

October 26, 2021

Mr. Roger Burggraf  
830 Sheep Creek Road  
Fairbanks, Alaska 99709

RE: GROUNDWATER-QUALITY ASSESSMENT SUMMARY, GRANT MINE, ESTER DOME,  
ALASKA

Dear Mr. Burggraf:

This report summarizes the results of groundwater sampling completed at the Grant Mine located at Mile 1.2 on Saint Patrick's Road in Ester, Alaska (Figure 1). We collected groundwater samples from monitoring wells M-1 and M-2 located downgradient of the Grant Mine primary tailings impoundment (Figure 2) in September 2018, June 2019, October 2019, June 2021, and September 2021. The primary contaminant of concern (COC) in groundwater at the site was cyanide. We have prepared this report for submittal to the Alaska Department of Environmental Conservation (ADEC) to assist their evaluation of groundwater quality at the site.

## BACKGROUND

Tri-Con Mining, Inc. (Tri-Con)/Silverado operated the mill at the Grant Mine site from 1985 to 1989 using a cyanide process for gold extraction. The cyanide process involved mixing crushed ore with sodium cyanide and lime solution and then extracting the gold, generating a tailings slurry containing waste rock, lime, and sodium cyanide-containing water. A tailings impoundment, lined with compacted silt and bordered by an earthen berm, was built in 1985 to contain the waste slurry.

The site came to the attention of ADEC in 1988 when Tri-Con applied for a rezone, and water samples from two wells (M-3 and M-R, both since decommissioned) contained cyanide concentrations above the federally established drinking water maximum level of 0.2 mg/L. According to Tri-Con employees, the cyanide-rich tailings slurry was accidentally discharged upslope of the impoundment, allowing the tailings to reach groundwater through the former water supply well, known as the "former Burggraf well or MW-R". Tri-Con removed the well casing and sealed the boring by pressure grouting in 1989. Monitoring wells, M-1 and M-2 were installed in 1989 and 1990, respectively, to continue monitoring cyanide in groundwater. The wells were routinely sampled by Mr. Burggraf for

total cyanide and/or weak-acid-dissociable (WAD) cyanide concentrations; the results of his sampling are presented in Table 1.

ADEC established a 1.5 micrograms per liter (ug/L) groundwater cleanup level for free cyanide with the November 6, 2016 revision of the 18 AAC 75. Our groundwater assessment in 2018 through 2019 included analyzing groundwater samples for free cyanide so the results could be compared with the current ADEC regulations. Previous investigations evaluated analytical groundwater results for total cyanide and/or WAD cyanide using the federally established maximum contaminant level (MCL) of 200 µg/L. Samples from M-1 and M-2 have not exceeded the MCL for total or WAD cyanide since May 2017.

We presented three rounds of monitoring results in a letter report dated January 31, 2020; free cyanide (CN<sup>-</sup>) was detected in sample *MW-102* collected at monitoring well M-2 in June 2019 at an estimated concentration of 1.55 ug/L, marginally exceeding the ADEC cleanup level of 1.5 µg/L. However, the result for free cyanide in *M-2* (the field duplicate of *MW-102*) did not exceed the ADEC cleanup level. The results for both samples were flagged as estimated values because the concentrations were below the 2.0 µg/L limit of quantitation reported by the laboratory. Free cyanide was not detected in the groundwater samples collected from either M-1 or M-2 in September 2018 or October 2019. We recommended no further sampling at this time.

In a letter dated January 14, 2021, ADEC concluded the J-flagged (estimated) value of 1.55 ug/L in the field duplicate warranted additional sampling and they requested three consecutive samples with CN<sup>-</sup> below the groundwater cleanup levels before they would consider our request for no further sampling.

## GROUNDWATER SAMPLING SUMMARY

We collected two additional rounds of groundwater samples from monitoring wells M-1 and M-2 using the dedicated well pumps installed in the monitoring wells. During purging we used a YSI ProPlus instrument to monitor temperature, conductivity, pH, dissolved oxygen (DO), and oxidation-reduction potential (ORP). Wells were purged until these parameters stabilized, or three well volumes were purged. Immediately after purging, we collected groundwater samples directly from the discharge tubing into laboratory-provided containers.

## Investigation Derived Waste

Purge water generated during sampling was discharged into the primary tailings impoundment at Grant Mine. Other investigation derived waste (IDW) consisting of disposable sampling equipment such as nitrile gloves was disposed at the Fairbanks North Star Borough landfill.

## ANALYTICAL METHODS

We submitted the groundwater samples collected from monitoring wells M-1 and M-2 to Alpha Analytical in Westborough, Massachusetts for laboratory analysis of free cyanide by the Environmental Protection Agency (EPA) Method SW9016.

## ANALYTICAL RESULTS

To evaluate groundwater analytical data, we compared groundwater-sample results to the groundwater cleanup level for cyanide listed in 18 AAC 75.345 Table C. *Groundwater Cleanup Levels*. Analytical results are presented in Table 2.

Free cyanide was not detected in the groundwater samples collected from either M-1 or M-2 in October 2019, June 2021, and September 2021. The limits of detection were below the ADEC cyanide cleanup level in these three sampling events.

## CONCLUSIONS

Mr. Burggraf is working with Alaska Department of Natural Resources, ADEC's Contaminated Sites Program, and ADEC's Solid Waste Program to implement a closure plan for the primary tailings impoundment at the Grant Mine. Based on the 2019 and 2021 analytical groundwater results from the Grant Mine monitoring wells, it does not appear that the 1988 cyanide release or the tailings within the primary tailings impoundment are affecting groundwater quality in the area downgradient from the release and the impoundment. We recommend no further monitoring of groundwater contaminants. If ADEC concurs with this recommendation, we would suggest decommissioning the wells at your earliest convenience.

## LIMITATIONS

This report was prepared for the use of Roger Burggraf and his representatives for evaluating the presence of cyanide in the groundwater down gradient of the Grant Mine.

Regulatory agencies may reach different conclusions than Shannon & Wilson. We have prepared the attachment, *Important Information about Your Geotechnical/Environmental Report*, to assist you and others in understanding the uses and limitations of our reports.

Sincerely,

SHANNON & WILSON

Mark S. Lockwood, CPG  
Senior Associate - Geologist

Enc. Table 1 - Historical On-Site Monitoring Well Groundwater Results  
Table 2 – Recent Groundwater Sample Results  
Figure 1 – Site Location  
Figure 2 – Monitoring Well Locations  
Alpha Analytical Reports L1949758, L2133246, L2152928, and LDRCs  
*Important Information about Your Geotechnical/Environmental Report*

