.01		
Fluorene	<	< 0.01		
Phenanthrene	<	< 0.01		
Anthracene	<	< 0.01		
Fluoranthene	<	< 0.01		
Pyrene	<	< 0.01		
Benz(a)anthracene	<	< 0.01		
Chrysene	<	< 0.01		
Benzo(a)pyrene	<	< 0.01		
Benzo(b)fluoranthe	ne <	< 0.01		
Benzo(k)fluoranthe	ne <	< 0.01		
Indeno(1,2,3-cd)pyr	ene <	< 0.01		
Dibenz(a,h)anthrac	ene <	< 0.01		
Benzo(g,h,i)perylen	e <	< 0.01		

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Creekbed 1		Client:	Hart Crowser	
Date Received:	12/13/19		Project:	Kosmos, F&BI 912244	
Date Extracted:	12/17/19		Lab ID:	912244-01	
Date Analyzed:	12/17/19		Data File:	121724A.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppm) Dry Weight	Operator :	MS	
	0 0 11		т	тт	
Sumoratory		0/ Decomposition	Lower	Upper Limit	
Surrogates:	14	% Recovery:			
1,2-Dichloroethane-	· û 4	100	50 50	150	
1 oluene-d8		101	50 50	150	
4-Bromofluorobenze	ene	101	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1.1.1.2-7	etrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xylene		< 0.05
Methylene chloride		< 0.5	Stvrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropane	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tri	chloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropene	e	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropane	е	< 0.05	1.3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentano	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	0.069
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5	, ,- = =	-	

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Bla	ank	Client:	Hart Crowser			
Date Received:	Not Applic	able	Project:	Kosmos, F&BI 912244	Į		
Date Extracted:	12/17/19		Lab ID:	09-3017 mb			
Date Analyzed:	12/17/19		Data File:	121713.D			
Matrix:	Soil		Instrument:	GCMS9			
Units:	mg/kg (ppr	n) Dry Weight	Operator:	MS			
	0 0 0 0	, , ,	т	TT			
0		0/ D	Lower	Upper			
Surrogates:	14	% Recovery:		Limit:			
1,2-Dichloroethane	· û 4	100	50 50	150			
1 Dromoflyonohongono		98	50 50	150			
4-Bromonuorobenzene		104	06	150			
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)		
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05		
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025		
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05		
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05		
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05		
Trichlorofluorometh	nane	< 0.5	Ethylber	< 0.05			
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05		
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1		
Hexane		< 0.25	o-Xylene		< 0.05		
Methylene chloride		< 0.5	Styrene	< 0.05			
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	< 0.05			
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05		
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05		
2,2-Dichloropropan	е	< 0.05	Bromobe	enzene	< 0.05		
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05		
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05		
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05		
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05		
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05		
1,1-Dichloropropen	9	< 0.05	tert-But	ylbenzene	< 0.05		
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05		
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05		
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05		
1,2-Dichloropropan	е	< 0.05	1,3-Dich	lorobenzene	< 0.05		
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05		
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05		
4-Methyl-2-pentanone		< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5		
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25		
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25		
trans-1,3-Dichloropropene		< 0.05	Naphtha	alene	< 0.05		
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25		
2-Hexanone		< 0.5					

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Creekbed 1 12/13/19 12/16/19 12/18/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912244 912244-01 1/6 121791.D GC7 VM
Surrogates: TCMX	% Recovery: 56	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221 Aroclor 1232 Aroclor 1016 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1262 Aroclor 1268	<0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02		

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Hart Crowser			
Date Received:	Not Applicable	Project:	Kosmos, F&BI 912244			
Date Extracted:	12/16/19	Lab ID:	09-3042 mb 1/6			
Date Analyzed:	12/17/19	Data File:	121749.D			
Matrix:	Soil	Instrument:	GC7			
Units:	mg/kg (ppm) Dry Weight	Operator:	VM			
Surrogates: TCMX	% Recovery: 98	Lower Limit: 23	Upper Limit: 127			
	Concentration					
Compounds:	mg/kg (ppm)					
Aroclor 1221	< 0.02					
Aroclor 1232	< 0.02					
Aroclor 1016	< 0.02					
Aroclor 1242	< 0.02					
Aroclor 1248	< 0.02					
Aroclor 1254	< 0.02					
Aroclor 1260	< 0.02					
Aroclor 1262	< 0.02					
Aroclor 1268	< 0.02					

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912244

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 9	12188-21 (Duplic				
		Samp	ole Du	plicate	
	Reporting	Resu	lt R	lesult	RPD
Analyte	Units	(Wet V	Wt) (W	(et Wt)	(Limit 20)
Gasoline	mg/kg (ppm)	<5		<5	nm
Laboratory Code: L	aboratory Contro	ol Sample	e		
			Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	
Gasoline	mg/kg (ppm)	20	85	71-131	—

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912244

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912245-01 (Matri	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	86	86	63-146	0
Laboratory Code:	Laboratory Conti	ol Samp	le				
			Percent	t			
	Reporting	Spike	Recover	y Accep	tance		
Analyte	Units	Level	LCS	Crit	eria		
Diesel Extended	mg/kg (ppm)	5,000	88	79-1	144		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912244

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912263-01 1/5 (Matrix Spike)

Laboratory Couc. 012200	or no (maining	pine)			
			Sample	Percent	
	Reporting	Spike	Result	Recovery	Acceptance
Analyte	Units	Level	(Wet wt)	MS	Criteria
Naphthalene	mg/kg (ppm)	0.17	< 0.01	80	44-129
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	81	52 - 121
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	80	51 - 123
Fluorene	mg/kg (ppm)	0.17	< 0.01	83	37 - 137
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	82	34-141
Anthracene	mg/kg (ppm)	0.17	< 0.01	83	32 - 124
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	91	16 - 160
Pyrene	mg/kg (ppm)	0.17	< 0.01	84	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	88	23 - 144
Chrysene	mg/kg (ppm)	0.17	< 0.01	82	32 - 149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	84	23 - 176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	70	42 - 139
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	75	21 - 163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	77	23 - 170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	74	31 - 146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	71	37-133

Laboratory Code: Laboratory Control Sample 1/5

v	v	1	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	84	83	58 - 121	1
Acenaphthylene	mg/kg (ppm)	0.17	89	89	54 - 121	0
Acenaphthene	mg/kg (ppm)	0.17	88	85	54 - 123	3
Fluorene	mg/kg (ppm)	0.17	91	90	56 - 127	1
Phenanthrene	mg/kg (ppm)	0.17	88	88	55 - 122	0
Anthracene	mg/kg (ppm)	0.17	87	89	50 - 120	2
Fluoranthene	mg/kg (ppm)	0.17	92	92	54 - 129	0
Pyrene	mg/kg (ppm)	0.17	98	104	53 - 127	6
Benz(a)anthracene	mg/kg (ppm)	0.17	92	94	51 - 115	2
Chrysene	mg/kg (ppm)	0.17	89	91	55 - 129	2
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	84	88	56 - 123	5
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	78	74	54 - 131	5
Benzo(a)pyrene	mg/kg (ppm)	0.17	77	78	51 - 118	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	85	92	49-148	8
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	83	93	50 - 141	11
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	82	90	52 - 131	9

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912244

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912244-01 (Matrix Spike)

Č (1 /		Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	15	13	10-56	14
Chloromethane	mg/kg (ppm)	2.5	< 0.5	49	45	10-90	9
Vinyl chloride	mg/kg (ppm)	2.5	< 0.05	43	39	10-91	10
Bromomethane	mg/kg (ppm)	2.5	< 0.5	65	49	10-110	28 vo
Chloroethane	mg/kg (ppm)	2.5	< 0.5	54	49	10-101	10
Trichlorofluoromethane	mg/kg (ppm)	2.5	<0.5	41	38	10-95	8
Acetone	mg/kg (ppm)	12.5	<0.5	125	96	11-141	26 vo
I,I-Dichloroethene	mg/kg (ppm)	2.0	<0.05	26	22	22-107	9
Methylene chloride	mg/kg (ppm)	2.5	<0.20	78	55 70	14-128	11
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	<0.05	90	82	17-134	9
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	70	65	13-112	7
1,1-Dichloroethane	mg/kg (ppm)	2.5	< 0.05	82	77	23-115	6
2,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	71	63	18-117	12
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	77	73	25-120	5
Chloroform	mg/kg (ppm)	2.5	< 0.05	83	78	29-117	6
2-Butanone (MEK)	mg/kg (ppm)	12.5	<0.5	109	100	20-133	9
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	91	85	22-124	7
1,1,1-1richloroethane	mg/kg (ppm)	2.0	<0.05	73	67	Z7-11Z 26.107	9
Carbon totrachlorido	mg/kg (ppm)	2.0	<0.05	67	61	26-107	9
Benzene	mg/kg (ppm)	2.5	<0.03	74	70	26-114	6
Trichloroethene	mg/kg (ppm)	2.5	< 0.02	70	66	30-112	6
1,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	84	78	31-119	7
Bromodichloromethane	mg/kg (ppm)	2.5	< 0.05	84	78	31-131	7
Dibromomethane	mg/kg (ppm)	2.5	< 0.05	77	72	27-124	7
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	< 0.5	103	93	16-147	10
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	81	74	28-137	9
Toluene	mg/kg (ppm)	2.5	<0.05	72	69	34-112	4
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	79 97	75	30-136	5 7
2-Hevenone	mg/kg (ppm)	12.5	<0.05	109	100	17.147	9
1 3-Dichloropropane	mg/kg (ppm)	2.5	<0.05	84	77	29-125	9
Tetrachloroethene	mg/kg (ppm)	2.5	< 0.025	59	56	25-114	5
Dibromochloromethane	mg/kg (ppm)	2.5	< 0.05	75	70	32-143	7
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	< 0.05	78	75	32-126	4
Chlorobenzene	mg/kg (ppm)	2.5	< 0.05	73	69	37-113	6
Ethylbenzene	mg/kg (ppm)	2.5	< 0.05	73	69	34 - 115	6
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	79	73	35-126	8
m,p-Aylene	mg/kg (ppm)	5	<0.1	70	65	25-125	7
0-Aylene Sturiono	mg/kg (ppm)	2.0	<0.05	12	68 79	27-120	5
Isopropylhenzene	mg/kg (ppm)	2.5	<0.05	72	67	34-123	5
Bromoform	mg/kg (ppm)	2.5	<0.05	78	70	18-155	11
n-Propylbenzene	mg/kg (ppm)	2.5	< 0.05	70	66	31-120	6
Bromobenzene	mg/kg (ppm)	2.5	< 0.05	70	67	40-115	4
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	67	63	24-130	6
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	99	93	27-148	6
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	< 0.05	94	89	33-123	5
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	73	69	39-110	6
4-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	70	67	39-111	4
1.2.4 Trimethylbonzono	mg/kg (ppm)	2.0	<0.05	70 67	64	35-116	5
sec-Butylbenzene	mg/kg (ppm)	2.5	<0.05	69	65	33-118	6
p-Isopropyltoluene	mg/kg (ppm)	2.5	< 0.05	66	62	32-119	Ğ
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	67	64	38-111	5
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	67	63	39-109	6
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	73	68	40-111	7
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	< 0.5	98	90	44-112	9
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	68	59	31-121	14
Hexachiorobutadiene	mg/kg (ppm)	2.5	<0.25	65	56	24-128	15
Naphthalene	mg/kg (ppm)	2.5	0.051	88	77 6=	24-139	13
1,2,0-111CHIOFODEHZENE	mg/kg (ppm)	2.0	N0.20	10	60	əə-117	10

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912244

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

	_		Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	55	10-76
Chloromethane	mg/kg (ppm)	2.5	83	34-98
Vinyl chloride	mg/kg (ppm)	2.5	81	42-107
Bromomethane	mg/kg (ppm)	2.5	85	46-113
Unioroethane	mg/kg (ppm)	2.5	87	47-115
Acetone	mg/kg (ppm)	2.5 12.5	128	39.147
1.1-Dichloroethene	mg/kg (ppm)	2.5	89	65-110
Hexane	mg/kg (ppm)	2.5	102	55-107
Methylene chloride	mg/kg (ppm)	2.5	106	50 - 127
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	102	72-122
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	98	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	110 vo	74-109
2,2-Dichloropropane	mg/kg (ppm)	2.5	90	63-145
Cls-1,2-Dichloroethene	mg/kg (ppm)	2.0	101	73-110
2-Butanone (MEK)	mg/kg (ppm)	2.5 12.5	119	60-121
1 2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	115 vo	73-111
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	98	72-116
1,1-Dichloropropene	mg/kg (ppm)	2.5	107	72-112
Carbon tetrachloride	mg/kg (ppm)	2.5	93	67-123
Benzene	mg/kg (ppm)	2.5	101	72-106
Trichloroethene	mg/kg (ppm)	2.5	99	72-107
1,2-Dichloropropane	mg/kg (ppm)	2.5	107	74-115
Bromodichloromethane	mg/kg (ppm)	2.5	104	75-126
4-Mothyl-2-pontanono	mg/kg (ppm)	2.0	90	80.128
cis-1.3-Dichloropropene	mg/kg (ppm)	2.5	103	71-138
Toluene	mg/kg (ppm)	2.5	103	74-111
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	103	73-124
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	107	76-118
2-Hexanone	mg/kg (ppm)	12.5	119	67-123
1,3-Dichloropropane	mg/kg (ppm)	2.5	106	75-118
Tetrachloroethene	mg/kg (ppm)	2.5	96	73-111
1.2 Dibromochloromethane	mg/kg (ppm)	2.0	94 104	64-152 77 117
Chlorobenzene	mg/kg (ppm)	2.5	104	76-109
Ethylbenzene	mg/kg (ppm)	2.5	105	75-112
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	102	75-129
m,p-Xylene	mg/kg (ppm)	5	102	77-115
o-Xylene	mg/kg (ppm)	2.5	104	76-115
Styrene	mg/kg (ppm)	2.5	104	76-119
Isopropylbenzene	mg/kg (ppm)	2.5	105	76-120
Bromotorm	mg/kg (ppm)	2.5	93	50-174
Bromohenzene	mg/kg (ppm)	2.5	109	76.112
1.3.5-Trimethylbenzene	mg/kg (ppm)	2.5	106	77-121
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	118	74-121
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	115	73-117
2-Chlorotoluene	mg/kg (ppm)	2.5	108	75-113
4-Chlorotoluene	mg/kg (ppm)	2.5	106	77-115
tert-Butylbenzene	mg/kg (ppm)	2.5	106	77-123
1,2,4-1rimethylbenzene	mg/kg (ppm)	2.5	106	77-119
p-Isopropyltoluene	mg/kg (ppm)	2.5	106	76-120
1.3-Dichlorobenzene	mg/kg (nnm)	2.5	102	76-112
1.4-Dichlorobenzene	mg/kg (ppm)	2.5	101	74-109
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	103	75-114
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	120	68-122
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	107	75-122
Hexachlorobutadiene	mg/kg (ppm)	2.5	102	74-130
Naphthalene	mg/kg (ppm)	2.5	113	73-122
1,2,3-1richlorobenzene	mg/kg (ppm)	2.5	110	75-117

