Tom Colligan RG

To: Andy Smith, Department of Ecology

From: Tom Colligan

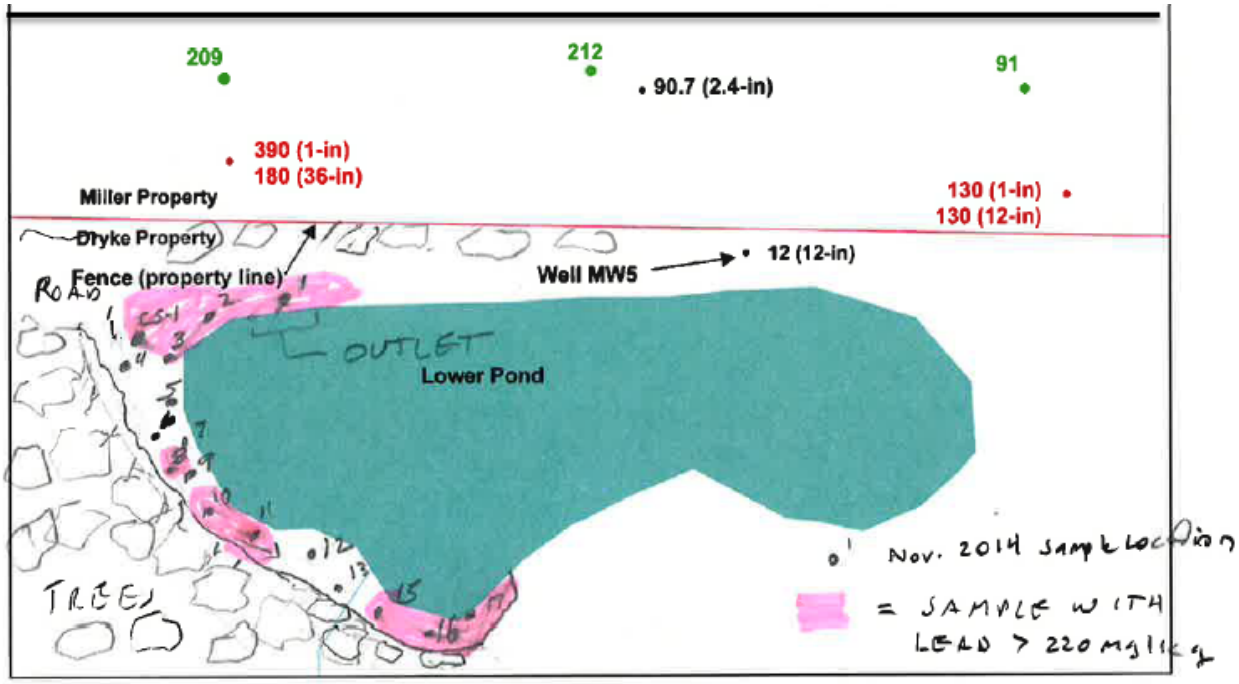
cc: Tom Kirkman

Date: October 4, 2016

Re: Completion Report for Additional Soil Removal in the Lower Pond Area of Sunnydell Shooting Range, Sequim WA

This memo describes supplemental work that was completed at the Sunnydell Shooting Range in order to comply with the terms of the final Cleanup Action Plan (CAP), specified, amongst other things, removal of lead-contaminated soil from the western edge of the lower pond. The western edge of the pond is a berm that was created by Mr. Chuck Dryke in the 1970s to prevent flooding of the neighboring property. It was found that the berm area was lead contaminated following sampling in 2013 following removal of lead-contaminated pond sediment as specified in the CAP. A round of sampling conducted from around the berm at 17 locations in November of 2014 revealed three areas along the berm with lead concentrations above the site cleanup level of 220 mg/kg. The lead exceedences occurred mostly within the upper foot of ground surface, however, in two locations (8 and 15) elevated lead levels were also noted in samples collected three feet below ground surface. The area of elevated lead is shown in the three pink-colored areas in the figure below.

Figure 1: Soil Sampling Locations from November 2014. North is up.



WORK CONDUCTED

The work occurred in three separate areas shown in pink above: a northern area around the outlet of the pond, a more narrow middle area and a curved southern area. The depth of lead contamination was mostly restricted to the upper 1 foot of soil. Only two of nine samples from the 3-foot depth interval contained lead above the cleanup level, meaning localized deeper excavation was necessary.