**TABLE 1**  
**GRANT MINE IMPOUNDMENT CLOSURE**  
**HISTORICAL ON-SITE MONITORING WELL GROUNDWATER RESULTS**

Sample Date	Units	M-1		M-2		M-3	M-4	M-R
		Total CN	WAD CN	Total CN	WAD CN	Total CN	Total CN	Total CN
1/15/1988	mg/L	-	-	-	-	0.01	-	-
11/29/1988	mg/L	-	-	-	-	0.14	-	0.91
12/29/1988	mg/L	-	-	-	-	0.23	-	0.54
1/5/1989	mg/L	-	-	-	-	-	-	0.52
5/3/1989	mg/L	-	-	-	-	1.26	-	-
7/10/1989	mg/L	-	-	-	-	1.27	-	-
8/15/1989	mg/L	-	-	-	-	0.35	-	-
10/20/1989	mg/L	0.01	-	-	-	0.31	-	-
6/26/1990	mg/L	0.01	-	-	-	0.13	-	-
8/13/1990	mg/L	-	-	0.01	-	-	-	-
10/25/1990	mg/L	0.01	-	0.02	-	0.09	-	-
11/1/1990	mg/L	-	-	0.08	-	-	-	-
11/28/1990	mg/L	0.01	-	0.08	-	0.22	-	-
1/4/1991	mg/L	<MDL	-	0.12	-	0.16	-	-
2/6/1991	mg/L	<MDL	-	0.09	-	-	-	-
4/9/1991	mg/L	0.01	-	0.01	-	0.1	-	-
6/5/1991	mg/L	<MDL	-	0.09	-	0.07	-	-
8/12/1991	mg/L	<MDL	-	0.08	-	0.03	-	-
10/24/1991	mg/L	<MDL	-	0.16	-	0.04	-	-
12/17/1991	mg/L	<MDL	-	0.19	-	0.03	-	-
3/9/1992	mg/L	<MDL	-	0.06	-	0.02	-	-
6/5/1992	mg/L	<MDL	-	0.01	-	0.02	-	-
7/16/1992	mg/L	<MDL	-	0.15	-	0.02	-	-
10/14/1992	mg/L	<MDL	-	0.27	-	0.03	-	-
11/13/1992	mg/L	-	-	0.17	-	-	-	-
2/22/1993	mg/L	<MDL	-	0.2	-	-	-	-
3/8/1993	mg/L	-	-	0.16	-	-	-	-
6/23/1993	mg/L	<MDL	-	0.16	-	0.01	-	-
10/1/1993	mg/L	<MDL	-	0.17	-	0.04	-	-
2/21/1994	mg/L	<MDL	-	0.1	-	<MDL	-	-
4/5/1994	mg/L	<MDL	-	0.21	-	<MDL	-	-
7/1/1994	mg/L	<MDL	-	0.15	-	<MDL	-	-
9/8/1994	mg/L	0.02	-	0.18	-	0.01	-	-
1/11/1995	mg/L	0.02	-	0.17	-	-	-	-
3/20/1995	mg/L	<MDL	-	0.14	-	-	-	-
7/3/1995	mg/L	<MDL	-	0.09	-	<MDL	-	-
10/19/1995	mg/L	<MDL	-	0.15	-	-	-	-
1/3/1996	mg/L	0.01	-	0.15	-	-	-	-
4/4/1996	mg/L	0.01	-	0.12	-	-	-	-
7/3/1996	mg/L	<MDL	-	0.14	-	<MDL	-	-
10/17/1996	mg/L	0.02	-	0.15	-	<MDL	.1*	-
11/5/1996	mg/L	-	-	-	-	-	<MDL	-
12/18/1996	mg/L	0.03	-	0.16	-	-	<MDL	-
3/10/1997	mg/L	0.03	-	0.14	-	-	<MDL	-
7/14/1997	mg/L	0.02	-	0.1	-	<MDL	<MDL	-
10/16/1997	mg/L	0.03	-	0.14	-	<MDL	<MDL	-
11/1/2002	mg/L	0.23	-	0.07	-	-	-	-
11/1/2003	mg/L	0.17	-	0.076	-	-	-	-
4/1/2004	mg/L	0.177	-	0.072	-	-	-	-
5/1/2005	mg/L	0.26	-	0.05	-	-	-	-
4/12/2006	mg/L	0.18	-	0.049	-	-	-	-
2/2/2007	mg/L	0.3	-	0.072	-	-	-	-
6/6/2007	mg/L	0.64	-	0.09	-	-	-	-

**TABLE 1**  
**GRANT MINE IMPOUNDMENT CLOSURE**  
**HISTORICAL ON-SITE MONITORING WELL GROUNDWATER RESULTS**

Sample Date	Units	<i>M-1</i>		<i>M-2</i>		<i>M-3</i>	<i>M-4</i>	<i>M-R</i>
		Total CN	WAD CN	Total CN	WAD CN	Total CN	Total CN	Total CN
4/1/2008	mg/L	0.21	-	0.062	-	-	-	-
10/7/2008	mg/L	0.21	-	0.06	-	-	-	-
1/16/2009	mg/L	0.22	0.034	0.072	0.02	-	-	-
5/15/2009	mg/L	0.25	0.055	0.068	0.013	-	-	-
5/5/2010	mg/L	0.055	0.091	0.019	0.084	-	-	-
5/6/2011	mg/L	0.23	0.048	0.072	0.021	-	-	-
10/4/2011	mg/L	0.25	0.091	0.084	0.019	-	-	-
5/1/2012	mg/L	0.3	0.096	0.088	0.025	-	-	-
10/8/2012	mg/L	0.05	0.26	0.072	0.021	-	-	-
5/24/2013	mg/L	0.065	0.02	0.23	0.005	-	-	-
6/30/2014	mg/L	-	-	0.071	0.0025	-	-	-
11/14/2014	mg/L	0.16	0.011	0.038	0.0083	-	-	-
6/22/2015	mg/L	0.14	0.059	0.056	0.018	-	-	-
10/26/2015	mg/L	0.22	0.07	0.076	0.025	-	-	-
5/20/2016	mg/L	0.22	0.049	0.076	0.017	-	-	-
5/31/2017	mg/L	0.2	0.046	0.077	0.022	-	-	-
10/26/2017	mg/L	0.18	0.04	0.072	0.025	-	-	-
6/4/2018	mg/L	0.18	0.045	0.09	0.032	-	-	-

mg/L milligrams per liter

<MDL Analyte not reported above the minimum detection limit (MDL).

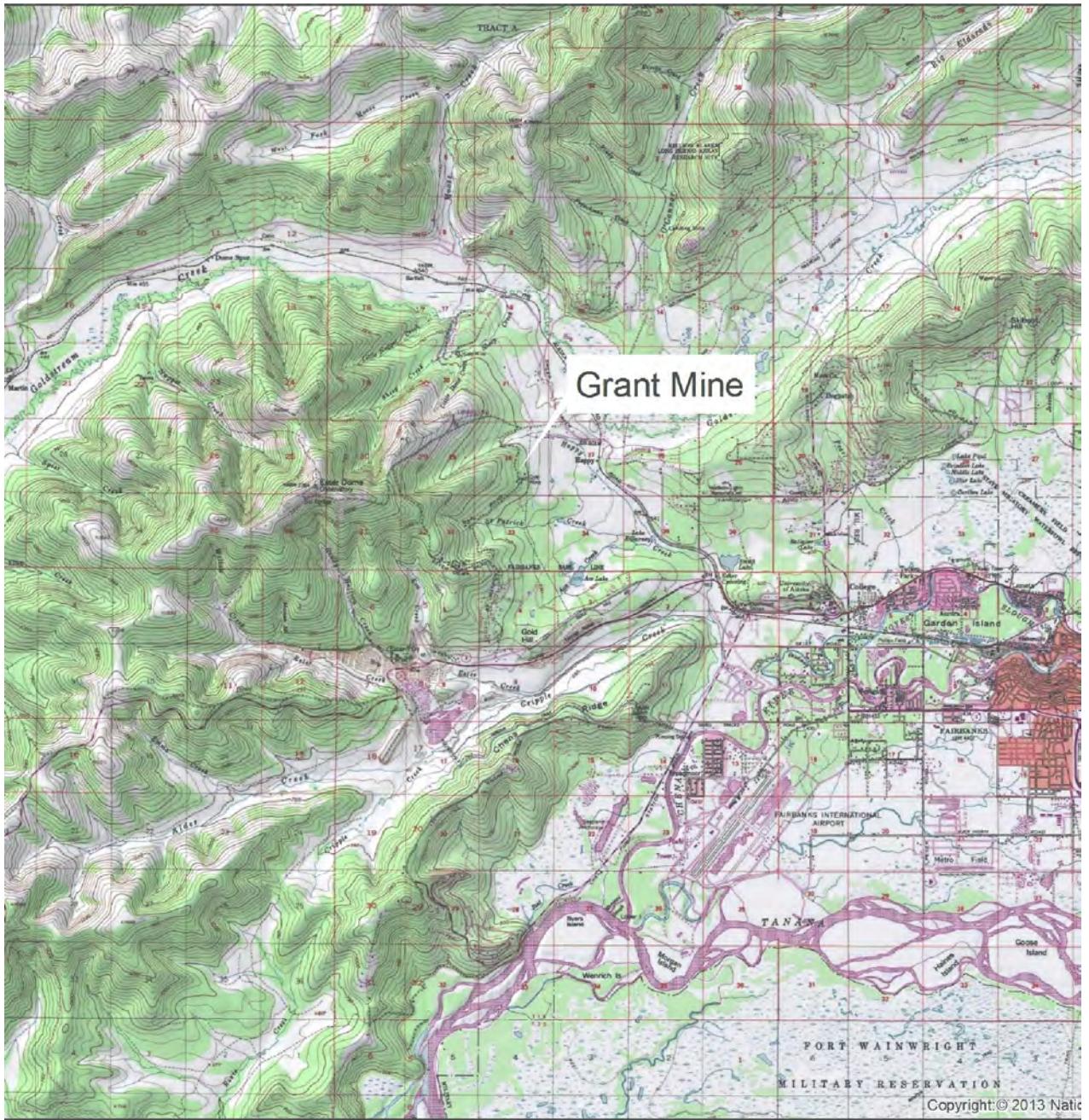
- Analytical sample not collected.