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/13/19 Project: Kosmos, F&BI 912244

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 912248-01 1/6 (Matrix Spike) 1/6

			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Control	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Limits	(Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	< 0.02	81	78	30-123	4
Aroclor 1260	mg/kg (ppm)	0.25	< 0.02	83	80	26 - 131	4

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	88	55 - 137
Aroclor 1260	mg/kg (ppm)	0.25	87	51 - 150

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 24, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 16, 2019 from the Kosmos, F&BI 912263 project. There are 22 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1224R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 16, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912263 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912263 -01	LB-1
912263 -02	LB-2
912263 -03	LB-3

1,1-Dichloroethane and 1,2-dichloroethane in the 8260C laboratory control sample exceeded the acceptance criteria. In addition, the matrix spike and matrix spike duplicate failed the relative percent difference for bromomethane and acetone. The analytes were not detected in the samples therefore the data were acceptable.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912263 Date Extracted: 12/18/19 Date Analyzed: 12/18/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
LB-1 912263-01	<5	82
LB-2 912263-02	73	88
LB-3 912263-03	<5	83
Method Blank ^{09-2931 MB}	<5	77

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912263 Date Extracted: 12/17/19 Date Analyzed: 12/17/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 53-144)
LB-1 912263-01	<50	<250	96
LB-2 912263-02	3,800	3,700	104
LB-3 912263-03	<50	<250	97
Method Blank ^{09-3049 MB}	<50	<250	87

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	LB-1 12/16/19 12/17/19 12/17/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912263 912263-01 1/5 121724.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 89 96	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	LB-2 12/16/19 12/17/19 12/19/19 Soil mg/kg (ppn	n) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912263 912263-02 1/25 121823.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 112 d 123 d	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		0.48		
Fluorene		0.79		
Phenanthrene		2.8		
Anthracene		0.78		
Fluoranthene		0.23		
Pyrene		1.9		
Benz(a)anthracene		0.51		
Chrysene		0.83		
Benzo(a)pyrene		0.21		
Benzo(b)fluoranthe	ne	0.11		
Benzo(k)fluoranthe	ne	< 0.05		
Indeno(1,2,3-cd)pyr	ene	< 0.05		
Dibenz(a,h)anthrac	ene	< 0.05		
Benzo(g,h,i)perylen	e	< 0.05		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	LB-3 12/16/19 12/17/19 12/18/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912263 912263-03 1/25 121822.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	ə-d12	% Recovery: 154 d 117 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		mg/kg (ppm)		
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthe Benzo(b)fluoranthe Indeno(1,2,3-cd)pyr Dibenz(a,h)anthrace	ne ne ene ene	$\begin{array}{c} < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.0$		
ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank Not Applicable 12/17/19 12/17/19 Soil mg/kg (ppm) Dry	y Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912263 09-3047 mb 1/5 121708.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	%∃ ∻-d12	Recovery: 95 104	Lower Limit: 31 24	Upper Limit: 163 168
	Con	centration		
Compounds:	mg	/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	LB-1		Client:	Hart Crowser	
Date Received:	12/16/19		Project:	Kosmos, F&BI 912263	5
Date Extracted:	12/17/19		Lab ID:	912263-01	
Date Analyzed:	12/17/19		Data File:	121719.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppn	n) Dry Weight	Operator :	MS	
	0 0 11	, , ,	T orrow	Unnon	
Surrogatos		% Rocovory:	Lower	Upper Limit:	
1 2-Dichloroothane	-d4	100	50	150	
Toluono-d8	-u-f	100	50	150	
4-Bromofluorobenzo	ene	101	50	150	
4-Diomonuorobenzo		100	00	100	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	2	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	е	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	pene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	LB-2		Client:	Hart Crowser	
Date Received:	12/16/19		Project:	Kosmos, F&BI 912263	}
Date Extracted:	12/17/19		Lab ID:	912263-02	
Date Analyzed:	12/17/19		Data File:	121720.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppr	n) Dry Weight	Operator :	MS	
	0 0 11	, , ,	т Т		
0		0/ D	Lower	Upper	
Surrogates:	14	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	·d4	101	50	150	
Toluene-d8		99	50	150	
4-Bromofluorobenzo	ene	108	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1.1.1.2-7	Tetrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene	2	< 0.05
Methylene chloride		< 0.5	Stvrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tr	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	е	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tr	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	LB-3		Client:	Hart Crowser	
Date Received:	12/16/19		Project:	Kosmos, F&BI 912263	3
Date Extracted:	12/17/19		Lab ID:	912263-03	
Date Analyzed:	12/17/19		Data File:	121721.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppr	n) Dry Weight	Operator :	MS	
			Lowor	Uppor	
Surrogates:		% Recovery:	Limit:	Limit:	
1.2-Dichloroethane	-d4	100	50	150	
Toluene-d8	u i	102	50	150	
4-Bromofluorobenz	ene	106	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1.3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinvl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1.2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1.1.1.2-7	etrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene)	< 0.05
Methylene chloride		< 0.5	Stvrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorio	łe	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentane	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bla	ank	Client:	Hart Crowser	
Date Received:	Not Applica	able	Project:	Kosmos, F&BI 912263	}
Date Extracted:	12/17/19		Lab ID:	09-3017 mb	
Date Analyzed:	12/17/19		Data File:	121713.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppn	n) Dry Weight	Operator:	MS	
	0 0 11	, i 8	т	TT	
Sumoratory		0/ Decorrorry	Lower	Upper Limit	
1.9 Dishlaroothono	44	% necovery:	Limit.	150	
Taluara do	·04	100	50	150	
1 Druene-08		98 104	50	150	
4-Bromofluorobenze	ene	104	06	190	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene		< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1.2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1.1-Dichloroethane		< 0.05	n-Propy	benzene	< 0.05
2.2-Dichloropropane	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	methylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-1	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tri	chloropropane	< 0.05
1.2-Dichloroethane	(EDC)	< 0.05	2-Chloro	toluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	toluene	< 0.05
1.1-Dichloropropene	e	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	e	< 0.05	1,2,4-Tri	methylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropane	e	< 0.05	1.3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentano	ne	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	chlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroethan	ne	< 0.05	1,2,3-Tri	chlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	LB-1 12/16/19 12/17/19 12/18/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912263 912263-01 1/6 121754.D GC7 VM
Surrogates: TCMX	% Recovery: 66	Lower Limit: 23	Upper Limit: 127
	Concentration		
Compounds:	mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	LB-2 12/16/19 12/17/19 12/18/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912263 912263-02 1/6 121755.D GC7 VM
Surrogates: TCMX	% Recovery: 59	Lower Limit: 23	Upper Limit: 127
	Concentration		
Compounds:	mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	LB-3 12/16/19 12/17/19 12/18/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912263 912263-03 1/6 121756.D GC7 VM
Surrogates: TCMX	% Recovery: 78	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221 Aroclor 1232 Aroclor 1016 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1262 Aroclor 1268	<0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Blank	Client:	Hart Crowser
Date Received:	Not Applicable	Project:	Kosmos, F&BI 912263
Date Extracted:	12/17/19	Lab ID:	09-3042 mb2 1/6
Date Analyzed:	12/18/19	Data File:	121751.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM
Surrogates: TCMX	% Recovery: 88	Lower Limit: 23	Upper Limit: 127
	Concentration		
Compounds:	mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912263

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 9	12263-01 (Duplic	eate)			
		Samp	ole Du	plicate	
	Reporting	Resu	lt R	lesult	RPD
Analyte	Units	(Wet V	Wt) (W	/et Wt)	(Limit 20)
Gasoline	mg/kg (ppm)	<5		<5	nm
Laboratory Code: L	aboratory Contro	ol Sample	e		
			Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	
Gasoline	mg/kg (ppm)	20	80	71-131	—

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912263

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912260-01 (Matri	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	106	106	64-133	0
Laboratory Code:	Laboratory Code: Laboratory Control Sample						
			Percent	t			
	Reporting	Spike	Recover	y Accep	tance		
Analyte	Units	Level	LCS	Crit	eria		
Diesel Extended	mg/kg (ppm)	5,000	108	58-1	47		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912263

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912263-01 1/5 (Matrix Spike)

Baserator, coac. cr==00	01 1.0 (1.1401 m k	pine)			
			Sample	Percent	
	Reporting	Spike	Result	Recovery	Acceptance
Analyte	Units	Level	(Wet wt)	\mathbf{MS}	Criteria
Naphthalene	mg/kg (ppm)	0.17	< 0.01	80	44-129
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	81	52 - 121
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	80	51 - 123
Fluorene	mg/kg (ppm)	0.17	< 0.01	83	37-137
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	82	34-141
Anthracene	mg/kg (ppm)	0.17	< 0.01	83	32 - 124
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	91	16-160
Pyrene	mg/kg (ppm)	0.17	< 0.01	84	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	88	23 - 144
Chrysene	mg/kg (ppm)	0.17	< 0.01	82	32 - 149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	84	23 - 176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	70	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	75	21 - 163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	77	23 - 170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	74	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	71	37-133

-	·	-	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	84	83	58-121	1
Acenaphthylene	mg/kg (ppm)	0.17	89	89	54 - 121	0
Acenaphthene	mg/kg (ppm)	0.17	88	85	54 - 123	3
Fluorene	mg/kg (ppm)	0.17	91	90	56 - 127	1
Phenanthrene	mg/kg (ppm)	0.17	88	88	55 - 122	0
Anthracene	mg/kg (ppm)	0.17	87	89	50 - 120	2
Fluoranthene	mg/kg (ppm)	0.17	92	92	54 - 129	0
Pyrene	mg/kg (ppm)	0.17	98	104	53 - 127	6
Benz(a)anthracene	mg/kg (ppm)	0.17	92	94	51 - 115	2
Chrysene	mg/kg (ppm)	0.17	89	91	55 - 129	2
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	84	88	56 - 123	5
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	78	74	54 - 131	5
Benzo(a)pyrene	mg/kg (ppm)	0.17	77	78	51 - 118	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	85	92	49-148	8
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	83	93	50-141	11
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	82	90	52 - 131	9

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912263

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912244-01 (Matrix Spike)

Č (1 /		Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	15	13	10-56	14
Chloromethane	mg/kg (ppm)	2.5	< 0.5	49	45	10-90	9
Vinyl chloride	mg/kg (ppm)	2.5	< 0.05	43	39	10-91	10
Bromomethane	mg/kg (ppm)	2.5	< 0.5	65	49	10-110	28 vo
Chloroethane	mg/kg (ppm)	2.5	< 0.5	54	49	10-101	10
Trichlorofluoromethane	mg/kg (ppm)	2.5	<0.5	41	38	10-95	8
Acetone	mg/kg (ppm)	12.5	<0.5	125	96	11-141	26 vo
I,I-Dichloroethene	mg/kg (ppm)	2.0	<0.05	26	22	22-107	9
Methylene chloride	mg/kg (ppm)	2.5	<0.20	78	55 70	14-128	11
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	<0.05	90	82	17-134	9
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	70	65	13-112	7
1,1-Dichloroethane	mg/kg (ppm)	2.5	< 0.05	82	77	23-115	6
2,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	71	63	18-117	12
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	77	73	25-120	5
Chloroform	mg/kg (ppm)	2.5	< 0.05	83	78	29-117	6
2-Butanone (MEK)	mg/kg (ppm)	12.5	<0.5	109	100	20-133	9
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	91	85	22-124	7
1,1,1-1richloroethane	mg/kg (ppm)	2.0	<0.05	73	67	Z7-11Z 26.107	9
Carbon totrachlorido	mg/kg (ppm)	2.0	<0.05	67	61	26-107	9
Benzene	mg/kg (ppm)	2.5	<0.03	74	70	26-114	6
Trichloroethene	mg/kg (ppm)	2.5	< 0.02	70	66	30-112	6
1,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	84	78	31-119	7
Bromodichloromethane	mg/kg (ppm)	2.5	< 0.05	84	78	31-131	7
Dibromomethane	mg/kg (ppm)	2.5	< 0.05	77	72	27-124	7
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	< 0.5	103	93	16-147	10
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	81	74	28-137	9
Toluene	mg/kg (ppm)	2.5	<0.05	72	69	34-112	4
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	79 97	75	30-136	5 7
2-Hevenone	mg/kg (ppm)	12.5	<0.05	109	100	17.147	9
1 3-Dichloropropane	mg/kg (ppm)	2.5	<0.05	84	77	29-125	9
Tetrachloroethene	mg/kg (ppm)	2.5	< 0.025	59	56	25-114	5
Dibromochloromethane	mg/kg (ppm)	2.5	< 0.05	75	70	32-143	7
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	< 0.05	78	75	32-126	4
Chlorobenzene	mg/kg (ppm)	2.5	< 0.05	73	69	37-113	6
Ethylbenzene	mg/kg (ppm)	2.5	< 0.05	73	69	34 - 115	6
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	79	73	35-126	8
m,p-Aylene	mg/kg (ppm)	5	<0.1	70	65	25-125	7
0-Aylene Sturiono	mg/kg (ppm)	2.0	<0.05	12	68 79	27-120	5
Isopropylhenzene	mg/kg (ppm)	2.5	<0.05	72	67	34-123	5
Bromoform	mg/kg (ppm)	2.5	<0.05	78	70	18-155	11
n-Propylbenzene	mg/kg (ppm)	2.5	< 0.05	70	66	31-120	6
Bromobenzene	mg/kg (ppm)	2.5	< 0.05	70	67	40-115	4
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	67	63	24-130	6
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	99	93	27-148	6
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	< 0.05	94	89	33-123	5
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	73	69	39-110	6
4-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	70	67	39-111	4
1.2.4 Trimethylbonzono	mg/kg (ppm)	2.0	<0.05	70 67	64	35-116	5
sec-Butylbenzene	mg/kg (ppm)	2.5	<0.05	69	65	33-118	6
p-Isopropyltoluene	mg/kg (ppm)	2.5	< 0.05	66	62	32-119	Ğ
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	67	64	38-111	5
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	67	63	39-109	6
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	73	68	40-111	7
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	< 0.5	98	90	44-112	9
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	68	59	31-121	14
Hexachiorobutadiene	mg/kg (ppm)	2.5	<0.25	65	56	24-128	15
Naphthalene	mg/kg (ppm)	2.5	0.051	88	77 6=	24-139	13
1,2,0-111CHIOFODEHZEHE	mg/kg (ppm)	2.0	N0.20	10	60	əə-117	10