On August 6th, 2015, when the area was sufficiently dry to support heavy equipment, each of the three pink areas were marked out on the ground using as a guide the sampling flags that were still in place from the November 2014 sample event. Soil was excavated using a small trackhoe (see photos) from the edge of the pond to the trees that form the edge of the berm, a strip that varied approximately 10 feet in width. The soil was removed to at least 1 feet below ground surface, except around the location of sample 8 and 15, which was excavated to 3 feet below ground surface. A few shotgun casings were found mixed in the soil excavated from the northern area (see photos). Soil was removed from these excavation area until what appeared to be native silts were encountered. The excavated soil was loaded onto a dump truck and transported to the berm at the Quail Run shooting area. Approximately 50 cubic yards of soil was excavated in total.

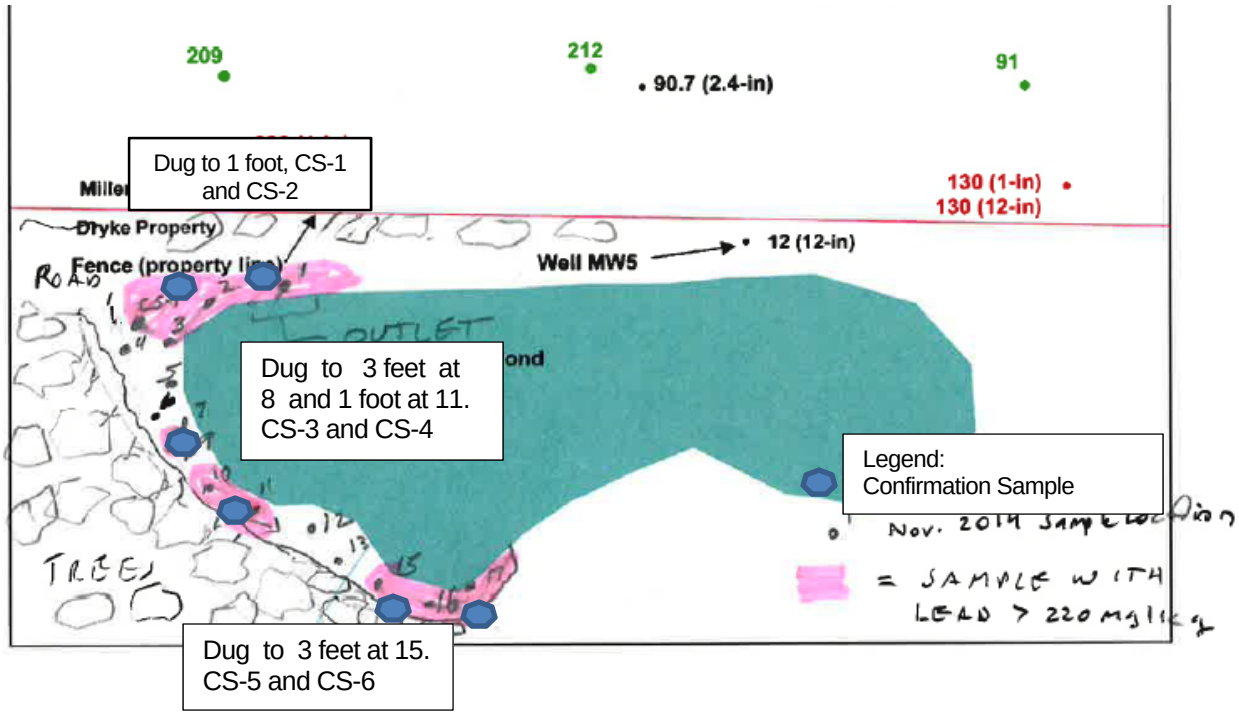
Following excavation to the target depths, confirmation samples were collected and then each area was backfilled with imported fill. The six initial confirmation sample locations are shown on Figure 2 and described as follow:

Northern Area- two bottom samples, CS-1 and CS-2, at sample locations 1 and 2 at 1-foot depth.

Middle Area- two bottom samples, CS-3 at 3 foot depth in location 8, and CS-4 at 1-foot depth between locations 10 and 11.

Southern Area- two bottom samples, CS-5 at 3 foot depth at location 15, and CS-6, at 3-foot depth between location 15 and 16.

Figure 2: Confirmation Sample Locations- August 2015



Initial sample results from August 2015 are shown on Table 1. Results indicated exceedences above the cleanup level in the middle area in both samples. Therefore, additional soil needed to be excavated and additional confirmation samples collected. This additional excavation of the middle area occurred on July 30th, 2016. After removal of the topsoil placed in 2015, approximately two additional feet of clayey soil was excavated across the entire area, resulting in 20 cubic yards of soil being transported to the Quail Run berm.

