Supplemental Site Characterization and Soil Stockpile Sampling

Calder Limestone Mine
Prince of Wales Island, Alaska
HydroCon Project Number: 2015-010

Prepared for:

Columbia River Carbonates
P.O. Box 2350
Woodland, Washington 98674

November 1, 2016

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1.0 INTRODUCTION

1.1 Site Description

The Calder Limestone Mine site is located in the northwest portion of the Prince of Wales Island in Alaska (Figure 1). It is currently operating as a calcium carbonate mine, owned and operated by Columbia River Carbonates (CRC). The site includes an open-pit calcium carbonate mine, loading/barge area, fueling station, shop area, and camp site. Additional site improvements include gravel access roadways, diesel power generators, and a water treatment/storage system.

1.2 Site History

In July 2004, Carson Dorn, Inc. (CDI) conducted an environmental assessment at the subject site. During the assessment, diesel-contaminated soils were observed adjacent to the Camp Generator, downhill from the two 18,000-gallon diesel aboveground storage tanks (ASTs), also known as the Fueling Station, and in an existing stockpile of soil. CDI also noted the presence of a drum storage area west of the Fueling Station. These and other site features are shown on Figure 2.

CDI collected five soil samples during the site assessment. Soil analytical results indicated that the existing 15 cubic yard stockpile (Sample C-1) had a diesel-range organics (DRO) concentration of 4,780 milligrams per kilogram (mg/kg). The two soil samples collected from Camp Generator area had a DRO concentration of 9,750 mg/kg near the 500-gallon diesel AST used to supply the generator (Sample G-2) and 485,000 mg/kg at the door of the Camp Generator (Sample G-1). In the Fueling Station area, a sample collected from the end of the westerly 18,000 AST had a DRO concentration of 16,400 mg/kg. The Method Two Alaska Department of Environmental Conservation (ADEC) cleanup level for DRO is 230 mg/kg.

In August 2004, CDI performed a drum inventory at the site. A total of 93 drums were present. Eighty of the drums were located in the drum storage area next to the Fueling Station and remainder of the drums was located in the Shop area. The contents of the drums included new and used gasoline, diesel, oil, grease, antifreeze, and water. The contents were consolidated into 51 drums and shipped off the island for recycling.

In September 2004, CDI provided oversight for the removal of contaminated soil by excavation from the two areas above. An estimated total of 100 cubic yards of soil was generated from the two excavations and from the 15 cubic yard stockpile and placed into an approximately 22'W x 60'L x 2'H (~100 cubic yards) bio treatment cell constructed on the site. This stockpile is referred to as the CDI Stockpile in this document.

In 2012, CRC performed a remedial excavation near the Camp Generators. Visibly stained soil was removed from the area south of the generator. The excavation measured approximately 50' x 30'. The depth of the excavation was approximately 6 feet below ground surface (bgs). No confirmation samples were collected at that time. The contaminated soil was transported to the onsite bio treatment cell staging area. The soil was placed on and covered with heavy gauge plastic sheeting. Two stockpiles were created: 35'L x 16'W x 3.5'H (approximately 135 cubic yards) and 30'L x 10'W x 1.5'H (approximately 16 cubic yards). These stockpiles are referred to as the CRC1 and CRC2 Stockpiles, respectively, in this document.

In August 2015 HydroCon personnel mobilized to the site to provide oversight and direction of additional remedial excavation in the two identified areas (Camp Generator and Fueling Station). Southeast Road Builders Construction Company (subcontractor for CRC) performed the excavation using a Cat 336E trackhoe. Approximately 180 cubic yards of PCS was removed from the Camp Generator area and approximately 200 cubic yards of PCS was removed from the Fueling Station area. All PCS was placed into a dump truck and hauled to a newly constructed bio treatment cell area referred to as the HydroCon Stockpile (Figure 2).

Excavation activities were completed in both areas until either field screening indicated that the contamination was no longer present or camp infrastructure presented obstruction for further remedial activities. Confirmation soil samples were collected from both excavation areas. Soil removed from the excavation was placed in a stockpile ("HydroCon" stockpile, Figure 2) and the pile was fertilized at a rate of 400 pounds urea and 100 pounds of phosphorus potassium fertilizer mix per 100 cubic yards of soil. The soil was mixed using the excavator bucket. After mixing, 10 mm polyethylene liners were placed over the stockpiled soil. In addition, HydroCon completed sampling of the existing stockpiles (CDI, CRC1, and CRC2).

Result of the soil stockpile sampling indicated that two of the stockpiles (CDI Stockpile and CRC2 Stockpile) have been successfully remediated and no longer require additional treatment. The soil in these stockpiles will be used as road base or fill in areas of the site that are located away from surface water bodies. Soil in two of the soil stockpiles (CRC1 and HydroCon) requires further treatment to reduce the concentration of DRO below ADEC's cleanup level.

On April 7, 2016, HydroCon directed additional remedial excavation of PCS at the Camp Generator area after CRC had moved the generator, water tank, and other equipment from this area of the site that prevented further excavation in 2015. The remedial excavation began immediately north of the northern extent of the 2015 remedial excavation and as close to the drainage ditch (western limit) as practical. The excavation proceeded as far north and east as practical until physical constraints (proximity to the drainage ditch to the northwest; wetland area, water treatment Conex®, and camp water tank to the north/northeast; and Mess Hall to the east) prevented any further excavation. Approximately 200 cubic yards of PCS was removed from this area of the site and placed in a bio treatment cell (HydroCon Stockpile). Results of the confirmation sampling indicated that the extent of

diesel impacted soil has been removed to concentrations below the applicable exposure pathways and no further action is required in this area of the site. Additional details of this remedial excavation are provided in HydroCon, 2016[1].

1.3 Soil Treatment in Bio Treatment Cells

All PCS removed from historic and recent remedial excavations at the site have been placed in constructed bio treatment cell area (CRC1, CRC2, CDI, and HydroCon Stockpiles). These soil stockpiles are located on relatively flat ground with no surface water bodies within 100 feet. PCS was placed on top of 30-mil geomembrane liners in approximate 3-foot lifts. After the completion of excavation activities, 10 mm polyethylene liners were placed over the stockpiled soil.

HydroCon prepared the *Stockpile Management and Sampling Plan* (May 27, 2016) for CRC to manage and treat the PCS within the two stockpiles. The Plan includes monthly tilling of the soil as weather allows using on-site equipment and labor during the mining season. Soil nutrient augmentation included the following:

- Urea at a rate of 400 pounds per 100 cubic yards of soil
- Phosphorus Potassium Fertilizer (20:20:0 mix) at a rate of 100 pounds per 100 cubic yards of soil.

1.4 Soil Cleanup Levels

The cleanup levels for this project are Method Two of ADEC's Oil Pollution and Hazardous Substances Pollution Control Regulations (Table B2, 18 AAC 75). The cleanup levels (based on over 40 inches of rainfall) are:

Parameter	ADEC Cleanup Level (CUL) in mg/kg		
	Ingestion	Inhalation	Migration to Groundwater
DRO	8,250	12,500	230
Benzene	120	8.5	0.025
Toluene	6,600	220	6.5
Ethylbenzene	8,300	81	6.9
Total Xylenes	16,600	63	63

HydroCon has demonstrated that the migration to groundwater pathway is incomplete at the site since CRC's potable water source is from a spring located in the upland area away from the camp. Therefore, the next most stringent cleanup level that's documented on the table above would be the cleanup level for the soil near the Camp Generator and AST Fueling Station (Ingestion for DRO and

[1] *HydroCon 2016. Remedial Excavation and Soil Sampling Report. Calder Limestone Mine. Prince of Wales Island, Alaska. Prepared for Columbia River Carbonates. May 26.*

Inhalation for BTEX). It should be noted that soil in the bio treatment cells must comply with the Migration to Groundwater pathway cleanup standards as runoff from these stockpiles has the potential to reach surface water bodies.

1.5 Opinion Letter from ADEC

On July 21, 2016, HydroCon received a letter from ADEC indicating acceptance of the *Remedial Excavation and Soil Sampling Report (May 26, 2016).* ADEC acknowledged that the remedial excavation performed by the Camp Generator reached a logical conclusion based on the constraints posed by the proximity of the north adjacent wetland. However, ADEC indicated that further characterization of the Fueling Station was required as the bounds of PCS impacts were not fully defined.

The scope of work performed by HydroCon in September 2016 included further characterization of the extent of PCS near the Fueling Station and assessment of current soil conditions in the two remaining bio treatment cells at the site. A discussion of these tasks and soil analytical results is provided below.

2.0 SUPPLEMENTAL CHARACTERIZATION OF FUELING STATION AND SOIL STOCKPILE SAMPLING

On September 27-28, 2016 HydroCon was at the Calder Mine site to perform additional characterization of the extent of PCS at the Fueling Station and perform soil sampling in the two bio treatment cells at the site.

2.1 Test Pits near Fueling Station

On September 27, 2016, HydroCon directed the excavation of 9 exploratory test pits (TP-1 through TP-9) to assess the lateral extent of PCS near the Fueling Station (Figure 3). Southeast Road Builders Construction Company (subcontractor for CRC) performed the excavations using a Cat 336E trackhoe. The test pits were advanced until hard rock was encountered [ranging from approximately 4 to 5.5 feet below ground surface (bgs)]. One exception was test pit TP-2 where buried electrical lines were encountered at a depth of approximately 3 feet bgs. A soil sample was collected from the bottom of each test pit for analysis.

At the completion of each test pit, soil removed during the test pit excavations was placed back in the hole in the approximate same sequence as it was removed. The operator compacted the surface of the backfilled test pits using the trackhoe bucket and tracks. Photographs of the exploratory test pit and stockpile sampling activities are provided in Appendix A.