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912263

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

	_		Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	55	10-76
Chloromethane	mg/kg (ppm)	2.5	83	34-98
Vinyl chloride	mg/kg (ppm)	2.5	81	42-107
Bromomethane	mg/kg (ppm)	2.5	85	46-113
Unioroethane Trickloughuseremethane	mg/kg (ppm)	2.5	87	47-115
Acetone	mg/kg (ppm)	2.0 12.5	128	39-112
1.1-Dichloroethene	mg/kg (ppm)	2.5	89	65-110
Hexane	mg/kg (ppm)	2.5	102	55-107
Methylene chloride	mg/kg (ppm)	2.5	106	50 - 127
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	102	72-122
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	98	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	110 vo	74-109
2,2-Dichloropropane	mg/kg (ppm)	2.5	90	63-145
Cls-1,2-Dichloroethene	mg/kg (ppm)	2.0	101	73-110
2-Butanono (MEK)	mg/kg (ppm)	12.5	1107	60-121
1 2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	115 vo	73-111
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	98	72-116
1,1-Dichloropropene	mg/kg (ppm)	2.5	107	72-112
Carbon tetrachloride	mg/kg (ppm)	2.5	93	67-123
Benzene	mg/kg (ppm)	2.5	101	72-106
Trichloroethene	mg/kg (ppm)	2.5	99	72-107
1,2-Dichloropropane	mg/kg (ppm)	2.5	107	74-115
Diknomonthono	mg/kg (ppm)	2.5	104	75-126
4 Mothyl 2 poptopopo	mg/kg (ppm)	2.0	90	76-116
cis-1 3-Dichloropropene	mg/kg (ppiii)	2.5	103	71-138
Toluene	mg/kg (ppm)	2.5	103	74-111
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	103	73-124
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	107	76-118
2-Hexanone	mg/kg (ppm)	12.5	119	67-123
1,3-Dichloropropane	mg/kg (ppm)	2.5	106	75-118
Tetrachloroethene	mg/kg (ppm)	2.5	96	73-111
1.2 Dibromochloromethane	mg/kg (ppm)	2.5	94	64-152 77 117
Chlorohenzene	mg/kg (ppm)	2.5	104	76-109
Ethylbenzene	mg/kg (ppm)	2.5	105	75-112
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	102	75-129
m,p-Xylene	mg/kg (ppm)	5	102	77-115
o-Xylene	mg/kg (ppm)	2.5	104	76-115
Styrene	mg/kg (ppm)	2.5	104	76-119
Isopropylbenzene	mg/kg (ppm)	2.5	105	76-120
Bromotorm	mg/kg (ppm)	2.5	93	50-174
Bromohonzono	mg/kg (ppm)	2.0	109	76-119
1.3.5-Trimethylbenzene	mg/kg (ppm)	2.5	106	77-121
1.1.2.2-Tetrachloroethane	mg/kg (ppm)	2.5	118	74-121
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	115	73-117
2-Chlorotoluene	mg/kg (ppm)	2.5	108	75-113
4-Chlorotoluene	mg/kg (ppm)	2.5	106	77-115
tert-Butylbenzene	mg/kg (ppm)	2.5	106	77-123
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	106	77-119
sec-Butylbenzene	mg/kg (ppm)	2.5	108	78-120
1 3-Dichlorobonzono	mg/kg (ppm)	2.0	106	76-112
1 4-Dichlorobenzene	mg/kg (ppm)	2.5	102	74-109
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	103	75-114
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	120	68-122
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	107	75-122
Hexachlorobutadiene	mg/kg (ppm)	2.5	102	74-130
Naphthalene	mg/kg (ppm)	2.5	113	73-122
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	110	75-117

ENVIRONMENTAL CHEMISTS

Date of Report: 12/24/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912263

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 912248-01 1/6 (Matrix Spike) 1/6

			Sample	Percent	Percent		
	Reporting	Spike	Result (Wet	Recovery	Recovery	Control	RPD
Analyte	Units	Level	Wt)	MS	MSD	Limits	(Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	< 0.02	81	78	30-123	4
Aroclor 1260	mg/kg (ppm)	0.25	< 0.02	83	80	26 - 131	4

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	88	55 - 137
Aroclor 1260	mg/kg (ppm)	0.25	87	51 - 150

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 26, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 16, 2019 from the Kosmos, F&BI 912265 project. There are 23 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1226R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 16, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912265 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912265 -01	B-4-W
912265 -02	Unlabeled

A 200.8 internal standard failed the acceptance criteria for sample B-4-W due to matrix interferences. The data were flagged accordingly. The sample was diluted and reanalyzed. All data sets were reported.

Benz(a)anthracene in 8270D failed below the acceptance criteria in the matrix spike samples. The laboratory control samples met the acceptance criteria, therefore the data were likely due to sample matrix effect.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265 Date Extracted: 12/18/19 Date Analyzed: 12/19/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Gasoline Range	Surrogate (<u>% Recovery)</u> (Limit 51-134)
B-4-W 912265-01	<100	89
Method Blank 09-2930 MB	<100	93

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265 Date Extracted: 12/17/19 Date Analyzed: 12/17/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	Motor Oil Range (C25-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
B-4-W 912265-01 1/1.4	150 x	<350	94
Method Blank ^{09-3050 MB}	<50	<250	78

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	B-4-W		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912265
Date Extracted:	12/18/19		Lab ID:	912265-01
Date Analyzed:	12/18/19		Data File:	912265-01.082
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Arsenic		37.0		
Barium		1,830 ve		
Cadmium		6.22		
Chromium		$52.8~\mathrm{J}$		
Lead		$48.0 \mathrm{~J}$		
Mercury		<1 J		
Selenium		<1		
Silver		<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	B-4-W		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912265
Date Extracted:	12/18/19		Lab ID:	912265-01 x10
Date Analyzed:	12/18/19		Data File:	912265-01 x10.079
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Mercury		<10		

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ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	B-4-W		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912265
Date Extracted:	12/18/19		Lab ID:	912265-01 x100
Date Analyzed:	12/20/19		Data File:	912265-01 x100.089
Matrix:	Water		Instrument:	ICPMS2
Units:	ug/L (ppb)		Operator:	SP
		Concentration		
Analyte:		ug/L (ppb)		
Barium		2,420		
Chromium		334		
Lead		128		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Hart Crowser
Date Received:	NA	Project:	Kosmos, F&BI 912265
Date Extracted:	12/18/19	Lab ID:	I9-809 mb2
Date Analyzed:	12/18/19	Data File:	I9-809 mb2.075
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP
Analyte:	Concentration ug/L (ppb)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	B-4-W 12/16/19 12/17/19 12/18/19 Water ug/L (ppb)		Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912265 912265-01 1/2 121733.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 100 101	Lower Limit: 31 25	Upper Limit: 160 165
Compounds:		Concentration		
Compounds.		ug/L/(ppb)		
Naphthalene		< 0.4		
Acenaphthylene		< 0.04		
Acenaphthene		< 0.04		
Fluorene		< 0.04		
Phenanthrene		0.12		
Anthracene		< 0.04		
Fluoranthene		0.071		
Pyrene		0.086		
Benz(a)anthracene		< 0.04		
Chrysene		< 0.04		
Benzo(a)pyrene		< 0.04		
Benzo(b)fluoranthe	ne	< 0.04		
Benzo(k)fluoranthe	ne	< 0.04		
Indeno(1,2,3-cd)pyr	ene	< 0.04		
Dibenz(a,h)anthrac	ene	< 0.04		
Benzo(g,h,i)perylen	e	< 0.04		

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blat Not Applica 12/17/19 12/17/19 Water ug/L (ppb)	nk ble	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912265 09-3044 mb2 121717.D GCMS6 ya
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 100 110	Lower Limit: 31 25	Upper Limit: 160 165
		Concentration		
Compounds:		ug/L (ppb)		
Naphthalene		< 0.2		
Acenaphthylene		< 0.02		
Acenaphthene		< 0.02		
Fluorene		< 0.02		
Phenanthrene		< 0.02		
Anthracene		< 0.02		
Fluoranthene		< 0.02		
Pyrene		< 0.02		
Benz(a)anthracene		< 0.02		
Chrysene		< 0.02		
Benzo(a)pyrene		< 0.02		
Benzo(b)fluoranthe	ne	< 0.02		
Benzo(k)fluoranthe	ne	< 0.02		
Indeno(1,2,3-cd)pyr	ene	< 0.02		
Dibenz(a,h)anthrac	ene	< 0.02		
Benzo(g,h,i)perylen	e	< 0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-4-W		Client:	Hart Crowser	
Date Received:	12/16/19		Project:	Kosmos, F&BI 912265	5
Date Extracted:	12/17/19		Lab ID:	912265-01	
Date Analyzed:	12/18/19		Data File:	121838.D	
Matrix:	Water		Instrument:	GCMS4	
Units:	ug/L (ppb)		Operator:	MS	
			Louron	Unnon	
Surrogatos		% Rocovory:	Lower	Upper Limit:	
1.9 Dichloroothono	d4	70 necovery.	57	191	
Toluono de	-u4	103	07 69	121	
A Bromofluorohonz	no	103	60 60	127	
4-Dromonuorobenzo	ene	99	00	100	
		Concentration			Concentration
Compounds:		ug/L (ppb)	Compou	nds:	ug/L (ppb)
Dichlorodifluorome	thane	<1	1.3-Dich	loropropane	<1
Chloromethane		<10	Tetrachl	loroethene	<1
Vinvl chloride		<0.2	Dibromo	ochloromethane	<1
Bromomethane		<1	1.2-Dibr	omoethane (EDB)	<1
Chloroethane		<1	Chlorobe	enzene	<1
Trichlorofluorometh	nane	<1	Ethylbei	nzene	<1
Acetone		<50	1.1.1.2-7	letrachloroethane	<1
1.1-Dichloroethene		<1	m.p-Xvle	ene	<2
Hexane		<1	o-Xvlene	2	<1
Methylene chloride		<5	Styrene		<1
Methyl t-butyl ethe	r (MTBE)	<1	Isopropy	lbenzene	<1
trans-1.2-Dichloroe	thene	<1	Bromofo	orm	<1
1.1-Dichloroethane		<1	n-Propy	lbenzene	<1
2,2-Dichloropropan	e	<1	Bromobe	enzene	<1
cis-1,2-Dichloroethe	ene	<1	1,3,5-Tri	imethylbenzene	<1
Chloroform		<1	1,1,2,2-7	Tetrachloroethane	<1
2-Butanone (MEK)		<10	1,2,3-Tri	ichloropropane	<1
1,2-Dichloroethane	(EDC)	<1	2-Chloro	otoluene	<1
1,1,1-Trichloroetha	ne	<1	4-Chloro	otoluene	<1
1,1-Dichloropropen	е	<1	tert-But	ylbenzene	<1
Carbon tetrachlorid	le	<1	1,2,4-Tri	imethylbenzene	<1
Benzene		< 0.35	sec-Buty	lbenzene	<1
Trichloroethene		<1	p-Isopro	pyltoluene	<1
1,2-Dichloropropan	e	<1	1,3-Dich	lorobenzene	<1
Bromodichlorometh	nane	<1	1,4-Dich	lorobenzene	<1
Dibromomethane		<1	1,2-Dich	lorobenzene	<1
4-Methyl-2-pentance	one	<10	1,2-Dibr	omo-3-chloropropane	<10
cis-1,3-Dichloroprop	pene	<1	1,2,4-Tri	ichlorobenzene	<1
Toluene		<1	Hexachl	orobutadiene	<1
trans-1,3-Dichlorop	ropene	<1	Naphtha	alene	<1
1,1,2-Trichloroetha	ne	<1	1,2,3-Tri	ichlorobenzene	<1
2-Hexanone		<10			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bla	.nk	Client:	Hart Crowser	
Date Received:	Not Applica	ıble	Project:	Kosmos, F&BI 912265	5
Date Extracted:	12/17/19		Lab ID:	09-3024 mb	
Date Analyzed:	12/18/19		Data File:	121812.D	
Matrix:	Water		Instrument:	GCMS4	
Units:	ug/L (ppb)		Operator :	MS	
			- т	TT	
C I		0/ D	Lower	Upper	
Surrogates:	14	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	- d 4	99	57	121	
Toluene-d8		100	63	127	
4-Bromofluorobenz	ene	97	60	133	
		Concentration			Concentration
Compounds:		ug/L (ppb)	Compou	nds:	ug/L (ppb)
		8 (11-7			8 (11-)
Dichlorodifluorome	thane	<1	1,3-Dich	loropropane	<1
Chloromethane		<10	Tetrachl	oroethene	<1
Vinyl chloride		< 0.2	Dibromo	chloromethane	<1
Bromomethane		<1	1,2-Dibr	omoethane (EDB)	<1
Chloroethane		<1	Chlorobe	enzene	<1
Trichlorofluoromet	hane	<1	Ethylber	nzene	<1
Acetone		<50	1,1,1,2-T	'etrachloroethane	<1
1,1-Dichloroethene		<1	m,p-Xyle	ene	<2
Hexane		<1	o-Xylene	;	<1
Methylene chloride		<5	Styrene		<1
Methyl t-butyl ethe	er (MTBE)	<1	Isopropy	lbenzene	<1
trans-1,2-Dichloroe	thene	<1	Bromofo	rm	<1
1,1-Dichloroethane		<1	n-Propyl	benzene	<1
2,2-Dichloropropan	e	<1	Bromobe	enzene	<1
cis-1,2-Dichloroethe	ene	<1	1,3,5-Tri	imethylbenzene	<1
Chloroform		<1	1, 1, 2, 2-T	etrachloroethane	<1
2-Butanone (MEK)		<10	1,2,3-Tri	chloropropane	<1
1,2-Dichloroethane	(EDC)	<1	2-Chloro	otoluene	<1
1,1,1-Trichloroetha	ne	<1	4-Chloro	toluene	<1
1,1-Dichloropropen	e	<1	tert-But	ylbenzene	<1
Carbon tetrachlorio	le	<1	1,2,4-Tri	methylbenzene	<1
Benzene		< 0.35	sec-Buty	lbenzene	<1
Trichloroethene		<1	p-Isopro	pyltoluene	<1
1,2-Dichloropropan	e	<1	1.3-Dich	lorobenzene	<1
Bromodichlorometh	nane	<1	1.4-Dich	lorobenzene	<1
Dibromomethane		<1	1.2-Dich	lorobenzene	<1
4-Methyl-2-pentance	one	<10	1.2-Dibr	omo-3-chloropropane	<10
cis-1.3-Dichloropro	pene	<1	1.2.4-Tri	chlorobenzene	<1
Toluene	L	<1	Hexachl	orobutadiene	<1
trans-1.3-Dichloror	propene	<1	Nanhtha	ilene	<1
1.1.2-Trichloroetha	ne	<1	1 2 3-Tri	chlorobenzene	<1
2-Hexanone		<10	-, - ,0 111		÷
		<u> </u>			