\* Flag not defined

**TABLE 2  
GRANT MINE TAILINGS IMPOUNDMENT CLOSURE  
RECENT GROUNDWATER SAMPLE RESULTS**

Analytical Method	Analyte	ADEC Cleanup Level	Units	M-1	M-101	M-2	M-1	M-2	M-102	M1	M2	M202	M1	M2	M101	M1	M2	M101
				9/14/2018	9/14/2018	9/14/2018	6/20/2019	6/20/2019	6/20/2019	10/17/2019	10/17/2019	10/17/2019	6/16/2021	6/16/2021	6/16/2021	9/27/2021	9/27/2021	9/27/2021
SW9016	Cyanide (free CN-)	1.5	µg/L	<0.544	<0.544	<0.544	1.04 J	1.42 J	<b>1.55 J</b>	<0.544	<0.544	<0.544	<0.544	<0.544	<0.544	<0.544	<0.544	<0.544
SW6020A (Metals)	Antimony	7.8	µg/L	<1.50	<1.50	<1.50	—	—	—	—	—	—	—	—	—	—	—	—
	Arsenic	0.52	µg/L	<b>61.5</b>	<b>65.1</b>	<b>196</b>	—	—	—	—	—	—	—	—	—	—	—	—
	Barium	3,800	µg/L	42.8	44.8	12.2	—	—	—	—	—	—	—	—	—	—	—	—
	Cadmium	9.2	µg/L	<1.00	<1.00	<1.00	—	—	—	—	—	—	—	—	—	—	—	—
	Chromium	22,000	µg/L	<2.00	<2.00	<2.00	—	—	—	—	—	—	—	—	—	—	—	—
	Lead	15	µg/L	0.456 J	0.495 J	1.41	—	—	—	—	—	—	—	—	—	—	—	—
	Mercury	0.52	µg/L	0.249	0.237	<0.100	—	—	—	—	—	—	—	—	—	—	—	—
	Selenium	100	µg/L	<10.0	<10.0	<10.0	—	—	—	—	—	—	—	—	—	—	—	—
	Silver	94	µg/L	<1.00	<1.00	<1.00	—	—	—	—	—	—	—	—	—	—	—	—

Notes: ADEC cleanup levels from October 27, 2018 18 AAC 75.345 - Table C *Groundwater Cleanup Levels*.  
 Sample M-101 is a field-duplicate of sample M-1.  
 Sample M-102 is a field-duplicate of sample M-2.  
 Sample M202 is a field-duplicate of sample M2.  
 µg/L micrograms per liter  
 < Analyte not detected; result listed as less than the limit of detection (LOD).  
 J Estimated concentration, detected greater than the LOD and less than the limit of quantitation (LOQ). Flag applied by the laboratory.  
**Bold** Detected result is above the associated ADEC groundwater cleanup level; arsenic concentration less than background concentration established by the EPA.  
 — Analyte not requested.  
 Arsenic background concentrations from EPA 1995 > 1000 µg/L



1 Mile  


Grant Mine Groundwater Quality Assessment  
 Ester Dome, Alaska

**SITE LOCATION**

October 2021

31-1-20094

 **SHANNON & WILSON, INC.**  
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

**Figure 1**



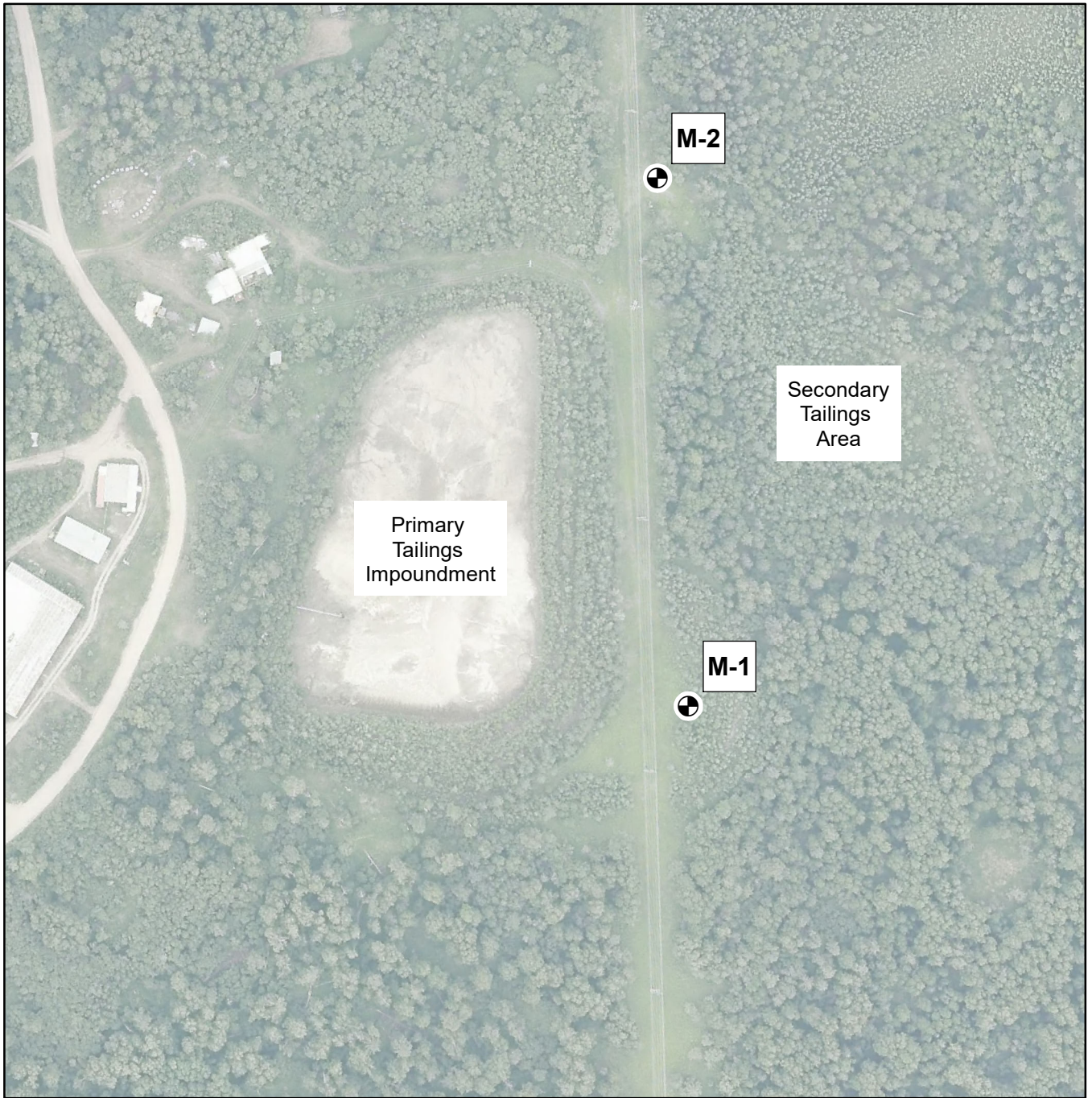
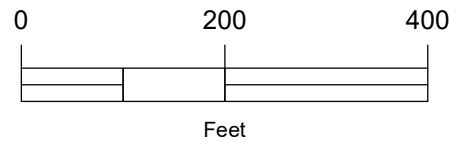


Image provided courtesy of Pictometry International 2012.