2.2 Field Screening Methods

Field screening was performed during test pit excavations to assess the nature and extent of petroleum contamination. Field screening consisted of volatile organic vapor measurements using a photoionization detector (PID), sheen testing, visual observations (staining, etc.), and olfactory observations. A portion of each soil sample was placed in a sealed Zip-Lock baggie. The tip of the PID was inserted into the Zip-Lock bag in the airspace above the soil sample and the PID measurement was recorded. The PID was calibrated before use each day to a test gas standard consisting of 100 ppmv isobutylene. Because several factors can affect PID readings (e.g. moisture, temperature, and background conditions), HydroCon determined that a value of 1 ppm or greater may indicate the presence of organic vapors originating from contaminants at the site. Sheen testing consisted of placing a small portion of soil in clear water and observing the water for the presence of hydrocarbon sheen.

Results of the field screening indicated that a faint petroleum hydrocarbon odor was observed in soil excavated from test pits TP-2 and TP-4. A PID reading above 1 ppm was observed in two soil samples (4.0 ppm in sample TP2-3 and 2.0 ppm in sample TP4-4).

2.3 Stockpile Soil Sampling

On September 28, 2016, HydroCon sampled the existing stockpiles (CRC1 and HydroCon) following ADEC guidance documents that recommend collection of 1 soil sample for every 10 cubic yards of stockpiled soil. All field observations, field measurements, soil sampling locations, site sketches, etc. were recorded of field forms. The data on these field forms was used to prepare this report and graphics herein.

CRC personnel removed the plastic sheeting covering each stockpile prior to sampling. Samples were collected by using a clean shovel to dig down to a depth of 1.5 to 2 feet bgs. A new pair of nitrile gloves was used to transfer soil from each sampling location into laboratory-prepared glass sample jars. The plastic sheeting was placed back over the stockpiles at the conclusion of sampling activity.

The shovel was cleaned prior to use at each location using potable water and alconox wash followed by potable water rinse. The rinse water was placed on top of the respective Stockpile plastic sheeting at the conclusion of sampling activities and allowed to evaporate.

All soil samples were analyzed for DRO. A minimum of one sample from each stockpile was analyzed for BTEX. The stockpile soil sampling locations are shown on Figures 4 and 5.

A summary of soil sampling at each stockpile is provided below.

2.3.1 CRC1 Stockpile

The composition of the soil includes a mixture of cobbles and boulders along with granular and fine grained soil. HydroCon collected twelve soil samples (CS-1 through CS-12) from this stockpile. One sample (CS-6) was analyzed for BTEX (Figure 4).

2.3.2 HydroCon Stockpile

The composition of the soil includes a mixture of cobbles and boulders along with granular and fine grained soil along with abundant wood debris. HydroCon collected forty soil samples from the stockpile (HS-1 through HS-40). Four samples (HS-1, HS-12, HS-26, and HS-40) were analyzed for BTEX (Figure 5).

2.4 Laboratory Analysis

The source of contamination at the Camp Generator and Fueling Station areas are spills from the ASTs used to store diesel, therefore all samples were analyzed for DRO using Alaska's Method AK102. At the request of ADEC, the analysis for benzene, toluene, ethylbenzene, and total xylenes (BETX) by EPA Method 8260B was also analyzed in the soil stockpile samples at an approximate rate of one per ten samples.

All soil samples were placed in laboratory-prepared glass jars and uniquely labeled with the sample identification number, date and time of sample collection, and site name. The sample jars were placed in a chilled cooler along with chain-of-custody documentation and transported to Friedman & Bruya laboratory in Seattle, Washington via air freight. The laboratory report is included in Appendix B.

3.0 SOIL ANALYTICAL RESULTS

Results are reported in milligrams per kilogram (mg/kg) and are summarized in Table 1 and on Figures 3 through 5.

3.1.1 Test Pits – Fueling Station

Diesel was detected in three samples (TP2-3, TP4-4, and TP8-4.5) at a concentration up to 160 mg/kg which is below the strictest ADEC cleanup level for diesel. Results are shown on Figure 3. Figure 3 shows the extent of DRO detections, however, all detections are below applicable ADEC soil CULs.

3.1.2 CRC1 Stockpile

Soil analytical results indicated that three of the twelve stockpile samples exceeded the CUL for DRO. The concentration of those three samples ranged 230 to 730 mg/kg. There was no detection of BTEX in the CS-6 sample. Results are shown on Figure 4.

3.1.3 HydroCon Stockpile

Soil analytical results indicated that all but one sample (HS-18) exceeded the CUL for DRO. There was no detection of BTEX above the laboratory's MRLs in the four samples analyzed. Results are shown on Figure 5.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations for each area of the site where remedial action has taken place are provided below.

4.1 Camp Generator Area

The concentrations of the PCS remaining at the Camp Generator area are all below the applicable Method Two exposure pathway CUL (i.e., ingestion and inhalation). PCS has been excavated to the point where access to the material requires an excavator, further reducing the potential for contact. As a result, HydroCon does not recommend further remedial excavation in this area of the site.

4.2 Fueling Station

On August 26, 2015, remedial excavation was performed at the Fueling Station. The limits of the excavation were defined by the following physical constraints:

- The western most AST prevented further excavation towards the south.
- Diesel product line and control panel prevented further excavation towards the east.
- The presence of the haul road to the north.

Confirmation sampling was performed after the remedial excavation and the laboratory results indicate that PCS remaining at the Camp Generator area are all below the applicable Method Two exposure pathway CULs (i.e., ingestion and inhalation). However, the extent of PCS was not fully characterized during the remedial excavation in 2015.

On September 27, 2016, HydroCon advanced nine test pits around the area of known contamination to delineate the extent of PCS. The test pits were advanced down to competent rock. Samples were collected at that interface of the rock/soil interface. Laboratory results indicated that low concentrations

of DRO was observed in three samples (TP2-3, TP4-4, and TP8-4.5) and not detected above the laboratory MRL in the other 6 samples. As shown on Figure 3, a release of diesel fuel occurred at the ASTs near the fuel pumps and migrated in a northeast direction following the topography to lower elevations along the Haul Road. The majority of the mass of contaminated soil was removed in 2015. The residual PCS that remains is at concentrations that are below applicable Method Two exposure pathways. Therefore, HydroCon recommends no further remedial excavation in this area of the site.

4.3 CRC 1 Stockpile

DRO concentrations at CRC 1 continue to show a decreasing trend with only three samples above the CUL. HydroCon recommends the following actions:

- A supplemental fertilizer application should be applied. The stockpile is approximately 135 cubic yards in size. Therefore, approximately 540 pounds of Urea and 135 pounds of phosphorus potassium blend should be applied to the stockpile.
- Monthly tilling of the stockpile should be completed during the mining season, using the backhoe bucket, as weather allows.
- Place the plastic liner over the stockpile after the conclusion of each tilling event.
- Perform confirmation soil sampling in the summer 2017.

4.4 HydroCon Stockpile

This was the first sampling event of the HydroCon Stockpile. The concentration of DRO in the stockpile remains above the cleanup level. As a result, HydroCon recommends the following actions:

- A supplemental fertilizer application should be applied. The stockpile is approximately 400 cubic yards in size. Therefore, approximately 1,600 pounds of Urea and 400 pounds of phosphorus potassium blend should be applied to the stockpile.
- Monthly tilling of the stockpile should be completed during the mining season, using the backhoe bucket, as weather allows.
- Place the plastic liner over the stockpile after the conclusion of each tilling event.
- Perform confirmation soil sampling in the summer 2017.

5.0 DATA QUALITY REVIEW

HydroCon performed a quality assurance/quality control (QA/QC) review of the analytical results, which is presented the attached Laboratory Data Review Checklist (Appendix C).

6.0 QUALIFICATIONS

HydroCon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. HydroCon makes no warranties, either expressed or implied, regarding the findings, conclusions or recommendations. Please note that HydroCon does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report.

Findings and conclusions resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, nondetectable or not present during these services, and we cannot represent that the site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this monitoring. Subsurface conditions may vary from those encountered at specific sampling locations or during other surveys, tests, assessments, investigations, or exploratory services; the data, interpretations and findings are based solely upon data obtained at the time and within the scope of these services.

This report is intended for the sole use of **Columbia River Carbonates**. This report may not be used or relied upon by any other party without the written consent of HydroCon. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations is at the risk of said user.