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265 Date Extracted: NA Date Analyzed: 12/19/19

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL SUSPENDED SOLIDS BY METHOD 2540D

Results Reported as mg/L (ppm)

 $\frac{\text{Sample ID}}{\text{Laboratory ID}}$

Total Suspended <u>Solids</u>

B-4-W 912265-01 19,000

Method Blank

<5

ENVIRONMENTAL CHEMISTS

Client Sample ID:	B-4-W		Client:	Hart Crowser
Date Received:	12/16/19		Project:	Kosmos, F&BI 912265
Date Extracted:	12/17/19		Lab ID:	912265-01
Date Analyzed:	12/18/19		Data File:	121758.D
Matrix:	Water		Instrument:	GC7
Units:	ug/L (ppb)		Operator:	VM
			Lower	Upper
Surrogates: TCMX		% Recovery: 63	Limit: 24	Limit: 127
		Concentration		
Compounds:		ug/L (ppb)		
Aroclor 1221		< 0.1		
Aroclor 1232		< 0.1		
Aroclor 1016		< 0.1		
Aroclor 1242		< 0.1		
Aroclor 1248		< 0.1		
Aroclor 1254		< 0.1		
Aroclor 1260		< 0.1		
Aroclor 1262		< 0.1		
Aroclor 1268		< 0.1		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Blank	Client:	Hart Crowser
Date Received:	Not Applicable	Project:	Kosmos, F&BI 912265
Date Extracted:	12/17/19	Lab ID:	09-3045 mb2
Date Analyzed:	12/18/19	Data File:	121757.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	VM
a		Lower	Upper
Surrogates: TCMX	% Recovery: 72	Limit: 24	Limit: 127
	Concentration		
Compounds:	ug/L (ppb)		
Aroclor 1221	<0.1		
Aroclor 1232	< 0.1		
Aroclor 1016	< 0.1		
Aroclor 1242	< 0.1		
Aroclor 1248	< 0.1		
Aroclor 1254	< 0.1		
Aroclor 1260	< 0.1		
Aroclor 1262	< 0.1		
Aroclor 1268	< 0.1		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 912	295-01 (Duplic	cate)			
	Reporting	Samp	le Du	plicate	RPD
Analyte	Units	Resul	t R	lesult	(Limit 20)
Gasoline	ug/L (ppb)	<100) <	<100	nm
Laboratory Code: Lab	oratory Contro	ol Sample			
	.	~ .1	Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	_
Gasoline	ug/L (ppb)	1,000	100	69-134	_

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	100	63-142	4

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 912264-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<1	104	98	70-130	6
Barium	ug/L (ppb)	50	1.60	100	94	70-130	6
Cadmium	ug/L (ppb)	5	<1	99	94	70-130	5
Chromium	ug/L (ppb)	20	<1	103	99	70-130	4
Lead	ug/L (ppb)	10	<1	103	97	70-130	6
Mercury	ug/L (ppb)	5	<1	98	93	70-130	5
Selenium	ug/L (ppb)	5	<1	102	97	70-130	5
Silver	ug/L (ppb)	5	<1	101	94	70 - 130	7

Haboratory co	ac. Baseratory	Control Ne	unpio	
			Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	ug/L (ppb)	10	103	85-115
Barium	ug/L (ppb)	50	99	85-115
Cadmium	ug/L (ppb)	5	100	85-115
Chromium	ug/L (ppb)	20	100	85-115
Lead	ug/L (ppb)	10	101	85-115
Mercury	ug/L (ppb)	5	97	85-115
Selenium	ug/L (ppb)	5	101	85 - 115
Silver	ug/L (ppb)	5	100	85-115

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912238-05 (Matrix Spike)

		- /	Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Naphthalene	ug/L (ppb)	1	< 0.2	82	82	10-172	0
Acenaphthylene	ug/L (ppb)	1	< 0.02	90	90	38-137	0
Acenaphthene	ug/L (ppb)	1	< 0.02	89	86	20 - 150	3
Fluorene	ug/L (ppb)	1	< 0.02	95	95	10-181	0
Phenanthrene	ug/L (ppb)	1	< 0.02	90	91	58 - 109	1
Anthracene	ug/L (ppb)	1	< 0.02	93	95	47-114	2
Fluoranthene	ug/L (ppb)	1	< 0.02	100	101	10-171	1
Pyrene	ug/L (ppb)	1	< 0.02	99	103	63-107	4
Benz(a)anthracene	ug/L (ppb)	1	< 0.02	95 vo	94 vo	60-93	1
Chrysene	ug/L (ppb)	1	< 0.02	89	88	60-102	1
Benzo(b)fluoranthene	ug/L (ppb)	1	< 0.02	81	79	62-91	2
Benzo(k)fluoranthene	ug/L (ppb)	1	< 0.02	68	69	51-98	1
Benzo(a)pyrene	ug/L (ppb)	1	< 0.02	78	76	60-86	3
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	< 0.02	69	62	10-98	11
Dibenz(a,h)anthracene	ug/L (ppb)	1	< 0.02	50	49	10-97	2
Benzo(g,h,i)perylene	ug/L (ppb)	1	< 0.02	59	57	10-102	3

		0. 'I	Percent	Percent	A	חחח
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	ug/L (ppb)	1	85	85	57-114	0
Acenaphthylene	ug/L (ppb)	1	85	92	65 - 119	8
Acenaphthene	ug/L (ppb)	1	86	90	66-118	5
Fluorene	ug/L (ppb)	1	90	95	64 - 125	5
Phenanthrene	ug/L (ppb)	1	91	91	67 - 120	0
Anthracene	ug/L (ppb)	1	93	96	65 - 122	3
Fluoranthene	ug/L (ppb)	1	94	98	65 - 127	4
Pyrene	ug/L (ppb)	1	100	107	62 - 130	7
Benz(a)anthracene	ug/L (ppb)	1	97	98	60-118	1
Chrysene	ug/L (ppb)	1	92	93	66 - 125	1
Benzo(b)fluoranthene	ug/L (ppb)	1	90	94	55 - 135	4
Benzo(k)fluoranthene	ug/L (ppb)	1	79	77	62 - 125	3
Benzo(a)pyrene	ug/L (ppb)	1	86	87	58 - 127	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	92	91	36 - 142	1
Dibenz(a,h)anthracene	ug/L (ppb)	1	80	81	37 - 133	1
Benzo(g,h,i)perylene	ug/L (ppb)	1	84	85	34 - 135	1
ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912300-01 (Matrix Spike)

-				Percent	
	Reporting	Spike	Sample	Recovery	Acceptance
Analyte	Units	Level	Result	MS	Criteria
Dichlorodifluoromethane	ug/L (ppb)	50	<1	111	10-172
Chloromethane	ug/L (ppb)	50	<10	108	25-166
Vinyl chloride	ug/L (ppb)	50	< 0.2	105	36-166
Bromomethane	ug/L (ppb)	50	<1	117	47-169
Unioroethane Tricklorefluoremethane	ug/L (ppb)	50	<1	113	46-160
Acetone	ug/L (ppb)	250	<50	88	10-182
1.1-Dichloroethene	ug/L (ppb)	50	<1	105	60-136
Hexane	ug/L (ppb)	50	<1	97	52-150
Methylene chloride	ug/L (ppb)	50	<5	101	67-132
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	104	74-127
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	101	72-129
1,1-Dichloroethane	ug/L (ppb)	50	<1	101	70-128
2,2-Dichloropropane	ug/L (ppb)	50	<1	102	36-154
Chloroform	ug/L (ppb)	50 50	<1	99	65-132
2-Butanone (MEK)	ug/L (ppb)	250	<10	95	10-129
1.2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	101	48-149
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	105	60-146
1,1-Dichloropropene	ug/L (ppb)	50	<1	99	69-133
Carbon tetrachloride	ug/L (ppb)	50	<1	106	56 - 152
Benzene	ug/L (ppb)	50	< 0.35	101	76 - 125
Trichloroethene	ug/L (ppb)	50	<1	96	66-135
1,2-Dichloropropane	ug/L (ppb)	50	<1	101	78-125
Dibromomothano	ug/L (ppb)	50	<1	97	61-150
4-Methyl-2-pentanone	ug/L (ppb)	250	<10	104	10-185
cis-1.3-Dichloropropene	ug/L (ppb)	50	<1	104	72-132
Toluene	ug/L (ppb)	50	<1	96	76-122
trans-1,3-Dichloropropene	ug/L (ppb)	50	<1	101	76-130
1,1,2-Trichloroethane	ug/L (ppb)	50	<1	96	68-131
2-Hexanone	ug/L (ppb)	250	<10	102	10-185
1,3-Dichloropropane	ug/L (ppb)	50	<1	97	71-128
Dibromochloroethene	ug/L (ppb)	50 50	<1	97	10-226
1 2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	95	69-134
Chlorobenzene	ug/L (ppb)	50	<1	97	77-122
Ethylbenzene	ug/L (ppb)	50	<1	98	69-135
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	<1	102	73-137
m,p-Xylene	ug/L (ppb)	100	<2	98	69-135
o-Xylene	ug/L (ppb)	50	<1	97	60-140
Styrene	ug/L (ppb)	50	<1	98	71-133
Bromoform	ug/L (ppb)	50 50	<1	97	65-142 65-149
n-Propylhenzene	ug/L (ppb)	50	<1	93	58-144
Bromobenzene	ug/L (ppb)	50	<1	95	75-124
1,3,5-Trimethylbenzene	ug/L (ppb)	50	<1	95	66-137
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	<1	96	51 - 154
1,2,3-Trichloropropane	ug/L (ppb)	50	<1	96	53 - 150
2-Chlorotoluene	ug/L (ppb)	50	<1	94	66-127
4-Chlorotoluene	ug/L (ppb)	50	<1	95	65-130
1.2.4 Trimothylhonzono	ug/L (ppb)	50 50	<1	94	60-137 50 146
sec-Butylbenzene	ug/L (ppb)	50	<1	54 88	64-140
p-Isopropyltoluene	ug/L (ppb)	50	<1	89	65-141
1,3-Dichlorobenzene	ug/L (ppb)	50	<1	93	72-123
1,4-Dichlorobenzene	ug/L (ppb)	50	<1	92	69-126
1,2-Dichlorobenzene	ug/L (ppb)	50	<1	94	69-128
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	<10	99	32-164
1,2,4-Trichlorobenzene	ug/L (ppb)	50	<1	89	66-136
Naphthalana	ug/L (ppb)	9U 50	<1	01 02	00-143 44-164
1.2.3-Trichlorobenzene	ug/L (ppb)	50	<1	86	69-148
, ,				50	++-