**LEGEND**

⊕ Monitoring Well



Grant Mine Groundwater Quality Assessment  
Ester Dome, Alaska

**MONITORING WELL LOCATIONS**

October 2021

31-1-20094

**SHANNON & WILSON, INC.**  
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

**Figure 2**



## ANALYTICAL REPORT

Lab Number:	L1949758
Client:	Shannon & Wilson, Inc. 2355 Hill Road Fairbanks, AK 99709
ATTN:	Mark S. Lockwood
Phone:	(907) 479-0600
Project Name:	GRANT MINE
Project Number:	20094
Report Date:	10/30/19

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

---

Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L1949758  
**Report Date:** 10/30/19

<b>Alpha Sample ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Sample Location</b>	<b>Collection Date/Time</b>	<b>Receive Date</b>
L1949758-01	M202	WATER	ESTER DOME, AK	10/17/19 16:23	10/23/19
L1949758-02	M2	WATER	ESTER DOME, AK	10/17/19 16:33	10/23/19
L1949758-03	M1	WATER	ESTER DOME, AK	10/17/19 15:14	10/23/19

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L1949758  
**Report Date:** 10/30/19

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

---

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L1949758  
**Report Date:** 10/30/19


### Case Narrative (continued)

#### Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Caitlin Walukevich

Title: Technical Director/Representative

Date: 10/30/19

# **INORGANICS & MISCELLANEOUS**

Project Name: GRANT MINE

Lab Number: L1949758

Project Number: 20094

Report Date: 10/30/19

## SAMPLE RESULTS

Lab ID: L1949758-01

Date Collected: 10/17/19 16:23

Client ID: M202

Date Received: 10/23/19

Sample Location: ESTER DOME, AK

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Cyanide, Free	ND		ug/l	2.00	0.544	1	10/29/19 16:15	10/29/19 23:16	109,9016	AT



Project Name: GRANT MINE

Lab Number: L1949758

Project Number: 20094

Report Date: 10/30/19

## SAMPLE RESULTS

Lab ID: L1949758-02

Date Collected: 10/17/19 16:33

Client ID: M2

Date Received: 10/23/19

Sample Location: ESTER DOME, AK

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Cyanide, Free	ND		ug/l	2.00	0.544	1	10/29/19 16:15	10/29/19 23:17	109,9016	AT





Project Name: GRANT MINE

Lab Number: L1949758

Project Number: 20094

Report Date: 10/30/19

## SAMPLE RESULTS

Lab ID: L1949758-03

Date Collected: 10/17/19 15:14

Client ID: M1

Date Received: 10/23/19

Sample Location: ESTER DOME, AK

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Cyanide, Free	ND		ug/l	2.00	0.544	1	10/29/19 16:15	10/29/19 23:17	109,9016	AT



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L1949758  
**Report Date:** 10/30/19

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1302055-1									
Cyanide, Free	ND	ug/l	2.00	0.544	1	10/29/19 16:15	10/29/19 23:12	109,9016	AT

## Lab Control Sample Analysis

Batch Quality Control

Project Name: GRANT MINE

Project Number: 20094

Lab Number: L1949758

Report Date: 10/30/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1302055-2								
Cyanide, Free	85		-		75-125	-		

**Matrix Spike Analysis**  
Batch Quality Control

Project Name: GRANT MINE

Lab Number: L1949758

Project Number: 20094

Report Date: 10/30/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Qual	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1302055-3 QC Sample: L1949758-01 Client ID: M202												
Cyanide, Free	ND	50	37.9	76	-	-	-	-	70-130	-	-	20

## Lab Duplicate Analysis

*Batch Quality Control*

Project Name: GRANT MINE

Project Number: 20094

Lab Number: L1949758

Report Date: 10/30/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1302055-4 QC Sample: L1949758-01 Client ID: M202						
Cyanide, Free	ND	ND	ug/l	NC		20

Project Name: GRANT MINE

Project Number: 20094

**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

**Cooler Information****Cooler**                      **Custody Seal**

A                                      Absent

**Container Information**

<b>Container ID</b>	<b>Container Type</b>	<b>Cooler</b>	<b>Initial pH</b>	<b>Final pH</b>	<b>Temp deg C</b>	<b>Pres</b>	<b>Seal</b>	<b>Frozen Date/Time</b>	<b>Analysis(*)</b>
L1949758-01A	Brown Plastic 120ml NaOH preserved	A	>12	>12	4.3	Y	Absent		FCN-9016(14)
L1949758-02A	Brown Plastic 120ml NaOH preserved	A	>12	>12	4.3	Y	Absent		FCN-9016(14)
L1949758-03A	Brown Plastic 120ml NaOH preserved	A	>12	>12	4.3	Y	Absent		FCN-9016(14)

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L1949758  
**Report Date:** 10/30/19

## GLOSSARY

### Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)  Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

### Footnotes

Report Format: DU Report with 'J' Qualifiers



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L1949758  
**Report Date:** 10/30/19

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1.8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

### Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedances are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.

Report Format: DU Report with 'J' Qualifiers





**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L1949758  
**Report Date:** 10/30/19

## REFERENCES

- 109 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Revision 0, June 2010.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



## Certification Information

---

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

**EPA 624/624.1:** m/p-xylene, o-xylene

**EPA 8260C:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

**EPA 8270D:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

**SM 2540D:** TSS

**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.

**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Biological Tissue Matrix:** EPA 3050B

---

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

**EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

**EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**

**EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

**Microbiology: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

#### Non-Potable Water

**SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

**SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.

**EPA 624.1:** Volatile Halocarbons & Aromatics,

**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

**Microbiology: SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

### Mansfield Facility:

#### Drinking Water

**EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.

**EPA 522.**

#### Non-Potable Water

**EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

**EPA 245.1** Hg.

**SM2340B**

---

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



**Laboratory Data Review Checklist**

Completed By:

Ashley Jaramillo

Title:

Chemist

Date:

November 21, 2019

CS Report Name:

Grant Mine

Report Date:

October 30, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

Alpha Analytical

Laboratory Report Number:

L1949758

ADEC File Number:

100.38.182

Hazard Identification Number:

731

1. Laboratory

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

Yes  No

Comments:

Analyses were performed by the Alpha Analytical laboratory in Westborough, MA. The laboratory is NELAP-certified.

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

Comments:

N/A; the samples were not transferred to a “network” laboratory.

2. Chain of Custody (CoC)

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

Yes  No

Comments:

The CoC was not properly relinquished prior to shipment of the samples.

b. Correct Analyses requested?

Yes  No

Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes  No

Comments:

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

Yes  No

Comments:

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

Yes  No

Comments:

The sample receipt documentation notes that the samples arrived in acceptable condition.

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

Yes  No

Comments:

The sample receipt form notes that there were no custody seals present on the sample cooler.

e. Data quality or usability affected?

Comments:

We reviewed the sample shipping documentation to verify that there were no irregularities regarding custody of the samples. The samples were collected by Shannon & Wilson, Inc. personnel on 10/17/2019 and remained in our custody until they were shipped to the analytical laboratory via FedEx Priority Overnight on 10/21/2019. The laboratory received the samples on the morning of 10/23/2019. The samples spent 1 full day in transit, which is the expected duration for the chosen method of shipment. For this reason, we are confident that custody was not breached.

4. Case Narrative

a. Present and understandable?

Yes  No

Comments:

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

Yes  No

Comments:

There are no discrepancies, errors, or QC failures noted in the case narrative.

c. Were all corrective actions documented?

Yes  No

Comments:

No corrective actions were required; see above.

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

Comments:

The case narrative did not note an effect on data quality/usability.

5. Samples Results

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

Yes  No

Comments:

b. All applicable holding times met?

Yes  No

Comments:

c. All soils reported on a dry weight basis?

Yes  No

Comments:

N/A; soil samples were not submitted with this work order.

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

Yes  No

Comments:

e. Data quality or usability affected?

Yes  No

Comments:

6. QC Samples

a. Method Blank

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

Yes  No

Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes  No

Comments:

iii. If above LOQ, what samples are affected?

Comments:

N/A; cyanide was not detected in the method blank sample.

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

Yes  No

Comments:

N/A; see above.

## v. Data quality or usability affected?

Comments:

The data quality and/or usability is not affected; see above.

## 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

Comments:

N/A; organics analyses were not requested for this work order.

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

Yes  No

Comments:

An LCS, matrix spike (MS), and laboratory duplicate were reported for cyanide analysis.

- 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

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/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes  No

Comments:

An LCSD and an MSD were not analyzed with the sample batch. A laboratory duplicate sample was analyzed; however, the results were non-detect, therefore a RPD could not be calculated.