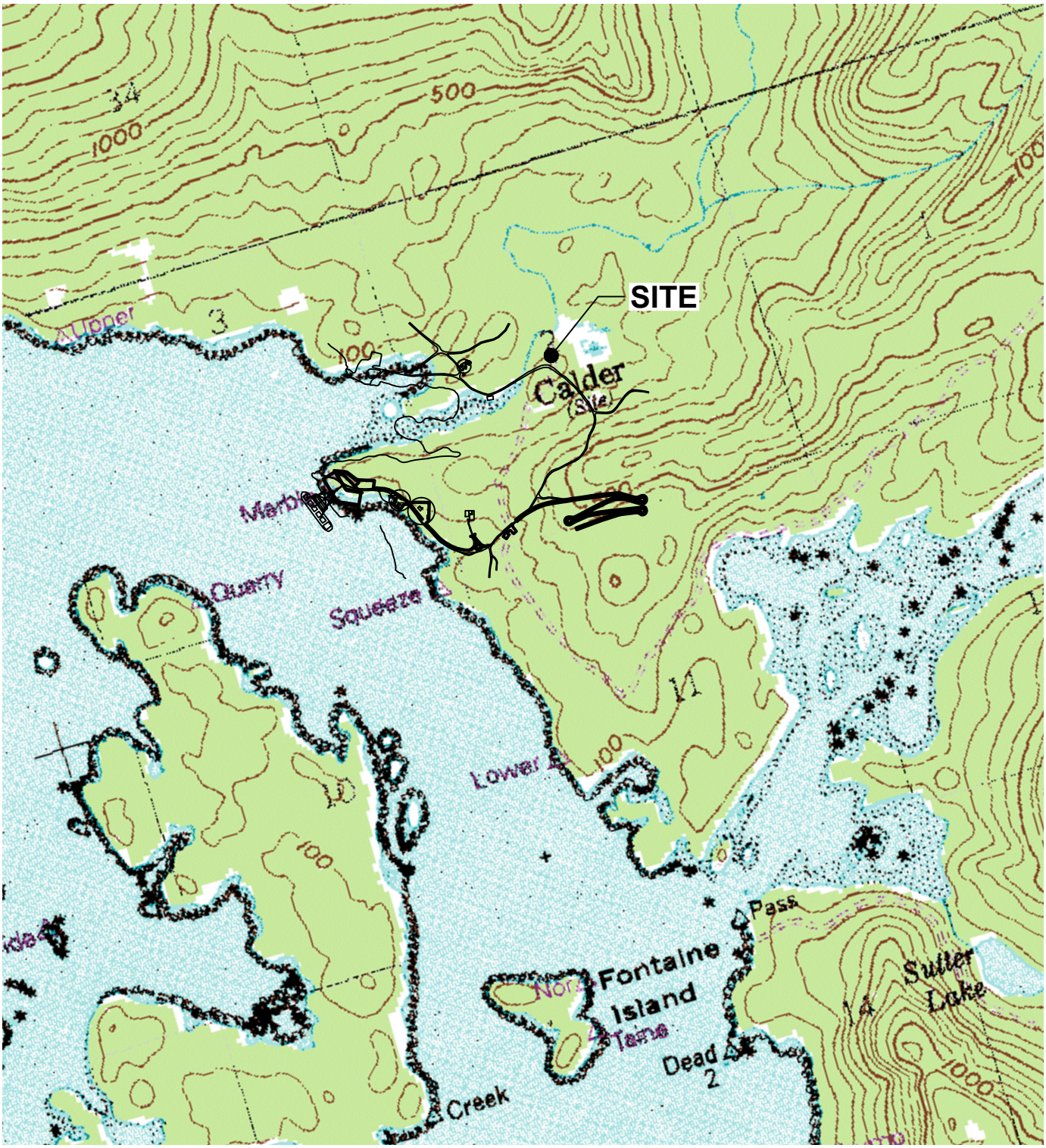
The conclusions presented in this report are, in part, based upon subsurface sampling performed at selected locations and depths. There may be conditions between borings or samples that differ significantly from those presented in this report and which cannot be predicted by this study.

Signature:

Report Prepared By:

Craig Hultgren, LHG
Principal Geologist/Project Manager

FIGURES



NOTE(S):

USGS, PETERSBURG (A-5) QUADRANGLE
ALASKA
1:63 360 SERIES (TOPOGRAPHIC)

0 2000 4000

SCALE IN FEET
1" = 2000'

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W E
S

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DATE: 4-26-16
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2015-010

FIGURE 1
SITE LOCATION MAP

CALDER MINE
PRINCE WALES ISLAND
ALASKA

C:\Users\Josh\Desktop\Autocad Backup\Hydrocon-Autocad\2015-010 Calder Mine\2016\April 2016\2015-010_BM-CMS-042016.dwg 2.17.2014

CAMP GENSET

Area of
Contamination

HYDROCON
STOCKPILES

CALDER MINE SITE

Area of
Contamination

SHOP AREA

CDI STOCKPILE
CRC STOCKPILES

FUELING
STATION

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0 500 1000
SCALE IN FEET
1" = 500'

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2015-010

FIGURE 2
SITE FEATURES

CALDER MINE
PRINCE OF WALES ISLAND
ALASKA

C:\Users\Josh\Desktop\Autocad Backup\Hydrocon-Autocad\2015-010 Calder Mine\2016\April 2016\2015-010_BM-CMS-042016.dwg 2.17.2014

Field ID	Analytical Results (mg/kg) DRPH	Diesel Range TPH+SG	Benzene	Ethylbenzene	Toluene	Xylene Total
ADEC Method 2 OPHSPCR	**8,250**	**8,250**	**8.5**	**220**	**81**	**63**
Fueling Station Remediation Excavation						
FS-F1-7	1,700 J	-	<0.02	0.44	<0.02	0.39
FS-F2-7	5,800 J	-	-	-	-	-
FS-F3-7	4,000 J	-	-	-	-	-
FS-F4-7	2,500 J	-	-	-	-	-
FS-S1-6	7,100 J	-	<0.02	0.37	<0.02	0.35
FS-S2-6	4,600 J	-	-	-	-	-
FS-S3-5	7,700 J	-	-	-	-	-
FS-S4-4	43	-	-	-	-	-
FS-S5-4	1,500	-	-	-	-	-
FS-S6-4	49	-	-	-	-	-
FS-S7-4	1,600	-	-	-	-	-
FS-S8-5	12	-	-	-	-	-
FS-S9-6	540	-	-	-	-	-
FS-S10-6	24	-	-	-	-	-
FS-S11-6	35	-	-	-	-	-
FS-S12-6	2,000 J	-	-	-	-	-

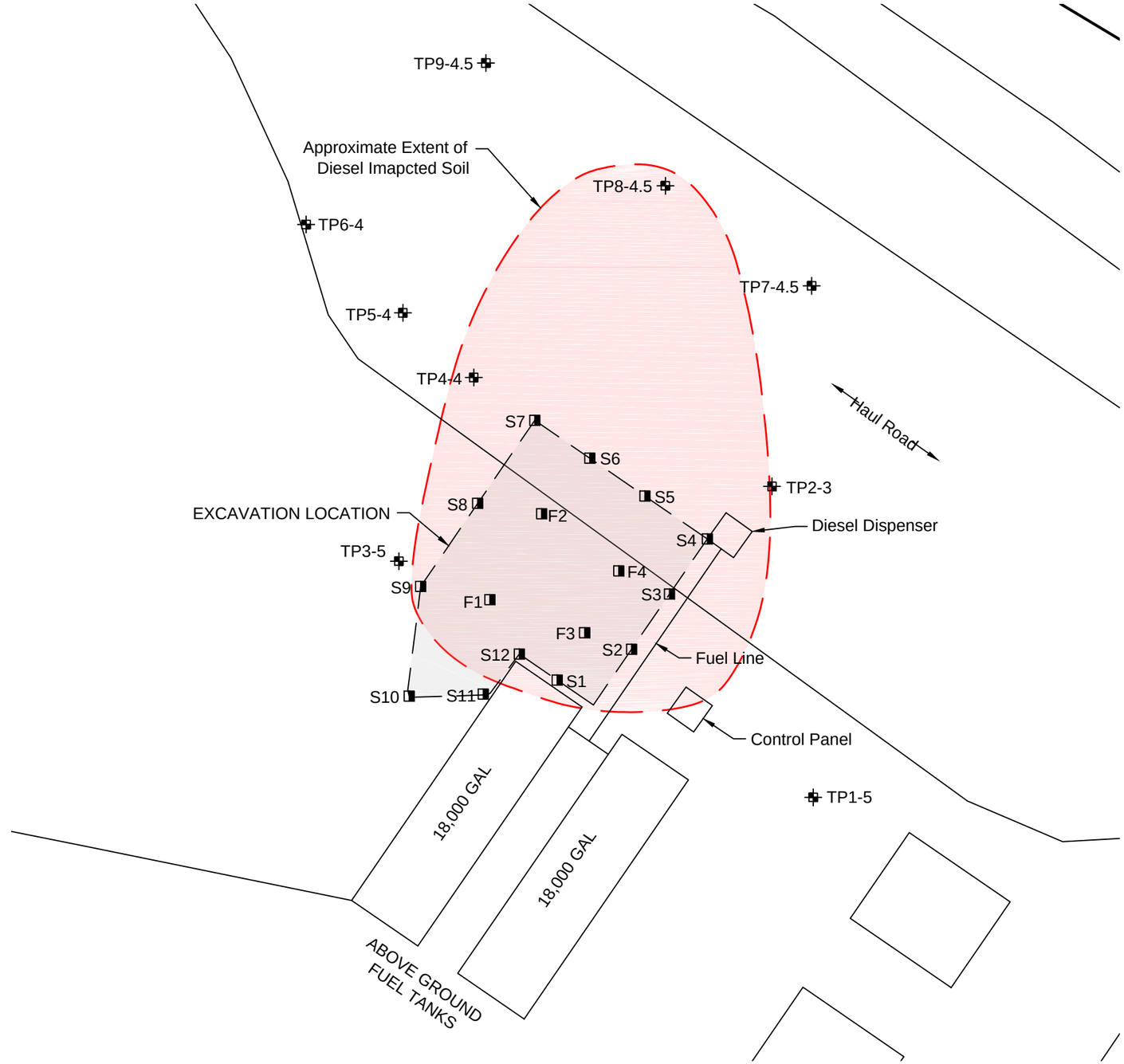
Field ID	Date	Analytical Results (mg/kg) Diesel Range Organics	Benzene	Toluene	Ethylbenzene	Xylene Total
ADEC Method 2 OPHSPCR		**8,250**	**8.5**	**220**	**81**	**63**
TP1-5	9/27/2016	<5	-	-	-	-
TP2-3	9/27/2016	97	-	-	-	-
TP3-5	9/27/2016	<5	-	-	-	-
TP4-4	9/27/2016	160	-	-	-	-
TP5-4	9/27/2016	<5	-	-	-	-
TP6-4	9/27/2016	<5	-	-	-	-
TP7-4.5	9/27/2016	<5	-	-	-	-
TP8-4.5	9/27/2016	7.3 x	-	-	-	-
TP9-4.5	9/27/2016	<5	-	-	-	-

Notes:
Red denotes concentration exceeds ADEC Cleanup Level.
Lab Qualifiers:
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
x - The sample chromatographic pattern does not resemble the fuel standard used for quantification.