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

-			Percent	Percent		
	Reporting	Spike	Recoverv	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Dichlorodifluoromethane	ug/L (pph)	50	97	119	25-158	20
Chloromethane	ug/L (ppb)	50	98	114	45-156	15
Vinyl chloride	ug/L (ppb)	50	94	110	50 - 154	16
Bromomethane	ug/L (ppb)	50	104	124	55-143	18
Chloroethane	ug/L (ppb)	50	102	119	58-146	15
Trichlorofluoromethane	ug/L (ppb)	250	100	112	50 - 150	11
Acetone	ug/L (ppb)	250	89	95	53-131	7
I, I-Dichloroethene	ug/L (ppb)	50	102	113	67-136	10
Methylene chloride	ug/L (ppb)	50	105	115	39-148	9
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	101	116	64-147	14
trans-1,2-Dichloroethene	ug/L (ppb)	50	102	111	68-128	8
1,1-Dichloroethane	ug/L (ppb)	50	103	111	79-121	7
2,2-Dichloropropane	ug/L (ppb)	50	93	106	55-143	13
cis-1,2-Dichloroethene	ug/L (ppb)	50	105	112	80-123	6
Chloroform	ug/L (ppb)	50	100	108	80-121	8
2-Butanone (MEK) 1.2 Diablereethene (FDC)	ug/L (ppb)	250	103	103	07-149 79 199	0
1.1.1-Trichloroethane	ug/L (ppb)	50	103	111	81-125	11
1.1-Dichloropropene	ug/L (ppb)	50	103	108	77-129	5
Carbon tetrachloride	ug/L (ppb)	50	104	117	75-158	12
Benzene	ug/L (ppb)	50	104	108	69-134	4
Trichloroethene	ug/L (ppb)	50	101	105	79-113	4
1,2-Dichloropropane	ug/L (ppb)	50	107	110	77-123	3
Bromodichloromethane	ug/L (ppb)	50	108	112	81-133	4
1 Methyl 2 pontonone	ug/L (ppb)	50 950	105	107	82-125	Z
4-Methyl-2-pentanone	ug/L (ppb)	250	106	110	82.132	4 2
Toluene	ug/L (ppb)	50	102	105	72-122	3
trans-1,3-Dichloropropene	ug/L (ppb)	50	113	112	80-136	1
1,1,2-Trichloroethane	ug/L (ppb)	50	102	106	75-124	4
2-Hexanone	ug/L (ppb)	250	107	110	60-136	3
1,3-Dichloropropane	ug/L (ppb)	50	105	107	76-126	2
Tetrachloroethene	ug/L (ppb)	50	103	106	76-121	3
1 2-Dibromoethano (EDB)	ug/L (ppb)	50	113	106	04-100 89.115	2
Chlorobenzene	ug/L (ppb)	50	102	107	83-114	5
Ethylbenzene	ug/L (ppb)	50	104	109	77-124	5
1,1,1,2 Tetrachloroethane	ug/L (ppb)	50	104	116	84-127	11
m,p-Xylene	ug/L (ppb)	100	103	108	81-112	5
o-Xylene	ug/L (ppb)	50	101	108	81-121	7
Styrene	ug/L (ppb)	50	104	108	84-119	4
Bromoform	ug/L (ppb)	50	100	109	74-136	3
n-Propylhenzene	ug/L (ppb)	50	105	107	74-126	2
Bromobenzene	ug/L (ppb)	50	107	107	80-121	0
1,3,5-Trimethylbenzene	ug/L (ppb)	50	105	110	78-123	5
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	106	109	66-126	3
1,2,3-Trichloropropane	ug/L (ppb)	50	107	107	67-124	0
2-Chlorotoluene	ug/L (ppb)	50	105	108	77-127	3
4-Chlorotoluene	ug/L (ppb)	50 50	106	107	78-128	1 5
1 2 4-Trimethylbenzene	ug/L (ppb)	50	103	108	79-122	5
sec-Butylbenzene	ug/L (ppb)	50	102	107	80-116	5
p-Isopropyltoluene	ug/L (ppb)	50	100	106	81-123	6
1,3-Dichlorobenzene	ug/L (ppb)	50	104	108	83-113	4
1,4-Dichlorobenzene	ug/L (ppb)	50	102	106	83-107	4
1,2-Dichlorobenzene	ug/L (ppb)	50	103	110	84-112	7
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	102	112	57-141	9
1,2,4-1 richlorobenzene Hovachlorobutadiono	ug/L (ppb)	50 50	101	112	72-130	10
Naphthalene	ug/L (ppb)	50	103	113	64-133	9 9
1,2,3-Trichlorobenzene	ug/L (ppb)	50	99	110	65-136	11
	/					

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL SUSPENDED SOLIDS BY METHOD 2540D

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
TSS	mg/L (ppm)	20	104	102	35-146	2

ENVIRONMENTAL CHEMISTS

Date of Report: 12/26/19 Date Received: 12/16/19 Project: Kosmos, F&BI 912265

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 912238-05 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016 Aroclor 1260	ug/L (ppb) ug/L (ppb)	$\begin{array}{c} 0.25\\ 0.25\end{array}$	<0.1 <0.1	$\begin{array}{c} 62 \\ 65 \end{array}$	63 72	$50-150 \\ 50-150$	2 10

			Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Aroclor 1016	ug/L (ppb)	0.25	76	78	35 - 111	3
Aroclor 1260	ug/L (ppb)	0.25	72	74	29-130	3

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 27, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 17, 2019 from the Kosmos, F&BI 912296 project. There are 30 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1227R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 17, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912296 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912296 -01	Westbank 1
912296 -02	Westbank 2
912296 -03	Westbank 3

A 6020B internal standard failed the acceptance criteria for the samples. The samples were diluted and reanalyzed with acceptable results. Both data sets were reported.

Several compounds in the 8260C laboratory control sample exceeded the acceptance criteria. The analytes were not detected in the samples, therefore the data were acceptable.

The 8082 PCB reporting limits in samples Westbank 2 and Westbank 3 were raised due to the presence of interfering compounds.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912296 Date Extracted: 12/18/19 Date Analyzed: 12/19/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
Westbank 1 912296-01	<5	84
Westbank 2 912296-02	<5	85
Westbank 3 912296-03	<5	84
Method Blank	<5	7709-2931 MB

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912296 Date Extracted: 12/18/19 Date Analyzed: 12/18/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	Surrogate <u>(% Recovery)</u> (Limit 48-168)
Westbank 1 912296-01	<50	<250	99
Westbank 2 912296-02	<50	<250	98
Westbank 3 912296-03	<50	<250	100
Method Blank ^{09-3052 MB2}	<50	<250	95

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Westbank 1 12/17/19 12/19/19 12/23/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912296 912296-01 912296-01.127 ICPMS2 SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.29		
Barium	28.3		
Cadmium	<1		
Chromium	$6.88~\mathrm{J}$		
Lead	1.93		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	Westbank 1 12/17/19 12/19/19 12/23/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912296 912296-01 x5 912296-01 x5.126 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	7.85		

7.85

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	Westbank 2 12/17/19 12/19/19 12/23/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912296 912296-02 912296-02.133 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	2.63		
Barium	80.0		
Cadmium	<1		
Chromium	$13.5~\mathrm{J}$		
Lead	3.83		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Westbank 2	Client:	Hart Crowser
Date Received:	12/17/19	Project:	Kosmos, F&BI 912296
Date Extracted:	12/19/19	Lab ID:	912296-02 x5
Date Analyzed:	12/23/19	Data File:	912296-02 x5.132
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	17.1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix:	Westbank 3 12/17/19 12/19/19 12/23/19 Soil	Client: Project: Lab ID: Data File: Instrument:	Hart Crowser Kosmos, F&BI 912296 912296-03 912296-03.135 ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	1.51		
Barium	58.7		
Cadmium	<1		
Chromium	$9.33~\mathrm{J}$		
Lead	2.41		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Westbank 3	Client:	Hart Crowser
Date Received:	12/17/19	Project:	Kosmos, F&BI 912296
Date Extracted:	12/19/19	Lab ID:	912296-03 x5
Date Analyzed:	12/23/19	Data File:	912296-03 x5.134
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP
Analyte:	Concentration mg/kg (ppm)		
Chromium	11.7		

9

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank NA 12/19/19 12/19/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912296 I9-819 mb I9-819 mb.089 ICPMS2 SP
Analyte:	Concentration mg/kg (ppm)		
Arsenic	<1		
Barium	<1		
Cadmium	<1		
Chromium	<1		
Lead	<1		
Mercury	<1		
Selenium	<1		
Silver	<1		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Westbank 1 12/17/19 12/18/19 12/18/19 Soil mg/kg (ppm)) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912296 912296-01 1/5 121817.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 96 102	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Westbank 2 12/17/19 12/18/19 12/18/19 Soil mg/kg (ppm)	Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912296 912296-02 1/5 121818.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 98 107	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Westbank 3 12/17/19 12/18/19 12/18/19 Soil mg/kg (ppm)) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912296 912296-03 1/5 121819.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 100 111	Lower Limit: 31 24	Upper Limit: 163 168
		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		< 0.01		
Phenanthrene		< 0.01		
Anthracene		< 0.01		
Fluoranthene		< 0.01		
Pyrene		< 0.01		
Benz(a)anthracene		< 0.01		
Chrysene		< 0.01		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank Not Applicable 12/18/19 12/18/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912296 09-3047 mb2 1/5 121816.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	% Recovery: 96 e-d12 103	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:	Concentration mg/kg (ppm)		
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthe Benzo(b)fluoranthe Indeno(1,2,3-cd)pyr Dibenz(a,h)anthrac	$\begin{array}{c} < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ < 0.01 \\ ne \\ < 0.01 \\ ne \\ < 0.01 \\ ene \\ < 0.$		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Westbank 1		Client:	Hart Crowser	•
Date Received:	12/17/19		Project:	Kosmos, F&BI 912296)
Date Extracted:	12/18/19		Lap ID: Doto Eilor	912296-01 191914 D	
Date Analyzed:	12/18/19 Seil		Data File:	121814.D	
Matrix:	5011 mg/ltg (ppm) Dry Woight	Instrument:	GCM54 MC	
Units:	mg/kg (ppm) Dry weight	Operator:	MS	
		_	Lower	Upper	
Surrogates:		% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	99	62	145	
Toluene-d8		100	55	145	
4-Bromofluorobenz	ene	97	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene	2	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentane	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received:	Westbank 2 12/17/19		Client: Project:	Hart Crowser Kosmos, F&BI 912296	;
Date Extracted:	12/18/19		Lab ID:	912296-02	
Date Analyzed:	12/18/19		Data File:	121819.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppm) Dry Weight	Operator:	MS	
			Lower	Upper	
Surrogates:	. .	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	99	62	145	
Toluene-d8		100	55	145	
4-Bromofluorobenz	ene	98	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene		< 0.05
Methylene chloride	•	< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1,2-Dichloroe	ethene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-1	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorie	de	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentan	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Data Bassived:	Westbank 3		Client: Project:	Hart Crowser Kosmos, F&BI 012206	
Date Received.	12/17/19		I noject.	019906-03	
Date Analyzed	12/18/19		Data File	121820 D	
Matrix.	Soil		Instrument.	GCMS4	
Units.	mg/kg (nnm) Dry Weight	Operator [.]	MS	
011105.	mg/ng (ppm) Diy Weight	operator.		
~			Lower	Upper	
Surrogates:	_	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane	-d4	101	62	145	
Toluene-d8		102	55	145	
4-Bromofluorobenz	ene	99	65	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Cetrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene)	< 0.05
Methylene chloride	•	< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	ethene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-1	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	de	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentan	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bla	ink	Client:	Hart Crowser	
Date Received:	Not Applica	able	Project:	Kosmos. F&BI 912296	
Date Extracted:	12/18/19		Lab ID:	09-3057 mb	
Date Analyzed:	12/18/19		Data File:	121809.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppn	n) Dry Weight	Operator:	MS	
	8 8 41	, ,	- <u>-</u>	TT	
C I		07 D	Lower	Upper	
Surrogates:	1.4	% Recovery:	Limit:	Limit:	
1,2-Dichloroethane-	d4	100	50	150	
Toluene-d8		99	50	150	
4-Bromofluorobenze	ene	105	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	<0.5 ca	Ethylber	nzene	< 0.05
Acetone		< 0.5	1.1.1.2-7	etrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene		< 0.05
Methylene chloride		<0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1.2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2.2-Dichloropropan	e	<0.05 ca	Bromobe	enzene	< 0.05
cis-1.2-Dichloroethe	ene	< 0.05	1.3.5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tri	chloropropane	< 0.05
1.2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1.1.1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1.1-Dichloropropene	e	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	e	< 0.05	1.2.4-Tri	methylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1.2-Dichloropropan	e	< 0.05	1.3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1.4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1.2-Dich	lorobenzene	< 0.05
4-Methvl-2-pentanc	ne	< 0.5	1.2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropror	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Westbank 1 12/17/19 12/19/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912296 912296-01 1/6 122015.D GC7 IJL
Surrogates: TCMX	% Recovery: 67	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221 Aroclor 1232 Aroclor 1016 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1262 Aroclor 1268	<0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Westbank 2		Client:	Hart Crowser
Date Received:	12/17/19		Project:	Kosmos, F&BI 912296
Date Extracted:	12/19/19		Lab ID:	912296-02 1/60
Date Analyzed:	12/20/19		Data File:	122016.D
Matrix:	Soil		Instrument:	GC7
Units:	mg/kg (ppm) Dr	ry Weight	Operator:	IJL
_			Lower	Upper
Surrogates:	%	Recovery:	Limit:	Limit:
TCMX		62	23	127
	Cor	ncentration		
Compounds:	m	g/kg (ppm)		
Aroclor 1221		< 0.2		
Aroclor 1232		< 0.2		
Aroclor 1016		< 0.2		
Aroclor 1242		< 0.2		
Aroclor 1248		< 0.2		
Aroclor 1254		< 0.2		
Aroclor 1260		< 0.2		
Aroclor 1262		< 0.2		
Aroclor 1268		< 0.2		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Westbank 3 12/17/19 12/19/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912296 912296-03 1/60 122017.D GC7 IJL
Surrogates: TCMX	% Recovery: 61	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221 Aroclor 1232 Aroclor 1016 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1262 Aroclor 1268	<0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Blank	Client:	Hart Crowser
Date Received:	Not Applicable	Project:	Kosmos, F&BI 912296
Date Extracted:	12/19/19	Lab ID:	09-3074 mb 1/6
Date Analyzed:	12/20/19	Data File:	122007.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL
Surrogates: TCMX	% Recovery: 85	Lower Limit: 23	Upper Limit: 127
	Concentration		
Compounds:	mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912296