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

Comments:

Analytical accuracy was demonstrated to be within acceptable limits. The analytical precision could not be assessed because cyanide was not detected in the laboratory duplicate sample.

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

Yes  No

Comments:

N/A; the sample results are not affected by analytical accuracy nor precision failures.



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

Comments:

The data quality and/or usability is not affected; see above.

c. Surrogates – Organics Only

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

Yes  No

Comments:

N/A; organics analyses were not requested with this work order.

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

Comments:

N/A; organics were not analyzed.

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

Yes  No

Comments:

N/A; organics were not analyzed.

iv. Data quality or usability affected?

Comments:

The data quality and/or usability is not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

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

Yes  No

Comments:

Volatile analyses were not requested with this work order. A trip blank is therefore not required.

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

Comments:

N/A; volatiles were not analyzed.

iii. All results less than LOQ?

Yes  No

Comments:

N/A; volatiles were not analyzed.

iv. If above LOQ, what samples are affected?

Comments:

None; see above.

v. Data quality or usability affected?

Comments:

The data quality and/or usability is not affected; see above.

e. Field Duplicate

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

Yes  No

Comments:

ii. Submitted blind to lab?

Yes  No

Comments:

The field duplicate sample samples *M-2* and *M-202* were submitted with this work order.

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

Comments:

The RPD for the duplicate pair could not be calculated as both results were non-detect.

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

Comments:

The data quality and/or usability is not affected; see above.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

Yes  No  Not Applicable

Samples were collected with disposable equipment.

i. All results less than LOQ?

Yes  No Comments:

N/A; an equipment blank was not submitted.

ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected?

Comments:

The data quality and/or usability is not affected; see above.

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

a. Defined and appropriate?

Yes  No Comments:

Additional data flags/qualifiers are not required.



## ANALYTICAL REPORT

Lab Number:	L2133246
Client:	Shannon & Wilson, Inc. 2355 Hill Road Fairbanks, AK 99709
ATTN:	Mark S. Lockwood
Phone:	(907) 479-0600
Project Name:	GRANT MINE
Project Number:	20094
Report Date:	07/07/21

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

---

Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2133246  
**Report Date:** 07/07/21

<b>Alpha Sample ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Sample Location</b>	<b>Collection Date/Time</b>	<b>Receive Date</b>
L2133246-01	M1	WATER	FAIRBANKS, AK	06/16/21 11:11	06/18/21
L2133246-02	M101	WATER	FAIRBANKS, AK	06/16/21 11:01	06/18/21
L2133246-03	M2	WATER	FAIRBANKS, AK	06/16/21 12:23	06/18/21

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2133246  
**Report Date:** 07/07/21

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

---

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2133246  
**Report Date:** 07/07/21

### Case Narrative (continued)

#### Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Sebastian Corbin

Title: Technical Director/Representative

Date: 07/07/21

# **INORGANICS & MISCELLANEOUS**



Project Name: GRANT MINE

Lab Number: L2133246

Project Number: 20094

Report Date: 07/07/21

## SAMPLE RESULTS

Lab ID: L2133246-01

Date Collected: 06/16/21 11:11

Client ID: M1

Date Received: 06/18/21

Sample Location: FAIRBANKS, AK

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Cyanide, Free	ND		ug/l	2.00	0.544	1	06/30/21 16:00	06/30/21 22:39	109,9016	AT



Project Name: GRANT MINE

Lab Number: L2133246

Project Number: 20094

Report Date: 07/07/21

## SAMPLE RESULTS

Lab ID: L2133246-02

Date Collected: 06/16/21 11:01

Client ID: M101

Date Received: 06/18/21

Sample Location: FAIRBANKS, AK

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Cyanide, Free	ND		ug/l	2.00	0.544	1	06/30/21 16:00	06/30/21 22:40	109,9016	AT



Project Name: GRANT MINE

Lab Number: L2133246

Project Number: 20094

Report Date: 07/07/21

## SAMPLE RESULTS

Lab ID: L2133246-03

Date Collected: 06/16/21 12:23

Client ID: M2

Date Received: 06/18/21

Sample Location: FAIRBANKS, AK

Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Cyanide, Free	ND		ug/l	2.00	0.544	1	06/30/21 16:00	06/30/21 22:40	109,9016	AT



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2133246  
**Report Date:** 07/07/21

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1519005-1									
Cyanide, Free	ND	ug/l	2.00	0.544	1	06/30/21 16:00	06/30/21 22:35	109,9016	AT

## Lab Control Sample Analysis

Batch Quality Control

Project Name: GRANT MINE

Project Number: 20094

Lab Number: L2133246

Report Date: 07/07/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1519005-2								
Cyanide, Free	87		-		75-125	-		

**Matrix Spike Analysis**  
Batch Quality Control

Project Name: GRANT MINE

Lab Number: L2133246

Project Number: 20094

Report Date: 07/07/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Qual	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1519005-3 QC Sample: L2133246-01 Client ID: M1												
Cyanide, Free	ND	50	38.0	76		-	-		70-130	-		20

## Lab Duplicate Analysis

*Batch Quality Control*

Project Name: GRANT MINE

Project Number: 20094

Lab Number: L2133246

Report Date: 07/07/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1519005-4 QC Sample: L2133246-01 Client ID: M1						
Cyanide, Free	ND	ND	ug/l	NC		20

Project Name: GRANT MINE

Project Number: 20094

**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

**Cooler Information****Cooler**                      **Custody Seal**

A                                      Present/Intact

**Container Information**

<b>Container ID</b>	<b>Container Type</b>	<b>Cooler</b>	<b>Initial pH</b>	<b>Final pH</b>	<b>Temp deg C</b>	<b>Pres</b>	<b>Seal</b>	<b>Frozen Date/Time</b>	<b>Analysis(*)</b>
L2133246-01A	Brown Plastic 120ml NaOH preserved	A	>12	>12	3.7	Y	Present/Intact		FCN-9016(14)
L2133246-02A	Brown Plastic 120ml NaOH preserved	A	>12	>12	3.7	Y	Present/Intact		FCN-9016(14)
L2133246-03A	Brown Plastic 120ml NaOH preserved	A	>12	>12	3.7	Y	Present/Intact		FCN-9016(14)



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2133246  
**Report Date:** 07/07/21

## GLOSSARY

### Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)  Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2133246  
**Report Date:** 07/07/21

#### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

#### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PAH Total:** With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

#### Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2133246  
**Report Date:** 07/07/21

**Data Qualifiers**

- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2133246  
**Report Date:** 07/07/21

## REFERENCES

- 109 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Revision 0, June 2010.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



## Certification Information

---

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

**EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene

**EPA 625/625.1:** alpha-Terpineol

**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

**SM 2540D:** TSS

**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.

**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Biological Tissue Matrix:** EPA 3050B

---

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

**EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

**EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**

**EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

#### Non-Potable Water

**SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

**SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.

**EPA 624.1:** Volatile Halocarbons & Aromatics,

**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

### Mansfield Facility:

#### Drinking Water

**EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

**EPA 522, EPA 537.1.**

#### Non-Potable Water

**EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

**EPA 245.1 Hg.**

**SM2340B**

---

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



# CHAIN OF CUSTODY

PAGE 1 OF 1

8 Walkup Drive  
Westboro, MA 01581  
Tel: 508-898-9220

320 Forbes Blvd  
Mansfield, MA 02048  
Tel: 508-822-9300

Date Rec'd in Lab: 6/18/21

ALPHA Job #: L2133246

## Project Information

Project Name: *Grant Mine*

Project Location: *Fairbanks, AK*

Project #: *20094*

Project Manager: *Mark Lockwood*

ALPHA Quote #: *354957 (Bottle order)*

## Report Information - Data Deliverables

ADEx  EMAIL

## Billing Information

Same as Client info PO #: *20094*

## Client Information

Client: *Shannon & Wilson, Inc.*

Address: *2355 Hill Road*

*Fairbanks, AK 99709*

Phone: *907-458-3149*

Email: *alt@shanwil.com*

## Regulatory Requirements & Project Information Requirements

Yes  No MA MCP Analytical Methods  Yes  No CT RCP Analytical Methods  
 Yes  No Matrix Spike Required on this SDG? (Required for MCP Inorganics)  
 Yes  No GW1 Standards (Info Required for Metals & EPH with Targets)  
 Yes  No NPDES RGP  
 Other State /Fed Program \_\_\_\_\_ Criteria \_\_\_\_\_