LEGEND

- EXISTING ACCESS ROAD
- EXISTING STRUCTURES
- S1 EXCAVATION SOIL SAMPLE
- TP1-5 TEST PIT LOCATION
- EXCAVATION LOCATION

*RED INDICATES IMPACTED SOIL



N W E S

0 15 30
SCALE IN FEET
1" = 15'

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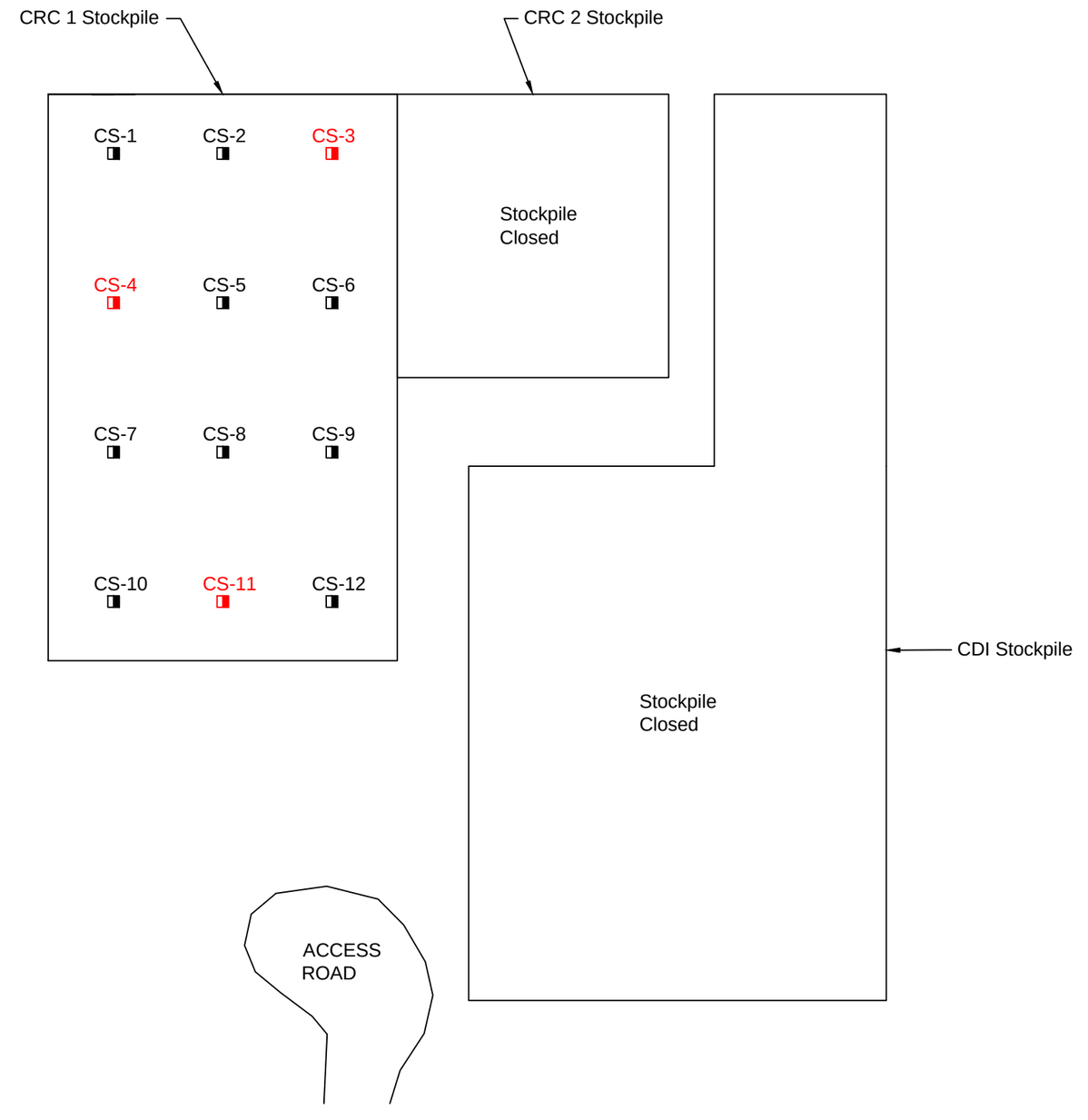
PRJ. MGR: CH
PROJECT NO: 2015-010

FIGURE 3
FUELING STATION LAYOUT AND EXCAVATION SAMPLE LOCATIONS AND ANALYTICAL RESULTS
CALDER MINE
PRINCE OF WALES ISLAND
ALASKA

C:\Users\Josh\Desktop\Autocad Files\Hydrocon-Autocad\2015-010 Calder Mine\2016\Oct 2016\2015-010_BM-CMS-102616.dwg 2.17.2014

Field ID	Date	Analytical Results (mg/kg)				
		Diesel Range Organics	Benzene	Toluene	Ethylbenzene	Xylene Total
ADEC Method 2 OPHSPCR		**230**	**0.025**	**6.5**	**6.9**	**63**
CS-1	9/28/2016	200	-	-	-	-
CS-2	9/28/2016	130	-	-	-	-
CS-3	9/28/2016	**300 J**	-	-	-	-
CS-4	9/28/2016	**230**	-	-	-	-
CS-5	9/28/2016	130	-	-	-	-
CS-6	9/28/2016	160	<0.02 J	<0.02 J	<0.02 J	<0.06 J
CS-7	9/28/2016	110	-	-	-	-
CS-8	9/28/2016	130	-	-	-	-
CS-9	9/28/2016	170	-	-	-	-
CS-10	9/28/2016	190	-	-	-	-
CS-11	9/28/2016	**730**	-	-	-	-
CS-12	9/28/2016	200	-	-	-	-

Notes:
Red denotes concentration exceeds ADEC Cleanup Level.
Lab Qualifiers:
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
x - The sample chromatographic pattern does not resemble the fuel standard used for quantification.



LEGEND

- EXISTING ACCESS ROAD
- STOCKPILE
- STK1 ◨ EXCAVATION STOCKPILE SOIL SAMPLE LOCATIONS

*RED INDICATES IMPACTED SOIL

N W E S

0 20 40
SCALE IN FEET
1" = 20'

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DWN: JJT
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FIGURE 4
CRC 1 STOCKPILE SAMPLE LOCATIONS

CALDER MINE
PRINCE OF WALES ISLAND
ALASKA

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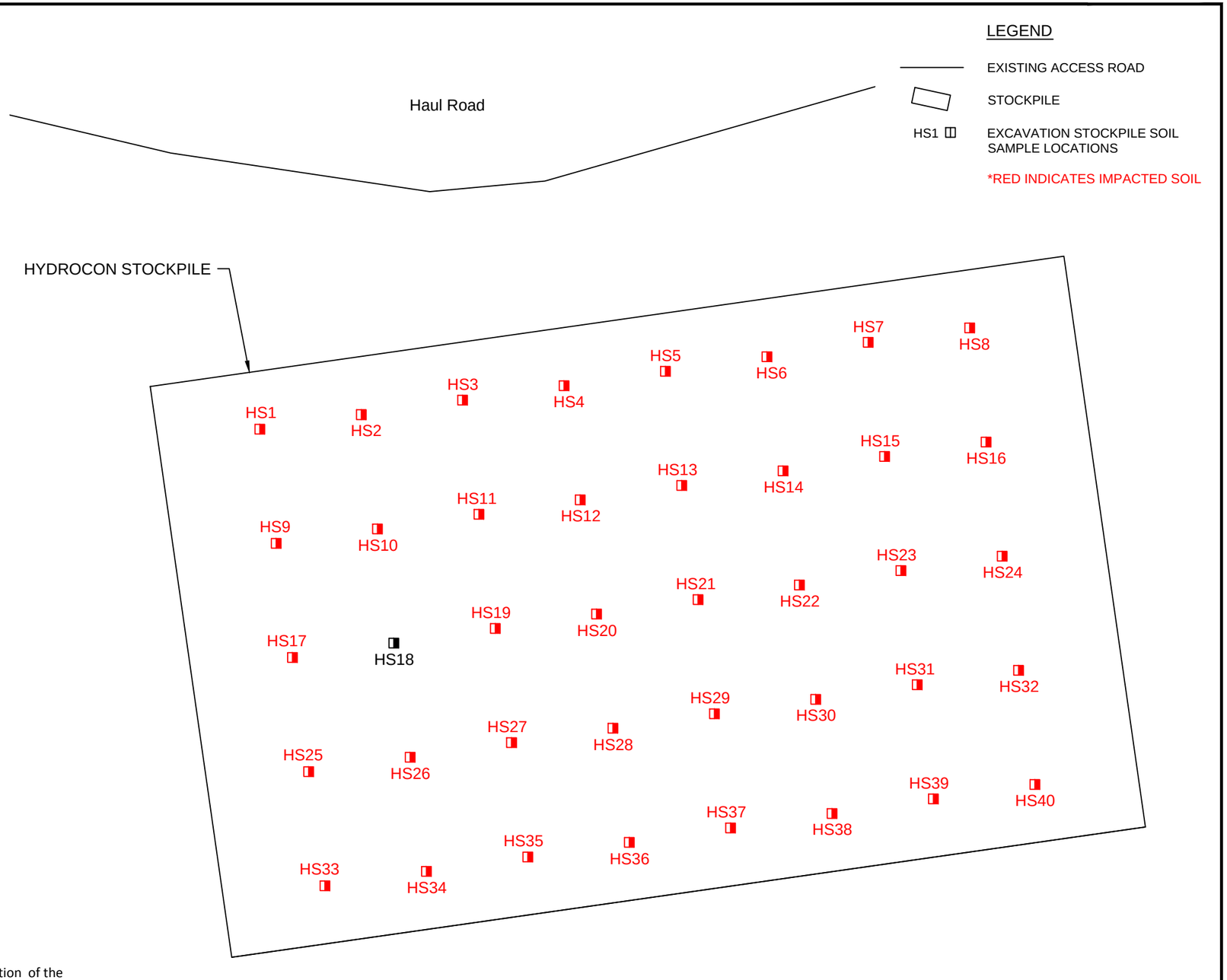
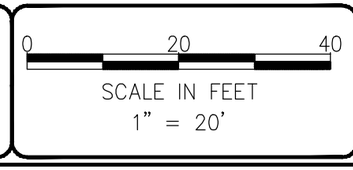
Field ID	Date	Analytical Results (mg/kg)				
		Diesel Range Organics	Benzene	Toluene	Ethylbenzene	Xylene Total
ADEC Method 2 OPHSPCR		**230**	**0.025**	**6.5**	**6.9**	**63**
HS-1	9/28/2016	**3,100**	<0.02	<0.02	<0.02	<0.06
HS-2	9/28/2016	**920**	-	-	-	-
HS-3	9/28/2016	**320**	-	-	-	-
HS-4	9/28/2016	**480**	-	-	-	-
HS-5	9/28/2016	**740**	-	-	-	-
HS-6	9/28/2016	**650**	-	-	-	-
HS-7	9/28/2016	**490**	-	-	-	-
HS-8	9/28/2016	**560**	-	-	-	-
HS-9	9/28/2016	**260**	-	-	-	-
HS-10	9/28/2016	**780**	-	-	-	-
HS-11	9/28/2016	**960**	-	-	-	-
HS-12	9/28/2016	**610**	<0.02	<0.02	<0.02	<0.06
HS-13	9/28/2016	**1,300**	-	-	-	-
HS-14	9/28/2016	**340**	-	-	-	-
HS-15	9/28/2016	**840**	-	-	-	-
HS-16	9/28/2016	**1,100**	-	-	-	-
HS-17	9/28/2016	**1,800**	-	-	-	-
HS-18	9/28/2016	200	-	-	-	-
HS-19	9/28/2016	**390**	-	-	-	-
HS-20	9/28/2016	**370**	-	-	-	-
HS-21	9/28/2016	**810**	-	-	-	-
HS-22	9/28/2016	**3,200**	-	-	-	-
HS-23	9/28/2016	**250**	-	-	-	-
HS-24	9/28/2016	**420**	-	-	-	-
HS-25	9/28/2016	**230**	-	-	-	-
HS-26	9/28/2016	**340**	<0.02	<0.02	<0.02	<0.06
HS-27	9/28/2016	**300**	-	-	-	-
HS-28	9/28/2016	**390**	-	-	-	-
HS-29	9/28/2016	**1,100**	-	-	-	-
HS-30	9/28/2016	**1,400**	-	-	-	-
HS-31	9/28/2016	**930**	-	-	-	-
HS-32	9/28/2016	**910**	-	-	-	-
HS-33	9/28/2016	**1,100**	-	-	-	-
HS-34	9/28/2016	**340**	-	-	-	-
HS-35	9/28/2016	**470**	-	-	-	-
HS-36	9/28/2016	**230**	-	-	-	-
HS-37	9/28/2016	**460**	-	-	-	-
HS-38	9/28/2016	**410**	-	-	-	-
HS-39	9/28/2016	**410**	-	-	-	-
HS-40	9/28/2016	**560**	<0.02	<0.02	<0.02	<0.06