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 9	12263-01 (Duplic	eate)			
		Samp	ole Du	plicate	
	Reporting	Resu	lt R	lesult	RPD
Analyte	Units	(Wet V	Wt) (W	/et Wt)	(Limit 20)
Gasoline	mg/kg (ppm)	<5	5 <5		nm
Laboratory Code: L	aboratory Contro	ol Sample	e		
			Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	
Gasoline	mg/kg (ppm)	20	80	71-131	—

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912296

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912283-02 (Matri	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	2,500	<50	108	100	64-133	8
Laboratory Code:	Laboratory Contr	ol Samp	le				
			Percent	t			
	Reporting	Spike	Recover	y Accep	tance		
Analyte	Units	Level	LCS	Crit	eria		
Diesel Extended	mg/kg (ppm)	2,500	100	58-1	147		

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ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912296

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 912286-05 x5 (Matrix Spike)

			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Arsenic	mg/kg (ppm)	10	5.41	84	90	75 - 125	7
Barium	mg/kg (ppm)	50	91.1	108	114	75 - 125	5
Cadmium	mg/kg (ppm)	10	8.16	71 b	36 b	75 - 125	$65 \mathrm{b}$
Chromium	mg/kg (ppm)	50	48.1	107	101	75 - 125	6
Lead	mg/kg (ppm)	50	13.6	101	92	75 - 125	9
Mercury	mg/kg (ppm	5	<5	94	102	75 - 125	8
Selenium	mg/kg (ppm)	5	<5	82	80	75 - 125	2
Silver	mg/kg (ppm)	10	<5	89	89	75 - 125	0

	<i>y y y y y y y y y y</i>	I I I I I	Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Arsenic	mg/kg (ppm)	10	89	80-120
Barium	mg/kg (ppm)	50	99	80-120
Cadmium	mg/kg (ppm)	10	98	80-120
Chromium	mg/kg (ppm)	50	91	80-120
Lead	mg/kg (ppm)	50	105	80-120
Mercury	mg/kg (ppm)	5	98	80-120
Selenium	mg/kg (ppm)	5	99	80-120
Silver	mg/kg (ppm)	10	97	80-120

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912296

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912263-01 1/5 (Matrix Spike)

Baserator, coac. cr==00	01 1.0 (1.1401 m k	pine)			
			Sample	Percent	
	Reporting	Spike	Result	Recovery	Acceptance
Analyte	Units	Level	(Wet wt)	\mathbf{MS}	Criteria
Naphthalene	mg/kg (ppm)	0.17	< 0.01	80	44-129
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	81	52 - 121
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	80	51 - 123
Fluorene	mg/kg (ppm)	0.17	< 0.01	83	37-137
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	82	34-141
Anthracene	mg/kg (ppm)	0.17	< 0.01	83	32 - 124
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	91	16-160
Pyrene	mg/kg (ppm)	0.17	< 0.01	84	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	88	23 - 144
Chrysene	mg/kg (ppm)	0.17	< 0.01	82	32 - 149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	84	23 - 176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	70	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	75	21 - 163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	77	23 - 170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	74	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	71	37-133

-	·	-	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	84	83	58-121	1
Acenaphthylene	mg/kg (ppm)	0.17	89	89	54 - 121	0
Acenaphthene	mg/kg (ppm)	0.17	88	85	54 - 123	3
Fluorene	mg/kg (ppm)	0.17	91	90	56 - 127	1
Phenanthrene	mg/kg (ppm)	0.17	88	88	55 - 122	0
Anthracene	mg/kg (ppm)	0.17	87	89	50 - 120	2
Fluoranthene	mg/kg (ppm)	0.17	92	92	54 - 129	0
Pyrene	mg/kg (ppm)	0.17	98	104	53 - 127	6
Benz(a)anthracene	mg/kg (ppm)	0.17	92	94	51 - 115	2
Chrysene	mg/kg (ppm)	0.17	89	91	55 - 129	2
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	84	88	56 - 123	5
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	78	74	54 - 131	5
Benzo(a)pyrene	mg/kg (ppm)	0.17	77	78	51 - 118	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	85	92	49-148	8
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	83	93	50 - 141	11
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	82	90	52 - 131	9

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912296

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912296-01 (Matrix Spike)

Č (1 /		Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	33	37	10-142	11
Chloromethane	mg/kg (ppm)	2.5	< 0.5	61	59	10-126	3
Vinyl chloride	mg/kg (ppm)	2.5	< 0.05	59	56	10-138	5
Bromomethane	mg/kg (ppm)	2.5	< 0.5	75	70	10-163	7
Chloroethane	mg/kg (ppm)	2.5	< 0.5	74	71	10-176	4
Trichlorofluoromethane	mg/kg (ppm)	2.5	<0.5	68	63	10-176	8
Acetone	mg/kg (ppm)	12.5	<0.5	76	71	10-163	7
I, I-Dichloroethene	mg/kg (ppm)	2.0	<0.05	18	13	10-160	19
Methylene chloride	mg/kg (ppin)	2.5	<0.25	79	74	10-156	12
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	<0.05	89	86	21-145	3
trans-1.2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	83	79	14-137	5
1,1-Dichloroethane	mg/kg (ppm)	2.5	< 0.05	86	79	19-140	8
2,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	85	81	10-158	5
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	< 0.05	91	84	25-135	8
Chloroform	mg/kg (ppm)	2.5	< 0.05	87	81	21-145	7
2-Butanone (MEK)	mg/kg (ppm)	12.5	< 0.5	83	73	19-147	13
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	< 0.05	90	83	12-160	8
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	88	84	10-156	5
1,1-Dichloropropene	mg/kg (ppm)	2.0	<0.05	66	18	0.164	9
Bonzono	mg/kg (ppm)	2.0	<0.05	00 87	04 79	9-104 99-199	5 10
Trichloroethene	mg/kg (ppin)	2.5	<0.03	85	77	21.139	10
1 2-Dichloropropane	mg/kg (ppm)	2.5	<0.02	90	80	30-135	10
Bromodichloromethane	mg/kg (ppm)	2.5	< 0.05	90	80	23-155	12
Dibromomethane	mg/kg (ppm)	2.5	< 0.05	87	79	23 - 145	10
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	< 0.5	89	80	24 - 155	11
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	91	79	28-144	14
Toluene	mg/kg (ppm)	2.5	< 0.05	86	78	35-130	10
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	88	77	26-149	13
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	<0.05	85	76	10-205	11
2-nexanone	mg/kg (ppm)	12.5	<0.0	89	18	10-100	13
Totrachloroothono	mg/kg (ppm)	2.0	<0.05	00 88	10	01-107 20.133	12
Dibromochloromethane	mg/kg (ppm)	2.5	<0.025	91	81	28-150	10
1.2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	<0.05	87	76	28-142	13
Chlorobenzene	mg/kg (ppm)	2.5	< 0.05	88	80	32-129	10
Ethylbenzene	mg/kg (ppm)	2.5	< 0.05	90	82	32-137	9
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	91	86	31-143	6
m,p-Xylene	mg/kg (ppm)	5	< 0.1	90	82	34-136	9
o-Xylene	mg/kg (ppm)	2.5	< 0.05	89	82	33-134	8
Styrene	mg/kg (ppm)	2.5	< 0.05	89	82	35-137	8
Bromofourn	mg/kg (ppm)	2.5	<0.05	90	83	31-142	8
n Propulhonzono	mg/kg (ppm)	2.0	<0.05	91	84 70	21-100	10
Bromohenzene	mg/kg (ppm)	2.5	<0.05	88	79	34-130	11
1.3.5-Trimethylbenzene	mg/kg (ppm)	2.5	<0.05	91	82	18-149	10
1.1.2.2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	88	77	28-140	13
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	< 0.05	86	77	25-144	11
2-Chlorotoluene	mg/kg (ppm)	2.5	< 0.05	89	80	31-134	11
4-Chlorotoluene	mg/kg (ppm)	2.5	< 0.05	89	80	31-136	11
tert-Butylbenzene	mg/kg (ppm)	2.5	< 0.05	89	81	30-137	9
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	89	81	10-182	9
sec-Butylbenzene	mg/kg (ppm)	2.5	<0.05	88	80	23-145	10
p-isopropyitoluene	mg/kg (ppm)	2.5	<0.05	88	80	21-149	10
1, a-Dichlorobenzene	ing/kg (ppm)	2.0	<0.05	88 86	81 70	30-131	8
1.2-Dichlorobenzene	mg/kg (ppm)	2.0 2.5	<0.05	00 88	19	29-129	0 7
1.2-Dibromo-3-chloropropane	mg/kg (nnm)	2.5	<0.5	84	79	11-161	6
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	87	83	22-142	5
Hexachlorobutadiene	mg/kg (ppm)	2.5	< 0.25	85	82	10-142	4
Naphthalene	mg/kg (ppm)	2.5	< 0.05	86	80	14-157	7
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	84	81	20-144	4

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912296

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

	-		Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	59	10-76
Chloromethane	mg/kg (ppm)	2.5	85	34-98
Vinyl chloride	mg/kg (ppm)	2.5	81	42-107
Bromomethane	mg/kg (ppm)	2.5	86	46-113
Unioroethane Tricklorefluceremethane	mg/kg (ppm)	2.5	83	47-115
Acetone	mg/kg (ppm)	2.0 12.5	70	39-112
1.1-Dichloroethene	mg/kg (ppm)	2.5	83	65-110
Hexane	mg/kg (ppm)	2.5	96	55-107
Methylene chloride	mg/kg (ppm)	2.5	114	50 - 127
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	95	72-122
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	93	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	106	74-109
2,2-Dichloropropane	mg/kg (ppm)	2.5	79	63-145
Cls-1,2-Dichloroethene	mg/kg (ppm)	2.0	97	73-110
2-Butanone (MEK)	mg/kg (ppm)	12.5	105	60-121
1.2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	119 vo	73-111
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	93	72-116
1,1-Dichloropropene	mg/kg (ppm)	2.5	109	72-112
Carbon tetrachloride	mg/kg (ppm)	2.5	91	67-123
Benzene	mg/kg (ppm)	2.5	103	72-106
Trichloroethene	mg/kg (ppm)	2.5	108 vo	72-107
1,2-Dichloropropane	mg/kg (ppm)	2.5	115	74-115
Diknomonthono	mg/kg (ppm)	2.5	116	75-126
4-Mothyl-2-pontanono	mg/kg (ppm)	2.5	100	80.128
cis-1.3-Dichloropropene	mg/kg (ppm)	2.5	117	71-138
Toluene	mg/kg (ppm)	2.5	106	74-111
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	119	73-124
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	116 vo	76-118
2-Hexanone	mg/kg (ppm)	12.5	128 vo	67-123
1,3-Dichloropropane	mg/kg (ppm)	2.5	115	75-118
Tetrachloroethene	mg/kg (ppm)	2.5	96	73-111
1.2 Dibromochioromethane (FDR)	mg/kg (ppm)	2.0	106	64-15Z 77 117
Chlorobenzene	mg/kg (ppm)	2.5	106	76-109
Ethylbenzene	mg/kg (ppm)	2.5	107	75-112
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	104	75-129
m,p-Xylene	mg/kg (ppm)	5	104	77-115
o-Xylene	mg/kg (ppm)	2.5	103	76-115
Styrene	mg/kg (ppm)	2.5	107	76-119
Isopropylbenzene	mg/kg (ppm)	2.5	104	76-120
Bromotorm	mg/kg (ppm)	2.5	108	50-174
Bromohenzene	mg/kg (ppm)	2.5	109	76-119
1.3.5-Trimethylbenzene	mg/kg (ppm)	2.5	114	77-121
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	124 vo	74-121
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	125 vo	73-117
2-Chlorotoluene	mg/kg (ppm)	2.5	115 vo	75-113
4-Chlorotoluene	mg/kg (ppm)	2.5	115	77-115
tert-Butylbenzene	mg/kg (ppm)	2.5	111	77-123
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	107	77-119
n-Isopropyltoluene	mg/kg (ppm)	2.5	109	78-120
1 3-Dichlorobenzene	mg/kg (ppm)	2.5	105	76-112
1.4-Dichlorobenzene	mg/kg (ppm)	2.5	107	74-109
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	105	75-114
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	126 vo	68-122
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	111	75-122
Hexachlorobutadiene	mg/kg (ppm)	2.5	105	74-130
Naphthalene	mg/kg (ppm)	2.5	116	73-122
1,2,3-1richlorobenzene	mg/kg (ppm)	2.5	119 VO	75-117

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/17/19 Project: Kosmos, F&BI 912296

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 912340-01 1/6 (Matrix Spike) 1/6

Aroclor 1016mg/kg (ppm)0.25<0.02	Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Control Limits
Aroclor 1260mg/kg (ppm)0.25<0.026726-131Laboratory Code:Laboratory Control Sample 1/6PercentPercentPercent	Aroclor 1016	mg/kg (ppm)	0.25	< 0.02	68	30-123
Laboratory Code: Laboratory Control Sample 1/6 Percent Percent	Aroclor 1260	mg/kg (ppm)	0.25	< 0.02	67	26-131
Percent Percent	Laboratory Code:	Laboratory Control	Sample 1/6			
				Percent	Percent	

	Reporting	Spike Level	Recovery	Recovery	Acceptance	RPD
Analyte	Units		LCS	LCSD	Criteria	(Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	93	89	55 - 137	4
Aroclor 1260	mg/kg (ppm)	0.25	93	92	51 - 150	1
ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

December 27, 2019

Angie Goodwin, Project Manager Hart Crowser 3131 Elliott Ave, Suite 600 Seattle, WA 98121

Dear Ms Goodwin:

Included are the results from the testing of material submitted on December 18, 2019 from the Kosmos, F&BI 912340 project. There are 22 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl Project Manager

Enclosures c: Andrew Kaparos HCR1227R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 18, 2019 by Friedman & Bruya, Inc. from the Hart Crowser Kosmos, F&BI 912340 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Hart Crowser</u>
912340 -01	UB-1
912340 -02	UB-2
912340 -03	UB-3

Several 8260C compounds in the matrix spike and matrix spike duplicate showed recoveries or RPDs exceeding of laboratory control limits. The compounds were non-detect for the affected analytes, therefore the data were reported.