## Turn-Around Time

Standard  RUSH (only confirmed if pre-approved)

Date Due:

## Additional Project Information:

*Report J-flags (detections between RL and MDL).*

ANALYSIS		SAMPLE INFO	TOTAL # BOTTLES
Method	Target		
VOC: <input type="checkbox"/> 8260 <input type="checkbox"/> 624 <input type="checkbox"/> 624.2	<input type="checkbox"/> Field <input type="checkbox"/> Lab to do	Filtration <input type="checkbox"/> Field <input type="checkbox"/> Lab to do	
SVOC: <input type="checkbox"/> ABN <input type="checkbox"/> PAH	Preservation <input type="checkbox"/> Lab to do		
METALS: <input type="checkbox"/> MCP 13 <input type="checkbox"/> MCP 14 <input type="checkbox"/> RCP 15			
EPH: <input type="checkbox"/> RCRA5 <input type="checkbox"/> RCRA8 <input type="checkbox"/> PPT3			
VPH: <input type="checkbox"/> Ranges & Targets <input type="checkbox"/> Ranges Only			
PCB: <input type="checkbox"/> Ranges & Targets <input type="checkbox"/> Ranges Only			
TPH: <input type="checkbox"/> Quant Only <input type="checkbox"/> Fingerprint			
<i>Cyanide EPA 9016</i>			
Sample Comments			

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler Initials								
		Date	Time										
33246-01	<i>M1</i>	<i>6-16-21</i>	<i>11:11</i>	<i>Water</i>	<i>ALF</i>								
02	<i>M101</i>	<i>6-17-21</i>	<i>11:01</i>	<i>L</i>	<i>ALF</i>								
03	<i>M2</i>	<i>6-17-21</i>	<i>12:23</i>	<i>L</i>	<i>ALF</i>								

Container Type	Preservative
P= Plastic	A= None
A= Amber glass	B= HCl
V= Vial	C= HNO <sub>3</sub>
G= Glass	D= H <sub>2</sub> SO <sub>4</sub>
B= Bacteria cup	E= NaOH
C= Cube	F= MeOH
O= Other	G= NaHSO <sub>4</sub>
E= Encore	H= Na <sub>2</sub> S <sub>2</sub> O <sub>5</sub>
D= BOD Bottle	I= Ascorbic Acid
	J= NH <sub>4</sub> Cl
	K= Zn Acetate
	O= Other

Container Type	Preservative
<i>P</i>	<i>E</i>

Relinquished By:	Date/Time	Received By:	Date/Time
<i>Andrew Frost</i>	<i>6-17-21 11:01</i>	<i>C. Telean ALF</i>	<i>6/18/21 1345</i>

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.  
FORM NO: 01-01 (rev. 12-Mar-2012)

**Custody Seal No.**

Date 6-16-21 Job No. 20094  
(Signature) Andrew Feil

# Bottle Order Request

JUN-08-21 13:50:37

Bottle Order # 354957

Page 1 of 1

<b>Acctnum :</b> SHANWIL <b>Contact Name :</b> Drew Frick <b>Projectnum :</b>	<b>Company :</b> Shannon & Wilson, Inc. <b>Client PM :</b>
<b>Request date :</b> 06/08/21 <b>Order taken by :</b> Nathalie Lewis	<b>Status :</b> NEED <b>Sample delivery date :</b> <b>Projected TAT :</b>
<b>Completed by :</b> <b>Date Completed :</b>	<b>Linked Call :</b> <b>Delivery method :</b> UPS to arrive by 6/11

<b>Matrix :</b> WATER <b>Analytes :</b> Free Cyanide by Microdiffusion -EPA 9016	<b># Samples :</b> 5 <b>Client IDs :</b> 1
<b>Container</b> Brown Plastic 120ml NaOH preserved 1 FCN-9016	<b>Quantity</b> Analyte Label

### Bottle Quantity Summary:

Brown Plastic 120ml NaOH preserved 5

Trip Blanks and Miscellaneous Field Blanks:

Special Shipping Requirements		
<input checked="" type="checkbox"/> Dangerous	<input type="checkbox"/> Certified	<input type="checkbox"/> NJ Courier Return Shipping Pickup Label

<b>Pending Shipping Date(s)</b> 06/08/21
---

Ship to arrive by 6/11 to: Drew Frick  
 2355 Hill Road  
 Fairbanks, AK, 99709 (907-458-3149) (OKL)

**If you have questions on this Bottle Order, need to order additional bottles or schedule a Sample Pickup, please call a member of our Alpha team at 508-898-9220.**



**PLEASE PUT SAMPLES ON ICE  
 EXCEPT CANISTER OR BAG SAMPLES**

Link to Alpha Sampling Reference Guide



**Laboratory Data Review Checklist**

Completed By:

Andrew Frick

Title:

Environmental Scientist

Date:

August 17, 2021

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

Alpha Analytical

Laboratory Report Number:

L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

ADEC File Number:

100.38.182

Hazard Identification Number:

731

L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

**Note: Any N/A or No box checked must have an explanation in the comments box.**

1. Laboratory

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

Yes  No  N/A  Comments:

Analyses were performed by the Alpha Analytical laboratory in Westborough, MA. The laboratory is NELAP-certified.

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  N/A  Comments:

The samples were not transferred to a “network” laboratory.

2. Chain of Custody (CoC)

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

Yes  No  N/A  Comments:

b. Correct analyses requested?

Yes  No  N/A  Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes  No  N/A  Comments:

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

Yes  No  N/A  Comments:

L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

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

Yes  No  N/A  Comments:

The sample receipt documentation notes that the samples arrived in acceptable condition.

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

Yes  No  N/A  Comments:

There were no discrepancies.

e. Data quality or usability affected?

Comments:

Data quality/usability was not affected.

4. Case Narrative

a. Present and understandable?

Yes  No  N/A  Comments:

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

Yes  No  N/A  Comments:

There are no discrepancies, errors, or QC failures noted in the case narrative.

c. Were all corrective actions documented?

Yes  No  N/A  Comments:

No corrective actions were required; see above.

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

Comments:

The case narrative did not note an effect on data quality/usability.

L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

5. Samples Results

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

Yes  No  N/A  Comments:

b. All applicable holding times met?

Yes  No  N/A  Comments:

c. All soils reported on a dry weight basis?

Yes  No  N/A  Comments:

N/A; soil samples were not submitted with this work order.

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

Yes  No  N/A  Comments:

e. Data quality or usability affected?

Data quality/usability was not affected.

6. QC Samples

a. Method Blank

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

Yes  No  N/A  Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes  No  N/A  Comments:

L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; cyanide was not detected in the method blank sample.

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

Yes  No  N/A  Comments:

N/A; see above.

v. Data quality or usability affected?

Comments:

Data quality/usability was not affected.

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  N/A  Comments:

N/A; organics were not analyzed.

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

Yes  No  N/A  Comments:

A LCS, MS, and laboratory duplicate laboratory QC samples were reported.

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

Yes  No  N/A  Comments:

L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

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

Yes  No  N/A  Comments:

An LCSD was not analyzed with the sample batch. A laboratory duplicate sample was analyzed; however, the results were non-detect, therefore a RPD could not be calculated.

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

Comments:

Analytical accuracy was demonstrated to be within acceptable limits. The analytical precision could not be assessed because cyanide was not detected in the laboratory duplicate sample.

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

Yes  No  N/A  Comments:

N/A; the sample results are not affected by analytical accuracy nor precision failures.

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

Comments:

No; see above.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

**Note: Leave blank if not required for project**

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes  No  N/A  Comments:

N/A; organics were not analyzed.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes  No  N/A  Comments:

An LCS, MS, and laboratory duplicate laboratory QC samples were reported.

L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes  No  N/A  Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes  No  N/A  Comments:

An MSD was not analyzed with the sample batch. A laboratory duplicate sample was analyzed; however, the results were non-detect, therefore a RPD could not be calculated.

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

Comments:

Analytical accuracy was demonstrated to be within acceptable limits. The analytical precision could not be assessed because cyanide was not detected in the laboratory duplicate sample.

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

Yes  No  N/A  Comments:

N/A; the sample results are not affected by analytical accuracy nor precision failures.