Notes:
Red denotes concentration exceeds ADEC Cleanup Level.
Lab Qualifiers:
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
x - The sample chromatographic pattern does not resemble the fuel standard used for quantification.





Hydro Con
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 10-26-16
DWN: JJT
CHK: CH
APPROVED:
PRJ. MGR: CH
PROJECT NO: 2015-010

FIGURE 5
HYDROCON STOCKPILE
SAMPLE LOCATIONS
CALDER MINE
PRINCE OF WALES ISLAND
ALASKA

C:\Users\Josh\Desktop\Autocad Files\Hydrocon-Autocad\2015-010 Calder Mine\2016\Oct 2016\2015-010_BM-CMS-1026t16.dwg 2.17.2014

TABLE

Soil Analytical Results
Calder Mine
Alaska

	AK 102		SW8021B			
	Diesel Range Organics	Diesel Range TPH+SG	Benzene	Toluene	Ethylbenzene	Xylene Total
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ADEC Method 2 OPHSPCR Site Specific	**230**	**230**	**0.025**	**6.5**	**6.9**	**63**
Field ID	**Date**					
Fueling Station Remediation Excavation						
FS-F1-7	8/26/2015	**1,700 J**	-	<0.02	<0.02	0.44	0.39
FS-F2-7	8/26/2015	**5,800 J**	-	-	-	-	-
FS-F3-7	8/26/2015	**4,000 J**	-	-	-	-	-
FS-F4-7	8/26/2015	**2,500 J**	-	-	-	-	-
FS-FX	8/26/2015	**2,100 J**	-	<0.02 j	<0.1	0.42	0.36
FS-S1-6	8/26/2015	**7,100 J**	-	<0.02	<0.02	0.37	0.35
FS-S2-6	8/26/2015	**4,600 J**	-	-	-	-	-
FS-S3-5	8/26/2015	**7,700 J**	-	-	-	-	-
FS-S4-4	8/26/2015	43	-	-	-	-	-
FS-S5-4	8/26/2015	**1,500**	-	-	-	-	-
FS-S6-4	8/26/2015	49	-	-	-	-	-
FS-S7-4	8/26/2015	**1,600**	-	-	-	-	-
FS-S8-5	8/26/2015	12	-	-	-	-	-
FS-S9-6	8/26/2015	**540**	-	-	-	-	-
FS-S10-6	8/26/2015	24	-	-	-	-	-
FS-S11-6	8/26/2015	35	-	-	-	-	-
FS-S12-6	8/26/2015	**2,000 J**	-	-	-	-	-
FS-SX	8/26/2015	**9,200 J**	-	<0.02	<0.02	<0.02	0.34
Fueling Station Test Pit Samples						
TP1-5	9/27/2016	<5	-	-	-	-	-
TP2-3	9/27/2016	97	-	-	-	-	-
TP3-5	9/27/2016	<5	-	-	-	-	-
TP4-4	9/27/2016	160	-	-	-	-	-
TP5-4	9/27/2016	<5	-	-	-	-	-
TP6-4	9/27/2016	<5	-	-	-	-	-
TP7-4.5	9/27/2016	<5	-	-	-	-	-
TP8-4.5	9/27/2016	7.3 x	-	-	-	-	-
TP9-4.5	9/27/2016	<5	-	-	-	-	-
Camp Generator Remedial Excavation						
F1-7	8/25/2015	-	39 x	<0.02 j	<0.08	<0.08	<0.24
F2-7	8/25/2015	-	10	-	-	-	-
F3-7	8/25/2015	-	<5	-	-	-	-
F4-7	4/7/2016	10	13	-	-	-	-
F5-7	4/7/2016	<5	<5	-	-	-	-
F6-7	4/7/2016	**2,700**	**2,500**	<0.02 pc	<0.02 pc	0.12 pc	0.82 pc
S1-5	8/25/2015	-	59	-	-	-	-
S2-5	8/25/2015	-	**1,200**	-	-	-	-
S3-5[1]	8/25/2015	-	**1,700**	-	-	-	-
S4-5[1]	8/25/2015	-	**37,000 J**	<0.02 j	<0.08	0.16	1
S5-5[1]	8/25/2015	-	**690**	-	-	-	-
S6-5	8/25/2015	-	52 x	-	-	-	-
S7-5	8/25/2015	-	50 x	-	-	-	-
S8-5	8/25/2015	-	**710**	-	-	-	-
S9-6	4/7/2016	**620**	**380**	-	-	-	-
S10-5	4/7/2016	160 x	<20	-	-	-	-
S11-5	4/7/2016	**500**	**300**	-	-	-	-
S12-6	4/7/2016	**420**	220	-	-	-	-
S13-6	4/7/2016	**550**	**550**	-	-	-	-
S14-5	4/7/2016	**830**	**990**	-	-	-	-
S15-6	4/7/2016	60 x	65	-	-	-	-

Soil Analytical Results
Calder Mine
Alaska

		AK 102		SW8021B			
		Diesel Range Organics	Diesel Range TPH+SG	Benzene	Toluene	Ethylbenzene	Xylene Total
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ADEC Method 2 OPHSPCR Site Specific		**230**	**230**	**0.025**	**6.5**	**6.9**	**63**
Field ID	**Date**						
CDI Stockpile							
CDI Stock-1	8/25/2015	-	24	<0.02	<0.02	<0.02	<0.06
CDI Stock-2	8/25/2015	-	31	-	-	-	-
CDI Stock-3	8/25/2015	-	36	-	-	-	-
CDI Stock-4	8/25/2015	-	40	-	-	-	-
CDI Stock-5	8/25/2015	-	30	-	-	-	-
CDI Stock-6	8/25/2015	-	9.7	-	-	-	-
CDI Stock-7	8/25/2015	-	54	-	-	-	-
CDI Stock-8	8/25/2015	-	37	-	-	-	-
CDI Stock-9	8/25/2015	-	51	-	-	-	-
CDI Stock-10	8/25/2015	-	48	-	-	-	-
CDI Stock-X	8/25/2015	-	34	-	-	-	-
CRC1 Stockpile							
CS-1	9/28/2016	200	-	-	-	-	-
CS-2	9/28/2016	130	-	-	-	-	-
CS-3	9/28/2016	**300 J**	-	-	-	-	-
CS-4	9/28/2016	**230**	-	-	-	-	-
CS-5	9/28/2016	130	-	-	-	-	-
CS-6	9/28/2016	160	-	<0.02 J	<0.02 J	<0.02 J	<0.06 J
CS-7	9/28/2016	110	-	-	-	-	-
CS-8	9/28/2016	130	-	-	-	-	-
CS-9	9/28/2016	170	-	-	-	-	-
CS-10	9/28/2016	190	-	-	-	-	-
CS-11	9/28/2016	**730**	-	-	-	-	-
CS-12	9/28/2016	200	-	-	-	-	-
CRC2 Stockpile							
CRC2 Stock-1	8/25/2015	-	37	<0.02	<0.02	<0.02	<0.06
CRC2 Stock-2	8/25/2015	-	21	-	-	-	-
CRC2-Stock-X	8/25/2015	-	17	-	-	-	-