All other quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912340 Date Extracted: 12/20/19 Date Analyzed: 12/20/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (<u>% Recovery</u>) (Limit 50-150)
UB-1 912340-01	<5	77
UB-2 912340-02	12	83
UB-3 912340-03	<5	83
Method Blank 09-2935 MB	<5	87

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912340 Date Extracted: 12/20/19 Date Analyzed: 12/20/19

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	Motor Oil Range (C25-C36)	Surrogate <u>(% Recovery)</u> (Limit 56-165)
UB-1 912340-01	<50	<250	80
UB-2 912340-02	<50	<250	79
UB-3 912340-03	90 x	<250	79
Method Blank 09-3089 MB	<50	<250	79

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	UB-1 12/18/19 12/19/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912340 912340-01 1/25 121923.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	ə-d12	% Recovery: 150 d 110 d	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		mg/kg (ppm)		
Naphthalene Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthe Benzo(b)fluoranthe Indeno(1,2,3-cd)pyr Dibenz(a,h)anthrac	ne ne ene ene	$< 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ < 0.05 \\ <$		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	UB-2 12/18/19 12/19/19 12/20/19 Soil mg/kg (ppm)) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912340 912340-02 1/5 121922.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	ə-d12	% Recovery: 99 112	Lower Limit: 31 24	Upper Limit: 163 168
Compounds:		Concentration		
Compounds.		mg/kg (ppm)		
Naphthalene		< 0.01		
Acenaphthylene		< 0.01		
Acenaphthene		< 0.01		
Fluorene		0.015		
Phenanthrene		0.049		
Anthracene		0.012		
Fluoranthene		< 0.01		
Pyrene		0.027		
Benz(a)anthracene		< 0.01		
Chrysene		0.016		
Benzo(a)pyrene		< 0.01		
Benzo(b)fluoranthe	ne	< 0.01		
Benzo(k)fluoranthe	ne	< 0.01		
Indeno(1,2,3-cd)pyr	ene	< 0.01		
Dibenz(a,h)anthrac	ene	< 0.01		
Benzo(g,h,i)perylen	e	< 0.01		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	UB-3 12/18/19 12/19/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912340 912340-03 1/25 122017.D GCMS6 VM
Surrogates: Anthracene-d10 Benzo(a)anthracene	e-d12	% Recovery: 125 d 108 d	Lower Limit: 31 24	Upper Limit: 163 168
Common day		Concentration		
Compounds:		mg/kg (ppm)		
Naphthalene		< 0.05		
Acenaphthylene		< 0.05		
Acenaphthene		0.051		
Fluorene		0.093		
Phenanthrene		0.28		
Anthracene		0.067		
Fluoranthene		< 0.05		
Pyrene		0.20		
Benz(a)anthracene		0.065		
Chrysene		0.077		
Benzo(a)pyrene		< 0.05		
Benzo(b)fluoranthe	ne	< 0.05		
Benzo(k)fluoranthe	ne	< 0.05		
Indeno(1,2,3-cd)pyr	ene	< 0.05		
Dibenz(a,h)anthrac	ene	< 0.05		
Benzo(g,h,i)perylen	e	< 0.05		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	Method Blank Not Applicable 12/19/19 12/19/19 Soil mg/kg (ppm) Dry Wei	Client: Project: Lab ID: Data File: Instrument: ght Operator:	Hart Crowser Kosmos, F&BI 912340 09-3070 mb 1/5 121906.D GCMS6 YA
Surrogates: Anthracene-d10 Benzo(a)anthracene	% Recov 101 e-d12 110	ery: Lower 31 24	Upper Limit: 163 168
	Concentr	ation	
Compounds:	mg/kg (p	pm)	
Naphthalene	< 0.0	1	
Acenaphthylene	< 0.0	1	
Acenaphthene	< 0.0	1	
Fluorene	< 0.0	1	
Phenanthrene	< 0.0	1	
Anthracene	< 0.0	1	
Fluoranthene	< 0.0	1	
Pyrene	< 0.0	1	
Benz(a)anthracene	< 0.0	1	
Chrysene	< 0.0	1	
Benzo(a)pyrene	< 0.0	1	
Benzo(b)fluoranthe	ne <0.0	1	
Benzo(k)fluoranthe	ne <0.0	1	
Indeno(1,2,3-cd)pyr	ene <0.0	1	
Dibenz(a,h)anthrac	ene <0.0	1	
Benzo(g,h,i)perylen	e <0.0	1	

ENVIRONMENTAL CHEMISTS

Client Sample ID:	UB-1		Client:	Hart Crowser	
Date Received:	12/18/19		Project:	Kosmos, F&BI 912340)
Date Extracted:	12/19/19		Lab ID:	912340-01	
Date Analyzed:	12/20/19		Data File:	122021.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppn	n) Dry Weight	Operator:	MS	
	8 8 41	, ,	т	TT	
Comparatasi		0/ Decorrorry	Lower	Upper	
1 0 Dicklausethause	14	% necovery:			
1,2-Dichloroethane	-04	103	62 55	145	
1 oluene-08		101	99 67	145	
4-Bromofluorobenze	ene	95	69	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	loroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorob	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	Tetrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xylene	9	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	orm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tr	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	Tetrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tr	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	е	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	е	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentance	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tr	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tr	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	UB-2		Client:	Hart Crowser	
Date Received:	12/18/19		Project:	Kosmos, F&BI 912340)
Date Extracted:	12/19/19		Lab ID:	912340-02	
Date Analyzed:	12/20/19		Data File:	122022.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppn	n) Dry Weight	Operator :	MS	
	0 0 11		T	тт	
Currentee		0/ Decorrorry	Lower	Upper	
Surrogates:	14	% Recovery:			
1,2-Dichloroethane-	α4	104	62	145	
1 oluene-d8		104	99 67	145	
4-Bromofluorobenze	ene	99	69	139	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluoromet	hane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	etrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene		< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ether	r (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroet	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropane	е	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroethe	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroethai	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropene	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	e	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropane	е	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentano	ne	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloroprop	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroethan	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	UB-3		Client:	Hart Crowser	
Date Received:	12/18/19		Project:	Kosmos, F&BI 912340)
Date Extracted:	12/19/19		Lab ID:	912340-03	
Date Analyzed:	12/20/19		Data File:	122023.D	
Matrix:	Soil		Instrument:	GCMS4	
Units:	mg/kg (ppr	n) Dry Weight	Operator :	MS	
	0 0 11	, i C	T	I I and an	
Surrogates:		% Recovery:	Lower Limit:	Upper Limit	
1 2-Dichloroethane	-d4	104	62	145	
Toluono-d8	-44	104	55	145	
4-Bromofluorobenz	ene	103	65	139	
1 2101101100000	0110	0	00	100	a
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	ochloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluoromet	hane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1,1,1,2-7	'etrachloroethane	< 0.05
1,1-Dichloroethene		< 0.05	m,p-Xyle	ene	< 0.1
Hexane		< 0.25	o-Xylene)	< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	er (MTBE)	< 0.05	Isopropy	lbenzene	< 0.05
trans-1,2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2,2-Dichloropropan	e	< 0.05	Bromobe	enzene	< 0.05
cis-1,2-Dichloroeth	ene	< 0.05	1,3,5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1,1,2,2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1,2,3-Tri	ichloropropane	< 0.05
1,2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1,1,1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1,1-Dichloropropen	e	< 0.05	tert-But	ylbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1,2,4-Tri	imethylbenzene	< 0.05
Benzene		< 0.03	sec-Buty	lbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1,2-Dichloropropan	e	< 0.05	1,3-Dich	lorobenzene	< 0.05
Bromodichlorometh	nane	< 0.05	1,4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1,2-Dich	lorobenzene	< 0.05
4-Methyl-2-pentane	one	< 0.5	1,2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropro	pene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene	-	< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichloron	oropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1,2,3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Bla	ank	Client:	Hart Crowser	
Date Received:	Not Applic	able	Project:	Kosmos, F&BI 912340)
Date Extracted:	12/19/19		Lab ID:	09-3076 mb	
Date Analyzed:	12/19/19		Data File:	121914.D	
Matrix:	Soil		Instrument:	GCMS9	
Units:	mg/kg (ppn	n) Dry Weight	Operator :	MS	
	0 0 11	, v 0	T	TL	
Sumoratory		0/ Decorrorry	Lower	Upper Limite	
1.9 Dichleroothono	24	% necovery:	Limit.	150	
Taluara do	·04	100	50	150	
1 oluene-a8		103	50 50	150	
4-Bromofluorobenze	ene	111	50	150	
Compounds:		Concentration mg/kg (ppm)	Compou	nds:	Concentration mg/kg (ppm)
Dichlorodifluorome	thane	< 0.5	1,3-Dich	loropropane	< 0.05
Chloromethane		< 0.5	Tetrachl	oroethene	< 0.025
Vinyl chloride		< 0.05	Dibromo	chloromethane	< 0.05
Bromomethane		< 0.5	1,2-Dibr	omoethane (EDB)	< 0.05
Chloroethane		< 0.5	Chlorobe	enzene	< 0.05
Trichlorofluorometh	nane	< 0.5	Ethylber	nzene	< 0.05
Acetone		< 0.5	1.1.1.2-7	etrachloroethane	< 0.05
1.1-Dichloroethene		< 0.05	m.p-Xvle	ene	< 0.1
Hexane		< 0.25	o-Xvlene		< 0.05
Methylene chloride		< 0.5	Styrene		< 0.05
Methyl t-butyl ethe	r (MTBE)	< 0.05	Isopropy	vlbenzene	< 0.05
trans-1.2-Dichloroe	thene	< 0.05	Bromofo	rm	< 0.05
1,1-Dichloroethane		< 0.05	n-Propy	lbenzene	< 0.05
2.2-Dichloropropan	е	< 0.05	Bromobe	enzene	< 0.05
cis-1.2-Dichloroethe	ene	< 0.05	1.3.5-Tri	imethylbenzene	< 0.05
Chloroform		< 0.05	1.1.2.2-7	etrachloroethane	< 0.05
2-Butanone (MEK)		< 0.5	1.2.3-Tri	chloropropane	< 0.05
1.2-Dichloroethane	(EDC)	< 0.05	2-Chloro	otoluene	< 0.05
1.1.1-Trichloroetha	ne	< 0.05	4-Chloro	otoluene	< 0.05
1.1-Dichloropropene	9	< 0.05	tert-But	vlbenzene	< 0.05
Carbon tetrachlorid	le	< 0.05	1.2.4-Tri	methylbenzene	< 0.05
Benzene	-	< 0.03	sec-Buty	vlbenzene	< 0.05
Trichloroethene		< 0.02	p-Isopro	pyltoluene	< 0.05
1.2-Dichloropropan	е	< 0.05	1.3-Dich	lorobenzene	< 0.05
Bromodichlorometh	ane	< 0.05	1.4-Dich	lorobenzene	< 0.05
Dibromomethane		< 0.05	1.2-Dich	lorobenzene	< 0.05
4-Methvl-2-pentanc	one	< 0.5	1.2-Dibr	omo-3-chloropropane	< 0.5
cis-1,3-Dichloropror	oene	< 0.05	1,2,4-Tri	ichlorobenzene	< 0.25
Toluene		< 0.05	Hexachl	orobutadiene	< 0.25
trans-1,3-Dichlorop	ropene	< 0.05	Naphtha	alene	< 0.05
1,1,2-Trichloroetha	ne	< 0.05	1.2.3-Tri	ichlorobenzene	< 0.25
2-Hexanone		< 0.5			

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	UB-1 12/18/19 12/19/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912340 912340-01 1/6 122010.D GC7 IJL
Surrogates: TCMX	% Recovery: 55	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221 Aroclor 1232 Aroclor 1016 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1262 Aroclor 1268	<0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	UB-2 12/18/19 12/19/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912340 912340-02 1/6 122012.D GC7 IJL
Surrogates: TCMX	% Recovery: 59	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221 Aroclor 1232 Aroclor 1016 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1262 Aroclor 1268	<0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID: Date Received: Date Extracted: Date Analyzed: Matrix: Units:	UB-3 12/18/19 12/19/19 12/20/19 Soil mg/kg (ppm) Dry Weight	Client: Project: Lab ID: Data File: Instrument: Operator:	Hart Crowser Kosmos, F&BI 912340 912340-03 1/6 122013.D GC7 IJL
Surrogates: TCMX	% Recovery: 52	Lower Limit: 23	Upper Limit: 127
Compounds:	Concentration mg/kg (ppm)		
Aroclor 1221 Aroclor 1232 Aroclor 1016 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Aroclor 1262 Aroclor 1268	<0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02 <0.02		