Table 1: Confirmation Soil Sample Results

Initial Sample	Area	Lead Concentration August 2015 (mg/kg)	Resample July 2016	Cleanup Level
CS-1	Northern	4.5		220
CS-2	Northern	179		220
CS-3	Middle	2,200	33.2	220
CS-4	Middle	626	38.9	220
CS-5	Southern	116		220
CS-6	Southern	3.3		220

Two additional confirmation samples, CS-3A and CS-4A, were collected from the base of the excavation using a spoon and then imported fill from a local pit was used to bring the excavation up to grade. The August 2016 re-sampling are shown in Table 1 above and indicate final lead concentrations are now well below cleanup levels in this area..

Summary and Conclusions

The soil removal action at the lower pond at Sunnydell Shooting Grounds was completed in accordance with the requirements of the CAP. Approximately 70 cubic yards of lead-contaminated soil was removed and all final confirmation samples document attainment of cleanup levels across the berm.

PHOTOGRAPHS FROM AUGUST 2015

Photo 1: Northern Excavation Area

Photo 2: Shotgun Hulls found in Northern Area

Photo 3: Middle Excavation Area. Note deeper area where excavation extended deeper.

Photo 4: Digging Out Southern Area

Photo 5: Beginning of Excavation of Southern Area

Photo 6: Southern Limit of Excavation in Southern Area

Photo 7: Base of Excavation in Middle Area where confirmation samples were collected and initially failed. This area was re-excavated.

Photo 8: Imported Backfill Pile

Photo 9: Backfilled Southen Area Looking North

Photo 10: Backfilled Southern Area Looking East

Photo 11: Backfilled Middle Area Looking North

Photo 12: Backfilled Northern Area Looking West

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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Seattle, WA 98119-2029
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fbi@isomedia.com
www.friedmanandbruya.com

August 14, 2015

Tom Colligan, Project Manager
Floyd-Snider
Two Union Square, Suite 600
601 Union St
Seattle, WA 98101

Dear Mr. Colligan:

Included are the results from the testing of material submitted on August 7, 2015 from the Sunnydell, F&BI 508117 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. 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
FDS0814R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on August 7, 2015 by Friedman & Bruya, Inc. from the Floyd-Snider Sunnydell, F&BI 508117 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Floyd-Snider
508117 -01	CS-1
508117 -02	CS-2
508117 -03	CS-3
508117 -04	CS-4
508117 -05	CS-5
508117 -06	CS-6

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 200.8

Client ID:	CS-1	Client:	Floyd-Snider
Date Received:	08/07/15	Project:	Sunnydell, F&BI 508117
Date Extracted:	08/11/15	Lab ID:	508117-01
Date Analyzed:	08/11/15	Data File:	508117-01.031
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	4.47

Analysis For Total Metals By EPA Method 200.8

Client ID:	CS-2	Client:	Floyd-Snider
Date Received:	08/07/15	Project:	Sunnydell, F&BI 508117
Date Extracted:	08/11/15	Lab ID:	508117-02
Date Analyzed:	08/11/15	Data File:	508117-02.032
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	90	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	179

Analysis For Total Metals By EPA Method 200.8

Client ID:	CS-3	Client:	Floyd-Snider
Date Received:	08/07/15	Project:	Sunnydell, F&BI 508117
Date Extracted:	08/11/15	Lab ID:	508117-03
Date Analyzed:	08/11/15	Data File:	508117-03.034
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	2,200

Analysis For Total Metals By EPA Method 200.8

Client ID:	CS-4	Client:	Floyd-Snider
Date Received:	08/07/15	Project:	Sunnydell, F&BI 508117
Date Extracted:	08/11/15	Lab ID:	508117-04
Date Analyzed:	08/11/15	Data File:	508117-04.035
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	88	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	626

Analysis For Total Metals By EPA Method 200.8

Client ID:	CS-5	Client:	Floyd-Snider
Date Received:	08/07/15	Project:	Sunnydell, F&BI 508117
Date Extracted:	08/11/15	Lab ID:	508117-05
Date Analyzed:	08/11/15	Data File:	508117-05.036
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	116

Analysis For Total Metals By EPA Method 200.8

Client ID:	CS-6	Client:	Floyd-Snider
Date Received:	08/07/15	Project:	Sunnydell, F&BI 508117
Date Extracted:	08/11/15	Lab ID:	508117-06
Date Analyzed:	08/11/15	Data File:	508117-06.037
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	87	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	3.33

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Floyd-Snider
Date Received:	Not Applicable	Project:	Sunnydell, F&BI 508117
Date Extracted:	08/11/15	Lab ID:	I5-437 mb
Date Analyzed:	08/11/15	Data File:	I5-437 mb.012
Matrix:	Soil	Instrument:	ICPMS1
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Holmium	78	60	125

Analyte:	Concentration mg/kg (ppm)
Lead	<1

Date of Report: 08/14/15
Date Received: 08/07/15
Project: Sunnydell, F&BI 508117

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

Laboratory Code: 507467-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	mg/kg (ppm)	50	1.91	105	101	59-148	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	mg/kg (ppm)	50	102	80-120

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 compound 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. Compounds in the sample matrix interfered with the quantitation of the analyte.