Soil Analytical Results
Calder Mine
Alaska

		AK 102		SW8021B			
		Diesel Range Organics	Diesel Range TPH+SG	Benzene	Toluene	Ethylbenzene	Xylene Total
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ADEC Method 2 OPHSPCR Site Specific		230	230	0.025	6.5	6.9	63
Field ID	**Date**						
HydroCon Stockpile							
HS-1	9/28/2016	3,100	-	<0.02	<0.02	<0.02	<0.06
HS-2	9/28/2016	920	-	-	-	-	-
HS-3	9/28/2016	320	-	-	-	-	-
HS-4	9/28/2016	480	-	-	-	-	-
HS-5	9/28/2016	740	-	-	-	-	-
HS-6	9/28/2016	650	-	-	-	-	-
HS-7	9/28/2016	490	-	-	-	-	-
HS-8	9/28/2016	560	-	-	-	-	-
HS-9	9/28/2016	260	-	-	-	-	-
HS-10	9/28/2016	780	-	-	-	-	-
HS-11	9/28/2016	960	-	-	-	-	-
HS-12	9/28/2016	610	-	<0.02	<0.02	<0.02	<0.06
HS-13	9/28/2016	1,300	-	-	-	-	-
HS-14	9/28/2016	340	-	-	-	-	-
HS-15	9/28/2016	840	-	-	-	-	-
HS-16	9/28/2016	1,100	-	-	-	-	-
HS-17	9/28/2016	1,800	-	-	-	-	-
HS-18	9/28/2016	200	-	-	-	-	-
HS-19	9/28/2016	390	-	-	-	-	-
HS-20	9/28/2016	370	-	-	-	-	-
HS-21	9/28/2016	810	-	-	-	-	-
HS-22	9/28/2016	3,200	-	-	-	-	-
HS-23	9/28/2016	250	-	-	-	-	-
HS-24	9/28/2016	420	-	-	-	-	-
HS-25	9/28/2016	230	-	-	-	-	-
HS-26	9/28/2016	340	-	<0.02	<0.02	<0.02	<0.06
HS-27	9/28/2016	300	-	-	-	-	-
HS-28	9/28/2016	390	-	-	-	-	-
HS-29	9/28/2016	1,100	-	-	-	-	-
HS-30	9/28/2016	1,400	-	-	-	-	-
HS-31	9/28/2016	930	-	-	-	-	-
HS-32	9/28/2016	910	-	-	-	-	-
HS-33	9/28/2016	1,100	-	-	-	-	-
HS-34	9/28/2016	340	-	-	-	-	-
HS-35	9/28/2016	470	-	-	-	-	-
HS-36	9/28/2016	230	-	-	-	-	-
HS-37	9/28/2016	460	-	-	-	-	-
HS-38	9/28/2016	410	-	-	-	-	-
HS-39	9/28/2016	410	-	-	-	-	-
HS-40	9/28/2016	560	-	<0.02	<0.02	<0.02	<0.06

Notes

[1]Soil was removed by additional remedial excavation

Red denotes concentration exceeds ADEC Method 2 cleanup level.

Samples analyzed by Friedman & Bruya, Inc., of Seattle, Washington.

Alaska Dept of Conservation Method 2 Oil Pollution & Hazardous Substances Pollution Control Regulations, Table B2, 18 AAC75, based on >40 inches of rainfall migration to groundwater.

< = not detected at a concentration exceeding the laboratory MRL shown

mg/kg = milligrams per kilogram

ADEC - Alaska Dept of Conservation

J -The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

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

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.

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

APPENDIX A

PHOTOGRAPHIC DOCUMENTATION

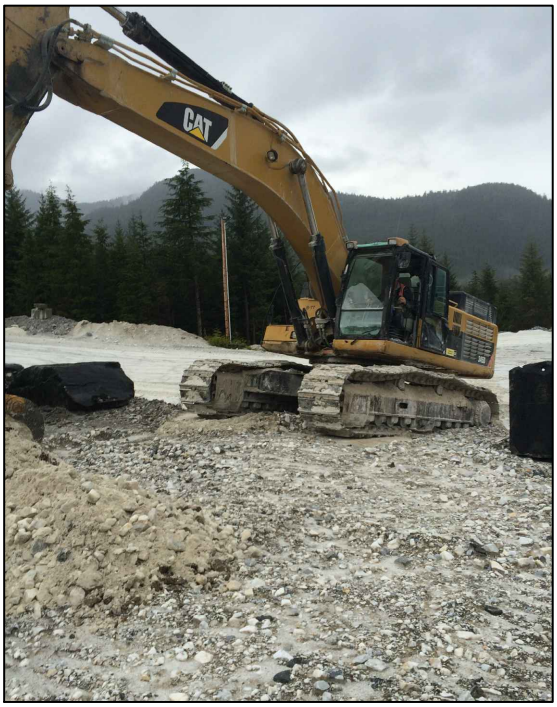


PHOTO 1
Test pits near Fuel Station.

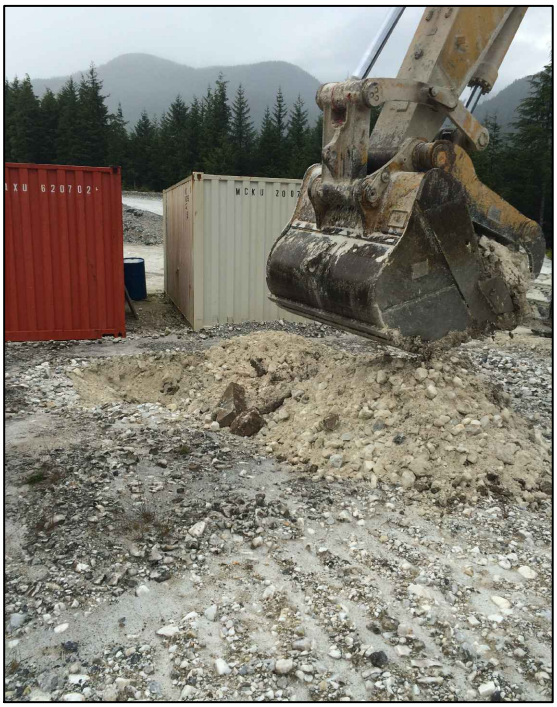


PHOTO 2
Test Pit TP-3.

C:\Users\Josh\Desktop\Autocad Files\Hydrocon-Autocad\2015-010 Calder Mine\2016\Oct 2016\2015-010_BM-CMS-102616.dwg 2.17.2014

HydroCon

DATE: 10-26-16
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2015-010

PHOTOPLATE 1
SITE PHOTOGRAPHS

CALDER MINE
PRINCE WALES ISLAND
ALASKA

PHOTO 3
Test Pit TP-2. Buried power lines encountered during excavation.

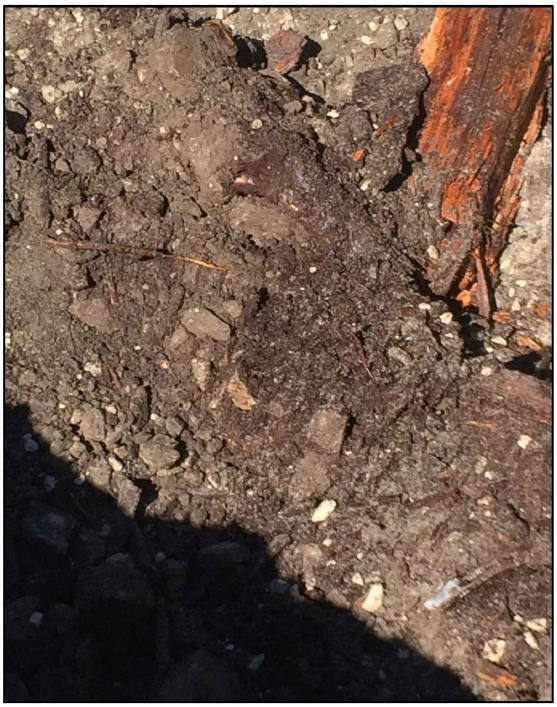


PHOTO 4
Hydrocon Stockpile.
Abundant wood debris in stockpile.

Hydro Con

DATE: 10-26-16
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2015-010

PHOTOPLATE 2
SITE PHOTOGRAPHS

CALDER MINE
PRINCE WALES ISLAND
ALASKA

PHOTO 5
CDI Stockpile

C:\Users\Josh\Desktop\Autocad Files\Hydrocon-Autocad\2015-010 Calder Mine\2016\Oct 2016\2015-010_BM-CMS-102616.dwg 2.17.2014

HydroCon

DATE: 10-26-16
DWN: JJT
CHK: CH
APPROVED: CH
PRJ. MGR: CH
PROJECT NO: 2015-010

PHOTOPLATE 3
SITE PHOTOGRAPHS

CALDER MINE
PRINCE WALES ISLAND
ALASKA

APPENDIX B

LABORATORY REPORT AND CHAIN-OF-CUSTODY DOCUMENTATION

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.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 4, 2016

Craig Hultgren, Project Manager
HydroCon
510 Allen St, Suite B
Kelso, WA 98626

Dear Mr Hultgren:

Included are the results from the testing of material submitted on September 30, 2016 from the Calder Mine, PO 2015-010, F&BI 609532 project. There are 4 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
HDC1004R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on September 30, 2016 by Friedman & Bruya, Inc. (ADEC laboratory approval number UST-007) from the HydroCon Calder Mine, PO 2015-010, F&BI 609532 project. The samples were received at 3 °C in good condition and were refrigerated upon receipt. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	HydroCon	Date Sampled
609532 -01	TP1-5	09/27/16
609532 -02	TP2-3	09/27/16
609532 -03	TP3-5	09/27/16
609532 -04	TP4-4	09/27/16
609532 -05	TP5-4	09/27/16
609532 -06	TP6-4	09/27/16
609532 -07	TP7-4.5	09/27/16
609532 -08	TP8-4.5	09/27/16
609532 -09	TP9-4.5	09/27/16

The samples were analyzed as follows.

DRO (soil) - Analysis Method AK 102, Extraction Method 3550B

All quality control requirements were acceptable.