ENVIRONMENTAL CHEMISTS

Client Sample ID:	Method Blank	Client:	Hart Crowser
Date Received:	Not Applicable	Project:	Kosmos, F&BI 912340
Date Extracted:	12/19/19	Lab ID:	09-3074 mb 1/6
Date Analyzed:	12/20/19	Data File:	122007.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL
Surrogates: TCMX	% Recovery: 85	Lower Limit: 23	Upper Limit: 127
	Concentration		
Compounds:	mg/kg (ppm)		
Aroclor 1221	< 0.02		
Aroclor 1232	< 0.02		
Aroclor 1016	< 0.02		
Aroclor 1242	< 0.02		
Aroclor 1248	< 0.02		
Aroclor 1254	< 0.02		
Aroclor 1260	< 0.02		
Aroclor 1262	< 0.02		
Aroclor 1268	< 0.02		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912340

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code:	912358-01 (Duplic	ate)			
		Samp	le Du	plicate	
	Reporting	Resu	lt F	Result	RPD
Analyte	Units	(Wet V	Vt) (W	Vet Wt)	(Limit 20)
Gasoline	mg/kg (ppm)	11		12	9
Laboratory Code:	Laboratory Contro	ol Sample	e		
			Percent		
	Reporting	Spike	Recovery	Acceptance	
Analyte	Units	Level	LCS	Criteria	_
Gasoline	mg/kg (ppm)	20	80	71-131	—

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912340

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	912340-01 (Matri	x Spike)					
			Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	(Wet Wt)	MS	MSD	Criteria	(Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	86	90	63-146	5
Laboratory Code:	Laboratory Contr	ol Samp	le				
			Percent	5			
	Reporting	Spike	Recover	y Accep	tance		
Analyte	Units	Level	LCS	Crite	eria		
Diesel Extended	mg/kg (ppm)	5,000	86	79-1	144		

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912340

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 912123-13 1/5 (Matrix Spike)

	10 1.0 (1.1401111 k	pine)			
			Sample	Percent	
	Reporting	Spike	Result	Recovery	Acceptance
Analyte	Units	Level	(Wet wt)	\mathbf{MS}	Criteria
Naphthalene	mg/kg (ppm)	0.17	< 0.01	75	44-129
Acenaphthylene	mg/kg (ppm)	0.17	< 0.01	75	52 - 121
Acenaphthene	mg/kg (ppm)	0.17	< 0.01	75	51 - 123
Fluorene	mg/kg (ppm)	0.17	< 0.01	80	37 - 137
Phenanthrene	mg/kg (ppm)	0.17	< 0.01	78	34-141
Anthracene	mg/kg (ppm)	0.17	< 0.01	78	32 - 124
Fluoranthene	mg/kg (ppm)	0.17	< 0.01	85	16-160
Pyrene	mg/kg (ppm)	0.17	< 0.01	80	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	< 0.01	84	23 - 144
Chrysene	mg/kg (ppm)	0.17	< 0.01	79	32 - 149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	< 0.01	81	23 - 176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	< 0.01	71	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	< 0.01	76	21 - 163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	< 0.01	78	23 - 170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	< 0.01	73	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	< 0.01	69	37 - 133

Laboratory Code: Laboratory Control Sample 1/5

-	-	-	Percent	Percent		
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20)
Naphthalene	mg/kg (ppm)	0.17	83	85	58 - 121	2
Acenaphthylene	mg/kg (ppm)	0.17	84	84	54 - 121	0
Acenaphthene	mg/kg (ppm)	0.17	84	86	54 - 123	2
Fluorene	mg/kg (ppm)	0.17	88	88	56 - 127	0
Phenanthrene	mg/kg (ppm)	0.17	85	86	55 - 122	1
Anthracene	mg/kg (ppm)	0.17	85	86	50 - 120	1
Fluoranthene	mg/kg (ppm)	0.17	91	90	54 - 129	1
Pyrene	mg/kg (ppm)	0.17	87	91	53 - 127	4
Benz(a)anthracene	mg/kg (ppm)	0.17	90	91	51 - 115	1
Chrysene	mg/kg (ppm)	0.17	86	90	55 - 129	5
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	83	81	56 - 123	2
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	74	79	54 - 131	7
Benzo(a)pyrene	mg/kg (ppm)	0.17	75	75	51 - 118	0
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	79	84	49-148	6
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	77	85	50 - 141	10
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	73	83	52 - 131	13

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912340

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 912319-01 (Matrix Spike)

Č (1 /		Sample	Percent	Percent		
	Reporting	Spike	Result	Recoverv	Recoverv	Acceptance	RPD
Analyte	Units	Level	(Wet wt)	MS	MSD	Criteria	(Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	31	29	10-56	7
Chloromethane	mg/kg (ppm)	2.5	< 0.5	57	58	10-90	2
Vinyl chloride	mg/kg (ppm)	2.5	< 0.05	59	59	10-91	0
Bromomethane	mg/kg (ppm)	2.5	< 0.5	64	86	10-110	29 vo
Chloroethane	mg/kg (ppm)	2.5	< 0.5	65	63	10-101	3
Trichlorofluoromethane	mg/kg (ppm)	2.5	< 0.5	55	53	10-95	4
Acetone	mg/kg (ppm)	12.5	<0.5	84	145 vo	11-141	53 vo
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	66	67	22-107	2
Hexane Methodaya ablasida	mg/kg (ppm)	2.5	<0.25	67	70	10-95	4
Methylene chloride	mg/kg (ppm)	2.0	<0.0	92	103	14-128	11
trans 1.2 Dishlaroothana	mg/kg (ppm)	2.0	<0.05	83	96	17-134	10
1 1-Dichloroothano	mg/kg (ppm)	2.0	<0.05	04 96	00 103	10-112 93-115	5
2.2-Dichloropropano	mg/kg (ppm)	2.5	<0.05	68	79	18-117	6
cis-1 2.Dichloroethene	mg/kg (ppm)	2.5	<0.05	87	95	25.120	9
Chloroform	mg/kg (ppm)	2.5	<0.05	94	102	29-117	8
2-Butanone (MEK)	mg/kg (ppm)	12.5	< 0.5	101	130	20-133	25 vo
1.2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	< 0.05	104	116	22-124	11
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	< 0.05	81	86	27-112	6
1,1-Dichloropropene	mg/kg (ppm)	2.5	< 0.05	95	101	26-107	6
Carbon tetrachloride	mg/kg (ppm)	2.5	< 0.05	77	84	28-126	9
Benzene	mg/kg (ppm)	2.5	< 0.03	92	98	26-114	6
Trichloroethene	mg/kg (ppm)	2.5	< 0.02	93	99	30-112	6
1,2-Dichloropropane	mg/kg (ppm)	2.5	< 0.05	101	106	31-119	5
Bromodichloromethane	mg/kg (ppm)	2.5	< 0.05	97	103	31-131	6
Dibromomethane	mg/kg (ppm)	2.5	< 0.05	87	96	27-124	10
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	< 0.5	105	111	16-147	6
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	93	101	28-137	8
Toluene	mg/kg (ppm)	2.5	<0.05	91	96	34-112	5 7
1 1 9 Trickloroothono	mg/kg (ppm)	2.0	<0.05	91	98	30-136	1
2 Hovenone	mg/kg (ppm)	19.5	<0.05	114	104	17 147	2
1 3-Dichloropropano	mg/kg (ppm)	2.5	<0.05	07	109	20.125	5
Tetrachloroethene	mg/kg (ppm)	2.5	<0.05	81	88	25-114	8
Dibromochloromethane	mg/kg (ppm)	2.5	<0.05	83	89	32-143	7
1.2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	< 0.05	93	100	32-126	7
Chlorobenzene	mg/kg (ppm)	2.5	< 0.05	89	94	37-113	5
Ethylbenzene	mg/kg (ppm)	2.5	< 0.05	91	97	34-115	6
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	< 0.05	86	92	35-126	7
m,p-Xylene	mg/kg (ppm)	5	< 0.1	89	94	25-125	5
o-Xylene	mg/kg (ppm)	2.5	< 0.05	88	95	27-126	8
Styrene	mg/kg (ppm)	2.5	< 0.05	90	97	39-121	7
Isopropylbenzene	mg/kg (ppm)	2.5	<0.05	88	96	34-123	9
Bromotorm	mg/kg (ppm)	2.5	0.045	82	87	18-155	6
n-Propylbenzene	mg/kg (ppm)	2.5	<0.05	93	99	31-120	6
1.2.5 Trimothylhonzono	mg/kg (ppm)	2.0	<0.05	00	95	40-110	0
1, 1, 2, 2. Totrachloroothano	mg/kg (ppm)	2.5	<0.05	106	109	24-130	3
1.2.3-Trichloropropane	mg/kg (ppm)	2.5	<0.05	105	113	33-123	7
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	93	100	39-110	7
4-Chlorotoluene	mg/kg (ppm)	2.5	< 0.05	92	97	39-111	5
tert-Butylbenzene	mg/kg (ppm)	2.5	< 0.05	92	96	36-116	4
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	< 0.05	89	97	35-116	9
sec-Butylbenzene	mg/kg (ppm)	2.5	< 0.05	92	98	33-118	6
p-Isopropyltoluene	mg/kg (ppm)	2.5	< 0.05	89	96	32-119	8
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	87	93	38-111	7
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	86	92	39-109	7
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	< 0.05	87	95	40-111	9
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	< 0.5	102	109	44-112	7
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	< 0.25	85	99	31-121	15
Hexachlorobutadiene	mg/kg (ppm)	2.5	<0.25	86	94	24-128	9
Naphthalene	mg/kg (ppm)	2.5	<0.05	94	104	24-139	10
1,2,3-1richlorobenzene	mg/kg (ppm)	2.5	<0.25	88	101	35-117	14

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912340

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

	_		Percent	
	Reporting	Spike	Recovery	Acceptance
Analyte	Units	Level	LCS	Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	46	10-76
Chloromethane	mg/kg (ppm)	2.5	76	34-98
Vinyl chloride	mg/kg (ppm)	2.5	80	42-107
Bromomethane	mg/kg (ppm)	2.5	89	46-113
Unioroethane Trickloughuseremethane	mg/kg (ppm)	2.5	97	47-115
Acetone	mg/kg (ppm)	2.0 12.5	94 102	39-112
1.1-Dichloroethene	mg/kg (ppm)	2.5	104	65-110
Hexane	mg/kg (ppm)	2.5	106	55-107
Methylene chloride	mg/kg (ppm)	2.5	108	50 - 127
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	107	72-122
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	109	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	107	74-109
2,2-Dichloropropane	mg/kg (ppm)	2.5	106	63-145
Cls-1,2-Dichloroethene	mg/kg (ppm)	2.0	110	73-110
2-Butanone (MEK)	mg/kg (ppm)	12.5	104	60-121
1 2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	105	73-111
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	110	72-116
1,1-Dichloropropene	mg/kg (ppm)	2.5	105	72-112
Carbon tetrachloride	mg/kg (ppm)	2.5	112	67-123
Benzene	mg/kg (ppm)	2.5	105	72-106
Trichloroethene	mg/kg (ppm)	2.5	103	72-107
1,2-Dichloropropane	mg/kg (ppm)	2.5	106	74-115
Diknomonthono	mg/kg (ppm)	2.5	106	75-126
4-Mothyl-2-pontanono	mg/kg (ppm)	2.0	104	80-128
cis-1.3-Dichloropropene	mg/kg (ppm)	2.5	112	71-138
Toluene	mg/kg (ppm)	2.5	101	74-111
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	105	73-124
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	97	76-118
2-Hexanone	mg/kg (ppm)	12.5	99	67-123
1,3-Dichloropropane	mg/kg (ppm)	2.5	99	75-118
Tetrachloroethene	mg/kg (ppm)	2.5	104	73-111
1.2 Dibromochioromethane (FDR)	mg/kg (ppm)	2.0	105	64-16Z 77 117
Chlorohenzene	mg/kg (ppm)	2.5	100	76-109
Ethylbenzene	mg/kg (ppm)	2.5	103	75-112
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	108	75-129
m,p-Xylene	mg/kg (ppm)	5	103	77-115
o-Xylene	mg/kg (ppm)	2.5	104	76-115
Styrene	mg/kg (ppm)	2.5	101	76-119
Isopropylbenzene	mg/kg (ppm)	2.5	105	76-120
n Propulhonzono	mg/kg (ppm)	2.0	110	00-174 77 115
Bromobenzene	mg/kg (ppm)	2.5	103	76-112
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	108	77-121
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	102	74-121
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	100	73-117
2-Chlorotoluene	mg/kg (ppm)	2.5	104	75-113
4-Chlorotoluene	mg/kg (ppm)	2.5	103	77-115
tert-Butylbenzene	mg/kg (ppm)	2.5	108	77-123
1,2,4-1 rimetnylbenzene	mg/kg (ppm)	2.0	106	77-119
p-Isopropyltoluene	mg/kg (ppm)	2.5	105	76-120
1.3-Dichlorobenzene	mg/kg (ppm)	2.5	102	76-112
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	101	74-109
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	103	75-114
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	105	68-122
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	107	75-122
Hexachlorobutadiene	mg/kg (ppm)	2.5	108	74-130
Naphthalene	mg/kg (ppm)	2.5	104	73-122
1,2,3-1 FICHIOFODENZENE	mg/kg (ppm)	2.5	102	10-117

ENVIRONMENTAL CHEMISTS

Date of Report: 12/27/19 Date Received: 12/18/19 Project: Kosmos, F&BI 912340

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 912340-01 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Control Limits
Aroclor 1016	mg/kg (ppm)	0.25	< 0.02	68	30-123
Aroclor 1260	mg/kg (ppm)	0.25	< 0.02	67	26 - 131
Laboratory Code	: Laboratory Control	Sample 1/6			
			Percent	Percent	
		·1 T 1 T	.	р	A /

	Reporting	Spike Level	Recovery	Recovery	Acceptance	RPD
Analyte	Units		LCS	LCSD	Criteria	(Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	93	89	55 - 137	4
Aroclor 1260	mg/kg (ppm)	0.25	93	92	51 - 150	1

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

 ${\rm J}$ - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.











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