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

Comments:

No; see above.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

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

Yes  No  N/A  Comments:

N/A; organics were not analyzed.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes  No  N/A  Comments:

N/A; organics were not analyzed.

L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

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

Yes  No  N/A  Comments:

N/A; organics were not analyzed.

iv. Data quality or usability affected?

Comments:

No; see above.

e. Trip Blanks

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

Yes  No  N/A  Comments:

Volatile analyses were not requested with this work order. A trip blank is therefore not required.

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  N/A  Comments:

N/A; volatiles were not analyzed.

iii. All results less than LOQ and project specified objectives?

Yes  No  N/A  Comments:

N/A; see above.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

None; see above.

v. Data quality or usability affected?

Comments:

No; see above.



L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

f. Field Duplicate

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

Yes  No  N/A  Comments:

ii. Submitted blind to lab?

Yes  No  N/A  Comments:

The field-duplicate sample pair *M1* and *M101* was submitted with this work order.

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

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

Where  $R_1$  = Sample Concentration  
 $R_2$  = Field Duplicate Concentration

Yes  No  N/A  Comments:

The RPD for the duplicate pair could not be calculated as both results were non-detect.

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

Comments:

Data quality and/or usability was not affected; see above.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes  No  N/A  Comments:

Samples were collected with permanently installed pumps and disposable tubing. Sampling equipment was not reused between sampling locations.

i. All results less than LOQ and project specified objectives?

Yes  No  N/A  Comments:

An equipment sample was not analyzed.

L2133246

Laboratory Report Date:

July 7, 2021

CS Site Name:

Grant Mine Site

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; see above.

iii. Data quality or usability affected?

Comments:

No; see above.

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

a. Defined and appropriate?

Yes  No  N/A  Comments:

There were no other data flags/qualifiers.



## ANALYTICAL REPORT

Lab Number:	L2152928
Client:	Shannon & Wilson, Inc. 2355 Hill Road Fairbanks, AK 99709
ATTN:	Mark S. Lockwood
Phone:	(907) 479-0600
Project Name:	GRANT MINE
Project Number:	20094
Report Date:	10/06/21

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

---

Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

<b>Alpha Sample ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Sample Location</b>	<b>Collection Date/Time</b>	<b>Receive Date</b>
L2152928-01	M1	WATER	FAIRBANKS, AK	09/27/21 11:51	09/29/21
L2152928-02	M101	WATER	FAIRBANKS, AK	09/27/21 11:41	09/29/21
L2152928-03	M2	WATER	FAIRBANKS, AK	09/27/21 13:43	09/29/21

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

---

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

**Case Narrative (continued)**

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Kelly Stenstrom

Title: Technical Director/Representative

Date: 10/06/21

# **INORGANICS & MISCELLANEOUS**

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

**SAMPLE RESULTS**

**Lab ID:** L2152928-01  
**Client ID:** M1  
**Sample Location:** FAIRBANKS, AK

**Date Collected:** 09/27/21 11:51  
**Date Received:** 09/29/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Cyanide, Free	ND		ug/l	2.00	0.544	1	10/05/21 16:00	10/05/21 22:50	109,9016	AT





**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

### SAMPLE RESULTS

**Lab ID:** L2152928-02  
**Client ID:** M101  
**Sample Location:** FAIRBANKS, AK

**Date Collected:** 09/27/21 11:41  
**Date Received:** 09/29/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Cyanide, Free	ND		ug/l	2.00	0.544	1	10/05/21 16:00	10/05/21 22:50	109,9016	AT



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

**SAMPLE RESULTS**

**Lab ID:** L2152928-03  
**Client ID:** M2  
**Sample Location:** FAIRBANKS, AK

**Date Collected:** 09/27/21 13:43  
**Date Received:** 09/29/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Cyanide, Free	ND		ug/l	2.00	0.544	1	10/05/21 16:00	10/05/21 22:52	109,9016	AT



**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1554801-1									
Cyanide, Free	ND	ug/l	2.00	0.544	1	10/05/21 16:00	10/05/21 22:47	109,9016	AT

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1554801-2								
Cyanide, Free	88		-		75-125	-		

**Matrix Spike Analysis**  
Batch Quality Control

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

<b>Parameter</b>	<b>Native Sample</b>	<b>MS Added</b>	<b>MS Found</b>	<b>MS %Recovery</b>	<b>MSD Qual</b>	<b>MSD Found</b>	<b>MSD %Recovery</b>	<b>MSD Qual</b>	<b>Recovery Limits</b>	<b>RPD</b>	<b>RPD Qual</b>	<b>RPD Limits</b>
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1554801-3 QC Sample: L2152928-03 Client ID: M2												
Cyanide, Free	ND	50	39.7	79		-	-		70-130	-		20

**Lab Duplicate Analysis**  
*Batch Quality Control*

Project Name: GRANT MINE

Project Number: 20094

Lab Number: L2152928

Report Date: 10/06/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1554801-4 QC Sample: L2152928-03 Client ID: M2						
Cyanide, Free	ND	ND	ug/l	NC		20

Project Name: GRANT MINE

Project Number: 20094

**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

**Cooler Information****Cooler**                      **Custody Seal**

A                                      Absent

**Container Information**

<b>Container ID</b>	<b>Container Type</b>	<b>Cooler</b>	<b>Initial pH</b>	<b>Final pH</b>	<b>Temp deg C</b>	<b>Pres</b>	<b>Seal</b>	<b>Frozen Date/Time</b>	<b>Analysis(*)</b>
L2152928-01A	Brown Plastic 120ml NaOH preserved	A	>12	>12	5.7	Y	Absent		FCN-9016(14)
L2152928-02A	Brown Plastic 120ml NaOH preserved	A	>12	>12	5.7	Y	Absent		FCN-9016(14)
L2152928-03A	Brown Plastic 120ml NaOH preserved	A	>12	>12	5.7	Y	Absent		FCN-9016(14)

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

## GLOSSARY

### Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)  Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers





**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

#### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

#### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PAH Total:** With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

#### Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers



**Laboratory Data Review Checklist**

Completed By:

Andrew Frick

Title:

Environmental Scientist

Date:

October 21, 2021

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

Alpha Analytical

Laboratory Report Number:

L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

ADEC File Number:

100.38.182

Hazard Identification Number:

731

L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

**Note: Any N/A or No box checked must have an explanation in the comments box.**

1. Laboratory

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

Yes  No  N/A  Comments:

Analyses were performed by the Alpha Analytical laboratory in Westborough, MA. The laboratory is NELAP-certified.

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  N/A  Comments:

The samples were not transferred to a “network” laboratory.

2. Chain of Custody (CoC)

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

Yes  No  N/A  Comments:

b. Correct analyses requested?

Yes  No  N/A  Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes  No  N/A  Comments:

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

Yes  No  N/A  Comments:

L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

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

Yes  No  N/A  Comments:

The sample receipt documentation notes that the samples arrived in acceptable condition.

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

Yes  No  N/A  Comments:

There were no discrepancies.

e. Data quality or usability affected?

Comments:

Data quality/usability was not affected.

4. Case Narrative

a. Present and understandable?

Yes  No  N/A  Comments:

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

Yes  No  N/A  Comments:

There are no discrepancies, errors, or QC failures noted in the case narrative.

c. Were all corrective actions documented?

Yes  No  N/A  Comments:

No corrective actions were required; see above.

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

Comments:

The case narrative did not note an effect on data quality/usability.

L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

5. Samples Results

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

Yes  No  N/A  Comments:

b. All applicable holding times met?

Yes  No  N/A  Comments:

c. All soils reported on a dry weight basis?

Yes  No  N/A  Comments:

N/A; soil samples were not submitted with this work order.

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

Yes  No  N/A  Comments:

e. Data quality or usability affected?

Data quality/usability was not affected.

6. QC Samples

a. Method Blank

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

Yes  No  N/A  Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes  No  N/A  Comments:

L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; cyanide was not detected in the method blank sample.

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

Yes  No  N/A  Comments:

N/A; see above.

v. Data quality or usability affected?

Comments:

Data quality/usability was not affected.

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  N/A  Comments:

N/A; organics were not analyzed.

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

Yes  No  N/A  Comments:

A LCS, MS, and laboratory duplicate laboratory QC samples were reported.