Date of Report: 10/04/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609532
Date Extracted: 09/30/16
Date Analyzed: 09/30/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Surrogate (% Recovery) (Limit 60-120)
TP1-5 609532-01	<5	91
TP2-3 609532-02	97	94
TP3-5 609532-03	<5	89
TP4-4 609532-04	160	90
TP5-4 609532-05	<5	88
TP6-4 609532-06	<5	86
TP7-4.5 609532-07	<5	84
TP8-4.5 609532-08	7.3 x	93
TP9-4.5 609532-09	<5	83
Method Blank 06-2043 MB	<5	94

Date of Report: 10/04/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609532

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel	mg/kg (ppm)	500	87	96	75-125	10

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.

609532

SAMPLE CHAIN OF CUSTODY

ME 09/30/16

C03

Page # 1 of 1

Report To Craig Hultgren

Company HydroCon

Address

City, State, ZIP Kelso, WA

Phone Email Craigh@hydrocon.net

SAMPLERS (signature)

PROJECT NAME: Calder Mine

PO #: 2015-010

REMARKS

INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☑ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: TPH-HCID	TPH-Diesel (AK 102)	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
TP1-5	01	9/27/16	1410	SOIL	1		X										
TP2-3	02		1445		1		X										
TP3-5	03		1510		1		X										
TP4-4	04		1530		1		X										
TP5-4	05		1550		1		X										
TP6-4	06		1605		1		X										
TP7-4.5	07		1635		1		X										
TP8-4.5	08		1700		1		X										
TP9-4.5	09		1720		1		X										

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Craig Hultgren	HydroCon	9/29/16	1100
Received by:	Nhan Phan	FEBI	9/30/16	0500
Relinquished by:				
Received by:		Samples received at 3 °C		

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

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.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 7, 2016

Craig Hultgren, Project Manager
HydroCon
510 Allen St, Suite B
Kelso, WA 98626

Dear Mr Hultgren:

Included are the results from the testing of material submitted on September 30, 2016 from the Calder Mine, PO 2015-010, F&BI 609533 project. There are 14 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
HDC1007R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on September 30, 2016 by Friedman & Bruya, Inc. (ADEC laboratory approval number UST-007) from the HydroCon Calder Mine, PO 2015-010, F&BI 609533 project. The samples were received at 3 °C in good condition and were refrigerated upon receipt. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	HydroCon	Date Sampled
609533 -01	CS-1	9/28/16
609533 -02	CS-2	9/28/16
609533 -03	CS-3	9/28/16
609533 -04	CS-4	9/28/16
609533 -05	CS-5	9/28/16
609533 -06	CS-6	9/28/16
609533 -07	CS-7	9/28/16
609533 -08	CS-8	9/28/16
609533 -09	CS-9	9/28/16
609533 -10	CS-10	9/28/16
609533 -11	CS-11	9/28/16
609533 -12	CS-12	9/28/16
609533 -13	HS-1	9/28/16
609533 -14	HS-2	9/28/16
609533 -15	HS-3	9/28/16
609533 -16	HS-4	9/28/16
609533 -17	HS-5	9/28/16
609533 -18	HS-6	9/28/16
609533 -19	HS-7	9/28/16
609533 -20	HS-8	9/28/16
609533 -21	HS-9	9/28/16
609533 -22	HS-10	9/28/16
609533 -23	HS-11	9/28/16
609533 -24	HS-12	9/28/16
609533 -25	HS-13	9/28/16
609533 -26	HS-14	9/28/16
609533 -27	HS-15	9/28/16
609533 -28	HS-16	9/28/16
609533 -29	HS-17	9/28/16
609533 -30	HS-18	9/28/16
609533 -31	HS-19	9/28/16
609533 -32	HS-20	9/28/16
609533 -33	HS-21	9/28/16
609533 -34	HS-22	9/28/16

CASE NARRATIVE (Continued)

609533 -36	HS-24	9/28/16
609533 -37	HS-25	9/28/16
609533 -38	HS-26	9/28/16
609533 -39	HS-27	9/28/16
609533 -40	HS-28	9/28/16
609533 -41	HS-29	9/28/16
609533 -42	HS-30	9/28/16
609533 -43	HS-31	9/28/16
609533 -44	HS-32	9/28/16
609533 -45	HS-33	9/28/16
609533 -46	HS-34	9/28/16
609533 -47	HS-35	9/28/16
609533 -48	HS-36	9/28/16
609533 -49	HS-37	9/28/16
609533 -50	HS-38	9/28/16
609533 -51	HS-39	9/28/16
609533 -52	HS-40	9/28/16

BTEX (soil) - Analysis Method 8021B, Extraction Method 5035
All quality control requirements were acceptable.

DRO (soil) - Analysis Method AK 102, Extraction Method 3550B
All quality control requirements were acceptable.

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533
Date Extracted: 10/04/16
Date Analyzed: 10/04/16

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
USING METHOD 8021B**

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

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Surrogate (% Recovery) (Limit 50-150)
CS-6 609533-06	<0.02	<0.02	<0.02	<0.06	153 ip
HS-1 609533-13	<0.02	<0.02	<0.02	<0.06	117
HS-12 609533-24	<0.02	<0.02	<0.02	<0.06	139
HS-26 609533-38	<0.02	<0.02	<0.02	<0.06	134
HS-40 609533-52	<0.02	<0.02	<0.02	<0.06	130
Method Blank 06-2069 MB	<0.02	<0.02	<0.02	<0.06	91

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533
Date Extracted: 09/30/16 and 10/03/16
Date Analyzed: 09/30/16, 10/01/16, 10/05/16 and 10/06/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Surrogate (% Recovery) (Limit 50-150)
CS-1 609533-01	200	92
CS-2 609533-02	130	89
CS-3 609533-03	300	182 ip
CS-4 609533-04	230	93
CS-5 609533-05	130	93
CS-6 609533-06	160	97
CS-7 609533-07	110	93
CS-8 609533-08	130	93
CS-9 609533-09	170	92
CS-10 609533-10	190	95

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533
Date Extracted: 09/30/16 and 10/03/16
Date Analyzed: 09/30/16, 10/01/16, 10/05/16 and 10/06/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Surrogate (% Recovery) (Limit 50-150)
CS-11 609533-11	730	99
CS-12 609533-12	200	92
HS-1 609533-13	3,100	73
HS-2 609533-14	920	87
HS-3 609533-15	320	90
HS-4 609533-16	480	90
HS-5 609533-17	740	95
HS-6 609533-18	650	89
HS-7 609533-19	490	88
HS-8 609533-20	560	85

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533
Date Extracted: 09/30/16 and 10/03/16
Date Analyzed: 09/30/16, 10/01/16, 10/05/16 and 10/06/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Surrogate (% Recovery) (Limit 50-150)
HS-9 609533-21	260	93
HS-10 609533-22	780	105
HS-11 609533-23	960	97
HS-12 609533-24	610	92
HS-13 609533-25	1,300	95
HS-14 609533-26	340	100
HS-15 609533-27	840	82
HS-16 609533-28	1,100	74
HS-17 609533-29	1,800	82
HS-18 609533-30	200	90

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533
Date Extracted: 09/30/16 and 10/03/16
Date Analyzed: 09/30/16, 10/01/16, 10/05/16 and 10/06/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Surrogate (% Recovery) (Limit 50-150)
HS-19 609533-31	390	91
HS-20 609533-32	370	124
HS-21 609533-33	810	94
HS-22 609533-34	3,200	131
HS-23 609533-35	250	98
HS-24 609533-36	420	83
HS-25 609533-37	230	82
HS-26 609533-38	340	93
HS-27 609533-39	300	84
HS-28 609533-40	390	92

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533
Date Extracted: 09/30/16 and 10/03/16
Date Analyzed: 09/30/16, 10/01/16, 10/05/16 and 10/06/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Surrogate (% Recovery) (Limit 50-150)
HS-29 609533-41	1,100	82
HS-30 609533-42	1,400	107
HS-31 609533-43	930	133
HS-32 609533-44	910	125
HS-33 609533-45	1,100	104
HS-34 609533-46	340	86
HS-35 609533-47	470	88
HS-36 609533-48	230	123
HS-37 609533-49	460	149
HS-38 609533-50	410	91

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533
Date Extracted: 09/30/16 and 10/03/16
Date Analyzed: 09/30/16, 10/01/16, 10/05/16 and 10/06/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

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

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Surrogate (% Recovery) (Limit 50-150)
HS-39 609533-51	410	97
HS-40 609533-52	560	89
Method Blank 06-2044 MB	<5	82
Method Blank 06-2045 MB	<5	100
Method Blank 06-2046 MB	<5	106

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES USING EPA METHOD 8021B

Laboratory Code: 610030-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benzene	mg/kg (ppm)	0.5	73	76	66-121	4
Toluene	mg/kg (ppm)	0.5	78	80	72-128	3
Ethylbenzene	mg/kg (ppm)	0.5	74	77	69-132	4
Xylenes	mg/kg (ppm)	1.5	77	80	69-131	4

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel	mg/kg (ppm)	500	95	100	75-125	5

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel	mg/kg (ppm)	500	98	106	75-125	8

Date of Report: 10/07/16
Date Received: 09/30/16
Project: Calder Mine, PO 2015-010, F&BI 609533

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD AK 102

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel	mg/kg (ppm)	500	101	100	75-125	1

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.

609533

SAMPLE CHAIN OF CUSTODY ME 09/30/16 CD3/CD5

Page # 1 of 6

Report To Craig Hultgren

Company Hydracon

Address

City, State, ZIP Kelso, WA

Phone Email craigh@hydraconllc.net

SAMPLERS (*signature*)

PROJECT NAME: Calder mine

PO #: 2015-010

REMARKS

INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☑ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: TPH-HCID	NWTPH-Dx Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
CS-1	01	9/28/16	0810	Soil	1		X										
CS-2	02		0815		1		X										
CS-3	03		0820		1		X										
CS-4	04		0825		1		X										
CS-5	05		0830		1		X										
CS-6	06AB		0835		2		X		X								
CS-7	07		0840		1		X										
CS-8	08		0845		1		X										
CS-9	09		0850		1		X										
CS-10	10	↓	0855	↓	1		X										

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Craig Hultgren	Hydracon	09/29/16	1100
Received by:	Nhan Phan	FEBI	9/30/16	0500
Relinquished by:				
Received by:		Samples received at 3 °C		

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

609533

SAMPLE CHAIN OF CUSTODY ME 09/30/16

CI3/C05

Page # 2 of 6

Report To Craig Hultgren

Company Hydrocon

Address

City, State, ZIP Kelso, WA

Phone Email craigh@hydrocon.net

SAMPLERS (signature)

PROJECT NAME: Caldermine

PO #: 2015-010

REMARKS

INVOICE TO

TURNAROUND TIME
- ☐ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: NWTPH-Dx AK102 Diesel	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
CS-11	11	9/28/16	0900	Soil	1	X											
CS-12	12		0905		1	X											
HS-1	13 AB		0920		2	X			X								
HS-2	14		0925		1	X											
HS-3	15		0930		1	X											
HS-4	16		0935		1	X											
HS-5	17		0940		1	X											
HS-6	18		0945		1	X											
HS-7	19		0950		1	X											
HS-8	20		0955		1	X											

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Craig Hultgren	Hydrocon	9/29/16	1100
Received by:	Nhan Phan	FEBI	9/30/16	0900
Relinquished by:				
Received by:		Samples received at 3 °C		

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

609533

SAMPLE CHAIN OF CUSTODY ME 09/30/16

CD3 / COS

Page # 3 of 6

Report To Craig Holtgren

Company Hydrocon

Address

City, State, ZIP Kelso, WA

Phone Email Craigh@hydrocon-llc.net

SAMPLERS (signature)	
PROJECT NAME: Calder Mine	PO #: 2015-010
REMARKS	INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☑ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: TPH-HCID	AK 102 TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
HS-9	21	9/28/16	1000	Soil	1		X										
HS-10	22		1005		1		X										
HS-11	23		1010		1		X										
HS-12	24 AB		1015		2		X		X								
HS-13	25		1020		1		X										
HS-14	26		1025		1		X										
HS-15	27		1030		1		X										
HS-16	28		1035		1		X										
HS-17	29		1040		1		X										
HS-18	30		1045		1		X										

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Craig Holtgren	Hydrocon	9/29/16	1100
Received by:	Nhan Phan	FEBI	9/30/16	0500
Relinquished by:				
Received by:		Samples received at 3 °C		

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

609533

SAMPLE CHAIN OF CUSTODY

ME 09/30/16

CE3 / C05

Page # 4 of 6

Report To Craig Hultgren

Company Hydrocon

Address

City, State, ZIP Kelso, WA

Phone Email Craigh@hydrocon llc.net

SAMPLERS (signature)

PROJECT NAME: Calder mine

PO #: 2015-010

REMARKS

INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☑ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: TPH-HCID	AK102 TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
HS-19	31	9/28/16	1050	Soil	1		X										
HS-20	32		1055		1		X										
HS-21	33		1100		1		X										
HS-22	34		1105		1		X										
HS-23	35		1110		1		X										
HS-24	36		1115		1		X										
HS-25	37		1120		1		X										
HS-26	38AB		1125		2		X		X								
HS-27	39		1130		1		X										
HS-28	40		1135		1		X										

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Craig Hultgren	Hydrocon	9/29/16	1100
Received by:	Nhan Phan	FEBI	9/30/16	0500
Relinquished by:				
Received by:		Samples received at 3 °C		

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

609533

SAMPLE CHAIN OF CUSTODY ME 09/30/16

CD3 / COS

Page # 5 of 6

Report To Craig Hultgren

Company Hydrocon

Address

City, State, ZIP Kelso, WA

Phone Email Cmsh@hydrocon11.com

SAMPLERS (*signature*)

PROJECT NAME	PO #
Calder mine	2015-010
REMARKS	INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☑ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: TPH-HCID	AK102 TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
HS-29	41	9/28/16	1140	soil	1		X										
HS-30	42		1145		1		X										
HS-31	43		1150		1		X										
HS-32	44		1155		1		X										
HS-33	45		1200		1		X										
HS-34	46		1205		1		X										
HS-35	47		1210		1		X										
HS-36	48		1215		1		X										
HS-37	49		1220		1		X										
HS-38	50		1225		1		X										

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Craig Hultgren	Hydrocon	9/29/16	1100
Received by:	Nhan Phan	FEBI	9/30/16	0500
Relinquished by:				
Received by:		Samples received at 3 °C		

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

609533

SAMPLE CHAIN OF CUSTODY

ME 09/30/16

CI3/16 C05

Page # 6 of 6

Report To Craig Hultgren

Company Hydrocon

Address

City, State, ZIP Kelso, WA

Phone Email craigh@hydrocon.net

SAMPLERS (signature)

PROJECT NAME: Calder mine

PO #: 2015-010

REMARKS

INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☑ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel AK102	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
HS-39	51	9/28/16	1230	Soil	1		X										
HS-40	52AB	↓	1235	↓	2		X		X								

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Craig Hultgren	Hydrocon	9/29/16	1100
Received by:	Nhan Phan	FEBI	9/30/16	0500
Relinquished by:				
Received by:		Samples received at 3 °C		

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Seattle, WA 98119-2029
Ph. (206) 285-8282

APPENDIX C

LABORATORY DATA REVIEW CHECKLIST

Laboratory Data Review Checklist

Completed by:	Eureka Project Solutions; Emily Swanson		
Title:	Environmental Scientist	Date:	10/11/16
CS Report Name:	Calder CRC 2015-010	Report Date:	10/4/16, 10/7/16
Consultant Firm:	HydroCon		
Laboratory Name:	Friedman & Bruya, Inc.	Laboratory Report Number:	609532, 609533
ADEC File Number:	1532.38.001	ADEC RecKey Number:	

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

(X) Yes ( ) No ( ) NA (Please explain.) Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

( ) Yes ( ) No (X) NA (Please explain) Comments:

Samples were not transferred.

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)?

( ) Yes (X) No ( ) NA (Please explain) Comments:

d. If there were any discrepancies, were they documented? - For example, incorrect sample containers/ preservation, sample temperature outside of acceptance range, insufficient or missing samples, etc.?

( ) Yes (X) No ( ) NA (Please explain) Comments:

e. Data quality or usability affected? (Please explain)

Comments:

4. Case Narrative

a. Present and understandable?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

This case narrative encompasses samples received on September 30, 2016 by Friedman & Bruya, Inc. (ADEC laboratory approval number UST-007) from the HydroCon Calder Mine, PO 2015-010, F&BI 609532 & 609533 project. The samples were received at 3 °C in good condition and were refrigerated upon receipt.

b. Discrepancies, errors or QC failures identified by the lab?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

The results for BTEX by method 8021B for sample CS-6 (609533-06), as well as Diesel by method AK 102 for sample CS-3 (609533-03) were given the laboratory qualifier "ip" meaning "Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte."

c. Were all corrective actions documented?

( ) Yes ( ) No (X) NA (Please explain) Comments:

No corrective actions needed.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Data is usable to meet project objectives.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

e. Data quality or usability affected? (Please explain)

Comments:

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(X) Yes ( ) No ( ) NA (Please explain) Comments:

iii. If above PQL, what samples are affected? Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ☒ NA (Please explain) Comments:

No affected samples.

v. Data quality or usability affected? (Please explain) Comments:

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics - One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☒ Yes ○ No ○ NA (Please explain) Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples?

○ Yes ○ No ☒ NA (Please explain) Comments:

No inorganics analysis present.

iii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☒ Yes ○ No ○ NA (Please explain) Comments:

iv. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

○ Yes ○ No ☒ NA (Please explain) Comments:

Laboratory duplicate not associated with samples.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ☒ NA (Please explain) Comments:

vii. Data quality or usability affected? (Please explain) Comments:

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses - field, QC and laboratory samples?

☒ Yes ○ No ○ NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

○ Yes ☒ No ○ NA (Please explain) Comments:

The results for BTEX by method 8021B for sample CS-6 (609533-06), as well as Diesel by method AK 102 for sample CS-3 (609533-03) were given the laboratory qualifier "ip" meaning "Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte."

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☒ Yes ○ No ○ NA (Please explain) Comments:

iv. Data quality or usability affected? (Use the comment box to explain.).

Comments:

For the BTEX by method 8021B for sample CS-6 (609533-06), the analyte concentration is reported below the lowest calibration standard. The value reported is an estimate. For the Diesel by method AK 102 for sample CS-3 (609533-03), the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

d. Trip Blank - Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): <u>Water and Soil</u>

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

○ Yes ☒ No ○ NA (Please explain.) Comments:

No trip blanks with this sample set.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

○ Yes ○ No ☒ NA (Please explain.) Comments:

No trip blanks with this sample set.

iii. All results less than PQL?

(X) Yes ( ) No ( ) NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

(X) No ( ) Yes ( ) NA (Please explain.) Comments:

ii. Submitted blind to lab?

( ) Yes ( ) No (X) NA (Please explain.) Comments:

No field duplicate submitted for this set of samples.

iii. Precision - All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

( ) Yes ( ) No (X) NA (Please explain) Comments:

No field duplicate submitted for this set of samples.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

( ) Yes ( ) No (X) NA (Please explain) Comments:

No field duplicate submitted for this set of samples.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ☒ No ○ NA (Please explain) Comments:

i. All results less than PQL?

○ Yes ○ No ☒ NA (Please explain) Comments:

No Equipment Blank present.

ii. If above PQL, what samples are affected?

Comments:

iii. Data quality or usability affected? (Please explain.)

Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

☒ Yes ○ No ○ NA (Please explain) Comments:

Results for total petroleum hydocarbon as diesel using method AK 102 for sample TP8-4.5 was given the lab qualifier "x". The lab qualifier "x" is defined as "The sample chromatographic pattern does not resemble the fuel standard used for quantitation."

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