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

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.

508117

SAMPLE CHAIN OF CUSTODY

ME 08/07/15

A03

Send Report To Tom Colligan

Company Floyd / Snider

Address

City, State, ZIP

Phone # Fax #

SAMPLERS *(signature)*

PROJECT NAME/NO. Sunny dell

PO #

REMARKS

* coc generated at lab

NP 8/7/15

TURNAROUND TIME
- ☐ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Lead					Notes
						ANALYSES REQUESTED											
CS-1	01	8/6/15		soil	1							X					X-pe TC
CS-2	02				1							X					std TAT
CS-3	03				1							X					8/7/15
CS-4	04				1							X					MG
CS-5	05				1							X					
CS-6	06				1							X					
																2	

Samples received at ____ °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:					
Received by:		Phan	FCB-I	8/7/15	1030
Relinquished by:					
Received by:					

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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Arina Podnozova, B.S.
Eric Young, B.S.

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Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 11, 2016

Tom Kirkman
Sunnydell Shooting Grounds
292 Dryke Rd
Sequim, WA 98382

Dear Mr Kirkman:

Included are the results from the testing of material submitted on August 2, 2016 from the Sunnydell PO 16-3, F&BI 608029 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. 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: trkirkman@hotmail.com
NAA0811R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on August 2, 2016 by Friedman & Bruya, Inc. from the Sunnydell Shooting Grounds Sunnydell PO 16-3, F&BI 608029 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Sunnydell Shooting Grounds
608029 -01	C53A
608029 -02	C54A

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 200.8

Client ID:	C53A	Client:	Sunnydell Shooting Grounds
Date Received:	08/02/16	Project:	Sunnydell PO 16-3, F&BI 608029
Date Extracted:	08/03/16	Lab ID:	608029-01
Date Analyzed:	08/04/16	Data File:	608029-01.019
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Lead	33.2

Analysis For Total Metals By EPA Method 200.8

Client ID:	C54A	Client:	Sunnydell Shooting Grounds
Date Received:	08/02/16	Project:	Sunnydell PO 16-3, F&BI 608029
Date Extracted:	08/03/16	Lab ID:	608029-02
Date Analyzed:	08/04/16	Data File:	608029-02.021
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Lead	38.9

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Sunnydell Shooting Grounds
Date Received:	Not Applicable	Project:	Sunnydell PO 16-3, F&BI 608029
Date Extracted:	08/03/16	Lab ID:	I6-507 mb
Date Analyzed:	08/04/16	Data File:	I6-507 mb.017
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Lead	<1

Date of Report: 08/11/16
Date Received: 08/02/16
Project: Sunnydell PO 16-3, F&BI 608029

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

Laboratory Code: 608029-01 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Lead	mg/kg (ppm)	50	30.6	73	74	70-130	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Lead	mg/kg (ppm)	50	105	85-115

Data Qualifiers & Definitions

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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 compound 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. Compounds in the sample matrix interfered with the quantitation of the analyte.

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

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.

608029

SAMPLE CHAIN OF CUSTODY

ME 08/02/16

AI

Send Report To Tom Kirkman

Company Sunnydell Shooting Grounds

Address 292 Dryke Rd.

City, State, ZIP Sequim WA 98382

Phone # 425 922 7450 Fax #

Email Address trkirkman@hotmail.com

SAMPLERS (signature) TRK

PROJECT NAME/NO. Sunnydell

PO # 16-3

PROJECT ADDRESS 292 Dryke Rd. Sequim WA 98382

· ELECTRONIC DATA REQUESTED

Page # _____ of _____

TURNAROUND TIME

✓ Standard Turnaround

· RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

✓ Dispose after 30 days

· Return samples

· Will call with instructions

Samples Received at ____ °C

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Pb	Pb				Notes
CS3A	01	7-30-16	11 AM	Dirt	1							X					
CS4A	02	7-30-16	11 AM	Dirt	1							X					

Samples received at 20 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: TRK	Thomas R Kirkman	Sunnydell	7-30-16	1 PM
Received by: Nhan Phan	Nhan Phan	FCBI	8/2/16	1330
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

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