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

Yes  No  N/A  Comments:

L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

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

Yes  No  N/A  Comments:

An LCSD was not analyzed with the sample batch. A laboratory duplicate sample was analyzed; however, the results were non-detect, therefore a RPD could not be calculated.

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

Comments:

Analytical accuracy was demonstrated to be within acceptable limits. The analytical precision could not be assessed because cyanide was not detected in the laboratory duplicate sample.

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

Yes  No  N/A  Comments:

N/A; the sample results are not affected by analytical accuracy nor precision failures.

- vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

No; see above.

- c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

**Note: Leave blank if not required for project**

- i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes  No  N/A  Comments:

N/A; organics were not analyzed.

- ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes  No  N/A  Comments:

An LCS, MS, and laboratory duplicate laboratory QC samples were reported.

L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes  No  N/A  Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes  No  N/A  Comments:

An MSD was not analyzed with the sample batch. A laboratory duplicate sample was analyzed; however, the results were non-detect, therefore a RPD could not be calculated.

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

Comments:

Analytical accuracy was demonstrated to be within acceptable limits. The analytical precision could not be assessed because cyanide was not detected in the laboratory duplicate sample.

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

Yes  No  N/A  Comments:

N/A; the sample results are not affected by analytical accuracy nor precision failures.

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

Comments:

No; see above.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

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

Yes  No  N/A  Comments:

N/A; organics were not analyzed.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes  No  N/A  Comments:

N/A; organics were not analyzed.



L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

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

Yes  No  N/A  Comments:

N/A; organics were not analyzed.

iv. Data quality or usability affected?

Comments:

No; see above.

e. Trip Blanks

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

Yes  No  N/A  Comments:

Volatile analyses were not requested with this work order. A trip blank is therefore not required.

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  N/A  Comments:

N/A; volatiles were not analyzed.

iii. All results less than LOQ and project specified objectives?

Yes  No  N/A  Comments:

N/A; see above.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

None; see above.

v. Data quality or usability affected?

Comments:

No; see above.

L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

f. Field Duplicate

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

Yes  No  N/A  Comments:

ii. Submitted blind to lab?

Yes  No  N/A  Comments:

The field-duplicate sample pair *M1* and *M101* was submitted with this work order.

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

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

Where  $R_1$  = Sample Concentration  
 $R_2$  = Field Duplicate Concentration

Yes  No  N/A  Comments:

The RPD for the duplicate pair could not be calculated as both results were non-detect.

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

Comments:

Data quality and/or usability was not affected; see above.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes  No  N/A  Comments:

Samples were collected with permanently installed pumps and disposable tubing. Sampling equipment was not reused between sampling locations.

i. All results less than LOQ and project specified objectives?

Yes  No  N/A  Comments:

An equipment sample was not analyzed.

L2152928

Laboratory Report Date:

October 6, 2021

CS Site Name:

Grant Mine Site

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; see above.

iii. Data quality or usability affected?

Comments:

No; see above.

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

a. Defined and appropriate?

Yes  No  N/A  Comments:

There were no other data flags/qualifiers.

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

**Data Qualifiers**

- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

**Project Name:** GRANT MINE  
**Project Number:** 20094

**Lab Number:** L2152928  
**Report Date:** 10/06/21

## REFERENCES

- 109 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Revision 0, June 2010.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



## Certification Information

---

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

**EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene

**EPA 625/625.1:** alpha-Terpineol

**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

**SM 2540D:** TSS

**EPA 8082A:** NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Biological Tissue Matrix:** EPA 3050B

---

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

**EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

**EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**

**EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

#### Non-Potable Water

**SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

**SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.

**EPA 624.1:** Volatile Halocarbons & Aromatics,

**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

### Mansfield Facility:

#### Drinking Water

**EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

**EPA 522, EPA 537.1.**

#### Non-Potable Water

**EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

**EPA 245.1 Hg.**

**SM2340B**

---

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



8 Walkup Drive  
Westboro, MA 01581  
Tel: 508-898-9220

320 Forbes Blvd  
Mansfield, MA 02048  
Tel: 508-822-9300

# CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 9/29/21

ALPHA Job #: L2152928

## Project Information

Project Name: Grant Mine

Project Location: Fairbanks, AK

Project #: 20094

Project Manager: Mark Lockwood

ALPHA Quote #:

## Turn-Around Time

Standard  RUSH (only confirmed if pre-approved)

Date Due:

## Report Information - Data Deliverables

ADEx  EMAIL

## Billing Information

Same as Client info PO #: 20094

## Client Information

Client: Shannon & Wilson, Inc

Address: 2355 Hill Rd

Fairbanks, AK 99709

Phone: 907-458-3142

Email: msl@shanwil.com

## Additional Project Information:

Report J-Flags (detections between RL+MDL)

## Regulatory Requirements & Project Information Requirements

Yes  No MA MCP Analytical Methods  Yes  No CT RCP Analytical Methods  
 Yes  No Matrix Spike Required on this SDG? (Required for MCP Inorganics)  
 Yes  No GW1 Standards (Info Required for Metals & EPH with Targets)  
 Yes  No NPDES RGP  
 Other State /Fed Program \_\_\_\_\_ Criteria \_\_\_\_\_

ANALYSIS	VOC: <input type="checkbox"/> 8260 <input type="checkbox"/> 624 <input type="checkbox"/> 524.2	SAMPLE INFO	
	SVOC: <input type="checkbox"/> ABN <input type="checkbox"/> PAH		Filtration
	METALS: <input type="checkbox"/> MCP 13 <input type="checkbox"/> MCP 14 <input type="checkbox"/> RCP 15		<input type="checkbox"/> Field
	METALS: <input type="checkbox"/> RCRA5 <input type="checkbox"/> RCRA8		<input type="checkbox"/> Lab to do
	EPH: <input type="checkbox"/> Ranges & Targets <input type="checkbox"/> Ranges Only		Preservation
	VPH: <input type="checkbox"/> Ranges & Targets <input type="checkbox"/> Ranges Only		<input type="checkbox"/> Lab to do
	PCB <input type="checkbox"/> PEST		
	TPH: <input type="checkbox"/> Quant Only <input type="checkbox"/> Fingerprint		

Cyanide EPA 9016

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler Initials
		Date	Time		
J2928-01	M1	9-27-21	11:51	Water	ALF
-02	M101	9	11:41	9	ALF
-03	M2	9	13:43	9	ALF

**Container Type**  
P= Plastic  
A= Amber glass  
V= Vial  
G= Glass  
B= Bacteria cup  
C= Cube  
O= Other  
E= Encore  
D= BOD Bottle

**Preservative**  
A= None  
B= HCl  
C= HNO<sub>3</sub>  
D= H<sub>2</sub>SO<sub>4</sub>  
E= NaOH  
F= MeOH  
G= NaHSO<sub>4</sub>  
H= Na<sub>2</sub>S<sub>2</sub>O<sub>5</sub>  
I= Ascorbic Acid  
J= NH<sub>4</sub>Cl  
K= Zn Acetate  
O= Other

Container Type	P
Preservative	E

Relinquished By:	Date/Time	Received By:	Date/Time
Andrew Frisk	9-28-21 11:15	William McE	9/29/21 11:15

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.  
FORM NO: 01-01 (rev. 12-Mar-2012)

ORIGIN ID:FAIA (907) 322-9169  
ANDREW FRICK  
SHANNON & WILSON  
2355 HILL RD

SHIP DATE: 28SEP21  
ACTWGT: 8.45 LB  
CAD: 6994066/55FE2220  
DIMS: 13x9x9 IN

FAIRBANKS, AK 99709  
UNITED STATES US

BILL THIRD PARTY

Part # 156297-2034-FRICK-WILSON 07/22

TO

**ALPHA ANALYTICAL  
8 WALKUP DR**

**WESTBOROUGH MA 01581**

(508) 898-9220  
TNU:  
PO:

REF: PO 20094

DEPT:



**FedEx  
Express**



AN1006/01/08/14/27

**WED - 29 SEP 10:30A  
PRIORITY OVERNIGHT**

TRK# 2842 9882 8464  
0201

**NB BBFA**

**01581  
MA-US BOS**





## Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

#### A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

#### THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

#### BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

#### READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

**The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland**